BELL BAY

# pulp mill project

# RESPONSE TO SUBMISSIONS

under the

*Environment Protection and Biodiversity Conservation Act 1999*

July 2007

Gunns Limited

# Non-Technical Response

***Introduction***

A total of 280 public submissions were received and 279 considered (one was withdrawn) in response to the Preliminary Documentation for the proposed Bell Bay Pulp Mill. These submissions addressed a wide range of issues.

A feature of the submissions was the challenge faced by submitters to develop an understanding of the quantity of proposed emissions from the Project and the environmental and health risks that those emissions might pose.

Gunns provides this Non-Technical Response to address this challenge. Full technical and scientific responses follow in the remainder of this document.

Many of the issues responded to in this document fall outside the scope of the relevant controlling provisions for the project under the EPBC Act. Nevertheless, responses are provided to all significant issues raised in the submissions to record Gunns' consideration of the wide variety of concerns expressed by submitters, and to establish an overall project context within which the project can be assessed under the EPBC Act.

***Potential economic benefits from the project***

The proposed mill represents a significant opportunity for Tasmania's economy to grow through value adding to one of its most valuable and renewable natural resources.

Detailed economic modelling has concluded that the mill would yield substantial positive benefits to Tasmania, and Australia as a whole, through greater economic activity and employment. Tasmania's gross state product (GSP) would be $6.7 billion higher in net present value terms over the project life, with over 1600 additional jobs sustained on average while the mill operates.

The value adding that the pulp mill will provide is consistent with the Tasmanian and Australian governments' strategy of increased value adding to Australia's forest products. Australia's balance of trade deficit in forest and wood products is approximately $2 billion per annum. The Bell Bay Pulp Mill has the potential to reduce this balance of trade deficit by $400 to $450 million each year (20 to 25%).

***Greenhouse gas reductions***

With the pulp mill commencing operations greenhouse gas emissions will be reduced by approximately a net 1.3 million tonnes $CO_2$-equivalent per annum. This is primarily because:

- Pulp shipments will replace pulpwood shipments at a ratio of approximately 1 pulp shipment for every 4 pulpwood shipments made previously;
- The mill's additional electrical energy that will be generated and supplied into the national grid will replace energy produced predominately from fossil fuels; and
- The forestry resource supplying the mill will be harvested under a sustainable regime and so the greenhouse gas impact of processing forest resource will be neutral.

Gunns is also investigating the possibility of converting the log transport trucks that will service the mill from diesel to Liquid Natural Gas (LNG) fuel. Gunns could manufacture LNG from the natural gas that will be available on site, using power from the excess of electricity that the mill will generate. This would result in a reduction in the usage of 27 million litres of diesel fuel per year. This would provide additional greenhouse gas savings to those noted above.

LNG sourced from the production facility at the pulp mill could also be supplied to other transport operators within the state, and some could be converted to Compressed Natural Gas (CNG) for use by major bus fleets, for example.

***Source of wood supply***

Gunns' motivation in seeking to bring this project to Tasmania is that it wishes to continue to invest in the future of this state through value adding to its renewable, sustainable forest resource. The project is based on diverting woodchips that are currently being exported to the pulp mill for value added processing. It involves no additional forest harvesting or intensification of forestry operations.

Wood is one of few renewable resources consumed by society today. Managed properly, it provides a unique opportunity to ensure that future generations can continue to benefit from both forest products and forests within the natural environment as we do today. Forestry is about achieving a sustainable balance between forest production, social benefits, and the environment to ensure that future generations have this opportunity.

Gunns has made a clear commitment that no timber from old growth forests (as defined by the Regional Forest Agreement) will be used as feedstock for the pulp mill. This relates to both log supply for pulp production and biofuel supply for the power boiler.

Wood supply for the pulp mill will come from a combination of regrowth and mixed-age native forests, and pine and eucalypt plantations. Gunns plans to supply the mill with 80% of plantation timber within approximately five years of commencing operation. While having a reliance on native forests in the initial stages of the project, the project clearly is plantation based over its life cycle.

***Emission limit guidelines***

With one exception, atmospheric and liquid emissions from the pulp mill can readily comply with all the *Environmental Emission Limit Guidelines for any New Bleached Kraft Pulp Mill in Tasmania* (Emission Limit Guidelines).

The exception relates to in-stack $NO_x$ emissions from the lime kiln. Gunns has a preference to use natural gas to fire its lime kiln, as it believes this will deliver a much better overall environmental outcome. However, gas firing will produce more $NO_x$ emissions than oil firing. The in-stack limit for $NO_x$ in the Emission Limit Guidelines was based on oil firing, and is less than could be achieved by gas firing.

Gunns has therefore put forward a recommendation that the Emission Limit Guidelines' in-stack limit for $NO_x$ be relaxed slightly to allow gas to be used. Specifically Gunns seeks that the limit be increased from 1.3 kgs of $NO_2$ per ADt of pulp produced to 1.5 kgs of $NO_2$ per ADt. The limit proposed by Gunns is in line with that published recently by the World Bank in its draft guidelines for pulp and paper mills. This will lead to lower

environmental impacts. If the limit were not relaxed, oil firing would be necessary, causing greater impacts due to greater $SO_x$ emissions.

The Emission Limit Guidelines also recommend $NO_x$ limits in the ambient air surrounding the pulp mill and beyond. Setting in-stack limits is a means to help achieve this goal. If the ambient goal can be met notwithstanding the exceedance of the in-stack limit, that exceedance has no significant environmental consequence. The ambient Emission Limit Guidelines for $NO_x$ will be met if the lime kiln is fired by natural gas, as they will be for all other parameters.

***Choice of bleaching process***

The Elemental Free Chlorine (ECF) bleaching method proposed for the pulp mill satisfies all relevant environmental guidelines, including those of the RPDC, the United Nations Environment Program and the World Bank.

The World Bank guidelines identify ECF as a prerequisite for certain types of pulp, which in practice is high quality pulp required, for example, for printing and writing purposes. This is the type of pulp that will be produced by the Bell Bay Pulp Mill.

The World Bank's recently released (15 June 2007) draft *Environmental, Health, and Safety Guidelines – Pulp and Paper Mills* confirm that to avoid significant production of dioxins and furans, pulp mills should: "*Replace elemental chlorine bleaching with elemental chlorine free (ECF) bleaching or total chlorine free (TCF) bleaching*", which is what the Bell Bay Pulp Mill design does.

These guidelines further state that although dioxins and furans "*are an important issue when elemental chlorine is used for bleaching*" the levels discharged are "*below the level of scientific significance when ECF or TCF bleaching technologies are used*".

The World Bank's guidelines therefore confirm that the choice of bleaching technology adopted for the Bell Bay Pulp Mill will lead to dioxin and furan emissions being below the level of ecological concern.

***Closed loop processing (involving the recyclying of water streams)***

The Bell Bay Pulp Mill will use a bleached kraft pulping process. No kraft process mills in the world use a closed loop technology.

However, the Bell Bay Pulp Mill design incorporates low water usage and tightly closed process circuits that are Accepted Modern Technologies (AMT) as defined by the Emission Limit Guidelines. These will result in effluent volumes per tonne of pulp production being among the lowest in the bleached kraft pulp industry in the world.

The Bell Bay Pulp Mill will partially recycle its bleach plant effluent. Alkaline effluent can and will be recycled. Acidic effluent cannot be recycled. A completely closed bleaching loop is not possible.

The mill design incorporates recycling of the alkaline effluent from the bleach plant to brown stock washing, a feature that has not been common in ECF mills to date. This recycling will be made possible by using a chloride and potassium removal system to purge these non-process elements from the recovery cycle.

Recycling of the acidic effluent from the bleach plant to brown stock washing is not practical due to increased corrosion and scaling in the fibreline and recovery circuit equipment, reduction of recovery boiler capacity, availability and efficiency, increased consumption of chemicals, and variable pulp quality.

The proposed Bell Bay Pulp Mill's bleach plant recycling of alkaline but not acidic effluent represents best available technology.

Complete bleach loop closure would not be possible in a total chlorine free (TCF) plant either. This is discussed in the Beca AMEC report prepared for the RPDC. Beca AMEC noted that both ECF and TCF bleaching closure can cause operating difficulties, with increased chemical consumption, poorer pulp quality and deposition and scaling on equipment.

***Chemical plant***
Gunns has selected an integrated chemical plant design for the manufacture of chlorine dioxide on site. The other alternative is the non-integrated method, which uses sulphuric acid and methanol, or hydrogen peroxide. In both alternatives sodium chlorate will be required as an intermediary step. Both alternatives will produce chlorine dioxide with a similarly minute elemental chlorine content.

An integrated chemical plant requires the lowest volumes of imported chemicals to the site and minimises social and environmental risks associated with the handling and transport of chemicals.

Although low-chlorine integrated chemical plants are a relatively new development in pulp mill design, they have a proven record in the drinking water treatment industry. That industry's experience confirms that an integrated plant can produce a purity of chlorine dioxide on an active chlorine basis of 99.6 to 99.9% and a residual chlorine concentration of 0.03 to 0.1 g/L solution, which is equivalent to that produced by a non-integrated chemical plant.

***Emission of dioxins and furans***
The mill's dioxin and furan emissions will meet the Emission Limit Guidelines.

Dioxins and furans can be formed whenever elemental chlorine comes into contact with organic matter as it is being burnt. In everyday life, they can form in bush fires, wood heaters, incineration of waste, petrol and diesel combustion in cars, and cigarette smoke, for example. They are also formed during the manufacture of cement, certain chlorinated chemicals used in plastics, medicine and agriculture, in the generation of electricity where fossil fuels are burnt, and in the production and recycling of many metals.

Dioxin and furan formation and destruction controls will purposefully be part of the management strategy of the proposed mill. The greatest sources of dioxins, the general combustion of organic matter in bushfires, incineration and domestic fuels do not have any dioxin controls.

Everyday activities by and on behalf of all members of the community therefore produce and release dioxins and furans. They are present throughout our environment, as a matter of course.

In pulp mills, dioxins and furans can be formed if elemental chlorine is used in the bleaching process. For this reason, the Bell Bay Pulp Mill will not use elemental chlorine – it is an elemental chlorine free (ECF) process. The bleaching agent (predominately chlorine dioxide) is 99.6 to 99.8% free of elemental chlorine. The small amount (0.2 to 0.4%) of elemental chlorine that is present only forms due to incidental side reactions during the manufacture of chlorine dioxide. This minuscule amount of chlorine reacts with a variety of substances in wood in preference to forming dioxins and furans so with the use of chlorine dioxide as a bleaching agent dioxin formation is virtually eliminated.

The World Bank's 2007 draft pulp mill guidelines confirm that by not using elemental chlorine, the formation of dioxins and furans is reduced to minute amounts (expressed as dioxin equivalents) "*below the level of scientific significance*".

While the mill will discharge an average of approximately 24 thousand million litres (24 GL) of treated effluent to Bass Strait each year, the total amount of dioxin and furans discharged with it each year is estimated to be only 0.074 grams.

The total amount of dioxins and furans that might enter the environment each year through possible leakage from the solid waste landfill is estimated to be only 0.00000002 grams.

The total amount of dioxins and furans discharged each year in gaseous emissions from the mill is estimated to be 0.037 grams.

The mill will therefore discharge a combined total of only 0.111 grams of dioxins and furans in liquid and gaseous emissions each year. The volume that this yearly total of 0.111 grams of dioxins and furans would occupy is approximately 0.06 cubic centimetres. Over 30 years, the total volume would be 1.8 cubic centimetres.

The total yearly emissions of dioxins and furans to air and water from the mill will therefore be approximately equal to the volume of a single grain of rice.

Over the life of the mill, the total volume of dioxins and furans emitted to air and water will be approximately equal to the volume of a small marble.

This minute amount is testimony to the effectiveness of the technology chosen by Gunns and the pollution controls that will be used by the mill.

As an everyday comparison, woodheaters in the Greater Launceston area are estimated to currently emit a total of 0.883 g of dioxin equivalents into the atmosphere each year. This is 24 times more dioxins and furans than the pulp mill will emit to the atmosphere in a year. Looking at the combined contributions from wood heaters and the pulp mill, woodheaters would represent 96% of the dioxins and furans emissions to the atmosphere and the pulp mill's contribution would be only 4%.

The likely concentration of dioxins and furans in the pulp mill liquid effluent is estimated to be 3.4 pg dioxin equivalents per litre. The Emission Limit Guideline is 13 pg dioxin equivalents per litre (for dioxin 10 pg per litre plus furan 30 pg per litre which has a dioxin equivalent of 0.1, i.e. 3 dioxin equivalents).

The 3.4 pg per litre expected concentration in effluent is the equivalent to the concentration of salt after one salt grain has been put in a volume of water occupying 70 Olympic sized swimming pools.

The effluent dioxin concentrations can be compared with everyday public exposure to dioxins and furans. The United States Environment Protection Authority's (USEPA) limit for the concentration of dioxins and furans in drinking water, for example, is 30 pg dioxin equivalents per litre. As another example, the average concentration of dioxins and furans in human breast milk in Australia is approximately 340 pg TEQ of dioxins and furans per litre.

Hence, the concentration of dioxins and furans in the undiluted effluent is approximately 10 times lower than their USEPA limit for drinking water and approximately 100 times lower than their concentration in human breast milk.

There is no credible human, animal or plant health risk from coming into contact with this effluent.

The likely concentrations of dioxins and furans in the pulp mill gaseous emissions from the recovery boiler, lime kiln and power boiler are 4.2, 3.9 and 14 pg dioxin equivalents per cubic metre respectively, all well below their corresponding Emission Limit Guideline values of 100, 100 and 140 pg per cubic metre respectively.

As with the effluent, there is no credible human, animal or plant health risk from coming into contact with these gaseous missions.

***Effluent dispersion in Bass Strait***

The maximum dilution required to reduce all effluent pollutants to satisfy the Emission Limit Guidelines for the protection of marine life is 670 times.

While the mixing zone to achieve this dilution will not be circular, its predicted area is equivalent to a circle with a radius of 280 m. The Tasmanian Department of Tourism, Arts and the Environment has set an interim mixing zone approximately twice this radius.

For the purpose of the impact assessment, a very conservative dilution factor of only 100 times was used. This would be achieved within 70 to 100 m of the outfall point. Even though dilution factors would increase exponentially with greater distance from the discharge, the impact assessment assumed no further dilution.

In reality, dilution rates will increase enormously with distance from the outfall. If effluent from the outfall reaches the mouth of the Tamar River or the nearest commercial fishing area, for example, it will have been diluted more than 10,000 times. Concentrations in those locations would therefore be 100 times lower than those used for the impact assessment.

Dispersion of the effluent will lead to massive dilutions throughout Bass Strait.

The whole of Bass Strait takes approximately 6 months to flush but a 6-month flushing time does not denote poor dispersion. Large bodies of water take a long time to flush. The volume of Bass Strait is 350,000 times more than the total volume of pulp mill effluent that will be discharged into it over any 6-month period.

***Accumulation of dioxins and furans in marine life***

A submission claimed that errors were made in calculations of the likely accumulation of dioxins and furans in fish, and that the resulting concentrations in fish would be far in excess of the limits set for human consumption, causing distressing impacts on the environment, human health and economic viability of fishing industries.

The claims in the submission were based on alternative calculation methodology. The assumptions, approach and compounding conservatism of those alternative calculations lead to conclusions that are at odds with reality.

The submission's alternative methodology predicts a ratio of dioxin concentration in fish to dioxin load in the environment that is between 40 and 1100 times higher that the actual ratios measured at various mill discharges around the world. The alternative methodology therefore performs very badly when judged against actual observations, and cannot be relied upon to make predictive assessments about potential environmental impacts.

The submission's assertion made using that alternative methodology about the Bell Bay Pulp Mill causing levels in fish to exceed health limits therefore has no validity.

Using the appropriate methodology, the estimated concentration of dioxins and furans in fish is approximately 70 pg/kg (dioxin equivalents), which is well below the NSW Food Authority limit of 6,000 pg/kg. The estimated concentration of dioxins and furans in fish living within 100 m of the Bell Bay Pulp Mill outfall is therefore over 80 times lower than the food health limit. Concentrations in fish living further away will be even lower.

***Stack height***

The proposed 130 m height for the Bell Bay Pulp Mill stack is shorter than the 215 m (two and a half times the recovery boiler building) height suggested by the USEPA *Good Engineering Practice Guidelines for Stack Height*. The Good Engineering Practice Guidelines are adopted in the Emission Limit Guidelines.

However, the USEPA guideline height is a very simplistic engineering "rule of thumb" dating back two decades to guide design in the absence of sophisticated mathematical dispersion modelling. Where such modelling is available and demonstrates that lower stack heights are environmentally acceptable, that rule of thumb does not apply. This is the case for the Bell Bay Pulp Mill.

The Good Engineering Practice Guidelines address building downwash, which results from the interaction of plumes with the turbulent flow around buildings. This can increase ground level concentrations of pollutants. Modern dispersion models, such as those used to assess the atmospheric emissions from the Bell Bay Pulp Mill, include algorithms that incorporate these building effects. The use of a dispersion model is a far more sophisticated approach than simply relying on the "rule of thumb".

***Emissions of particulates***
The Bell Bay Pulp Mill's particulate emissions will meet the Emission Limit Guidelines.

The mill's particulate emission controls will be very effective and capture approximately 99.87% of particulates generated by the mill.

The very small quantity of residual particulates that escape from the stack will add to the existing background level of particulates in the Tamar Valley air shed. The greatest concentration of background particulates in the air shed occurs in the Launceston area, primarily as a result of the use of wood heaters

An assessment has been undertaken using sophisticated numerical modelling (using CSIRO's Air Pollution Model) of the atmospheric dispersion of the mill's particulates into the airshed of the Tamar Valley. The modelling took account of important features of the atmosphere such as temperature inversions, valley drainage flows and seabreezes.

The significance of the contribution of the mill's emissions to the Tamar Valley air quality can be judged by the resultant increase in the concentration of particulates relative to the existing background level in Launceston and relative to health limits.

The National Environment Protection Measure (NEPM) limit for particulates is 50 micrograms per cubic metre (over a 24 hour averaging period). This limit can be exceeded for up to five times per year.

The modelling has shown that:

- On 42% of days in a year, the mill will contribute less than 0.05 micrograms per cubic metre in Launceston. This is only 0.1% of the NEPM limit;
- On only 0.3% of days in a year will the contribution be greater than 1 microgram per cubic metre. This is still only 2% of the NEPM limit; and
- On all remaining days in the year, the mill will contribute less than 0.5 micrograms per cubic metre. This is only 1% of the NEPM limit.

The maximum contribution of the mill to the particulate load in Launceston air is therefore no greater than 2% of the NEPM limit.

This means that if the 50 microgram per cubic metre NEPM limit is reached in Launceston, at least 98% of the responsibility for this will come from sources other than the pulp mill. Launceston's air quality exceeded this limit on 13 days during 2005 and 10 days during 2004.

These exceedances are largely due to the fact that Launceston's air quality is most degraded during temperature inversions, which typically occur in stable atmospheric condition with light, down-valley winds. The main stack is of a sufficient height to ensure emissions are discharged above the inversion layer. As a result, the mill's contribution to airborne particulate concentrations in Launceston is negligible.

***Emissions of odours***

The processes and chemical reactions used in pulp mills can produce malodorous (unpleasant odours) emissions, particularly from sulphides.

The total reduced sulphides (TRS) emissions from the pulp mill will meet the Emission Limit Guidelines, which have been set so that the mill will not cause odour annoyance to its neighbours.

Sulphide odours are generated primarily at particular points in the process, called “point sources”, but small amounts may also be emitted from other sources (for example, from the surface of a pond) in which case they are called “diffuse” or “fugitive” emissions.

The mill design specifically collects all point source malodorous gases and destroys them before they can emerge to the atmosphere.

Diffuse emissions are reduced to the maximum extent practicable by implementing best available techniques for the capture and destruction of gases.

The greatest risk of malodorous emissions from pulp mills comes from breakdowns in the point source odour controls. Old mills often caused odour emissions because they had no or only one odour destruction system. To avoid this problem, modern pulp mills typically use a backup system to maintain the odour destruction controls in the event of the primary control failing.

The Bell Bay Pulp Mill will be the first mill in the world to use not only one but two levels of backup, thereby reducing odour risks to an international best practice benchmark.

Odour risks can be described statistically as the likelihood of odour destruction being unavailable due to breakdowns, and therefore of an odour event occurring.

Malodorous gases are of two types, concentrated and dilute, and these are destroyed by separate systems.

In a typical modern pulp mill, using a two-tier destruction system for concentrated gas, the statistical unavailability of the destruction system amounts to approximately 2-3 failures each of 15 minutes per year. The introduction of a third tier for the Bell Bay Pulp Mill reduces this period to only about 30 seconds per year.

This means that the statistically expected release of malodourous concentrated gas is limited to only 30 seconds per year.

In a typical modern pulp mill using a one-tier destruction system for dilute gas the statistical unavailability amounts to approximately one day per month. The introduction of a second and a third tier reduces this period to about 30 minutes per year.

This means that the statistically expected release of malodourous dilute gas is limited to only 30 minutes per year.

The Bell Bay Pulp Mill’s odour controls will be better than any other mill in the world, and the likelihood of unpleasant odour events occurring is extremely low.

***Water extraction from Lake Trevallyn***
The Bell Bay Pulp Mill will require a design volume of 26 GL per year of raw water, and this will be extracted from Lake Trevallyn and conveyed to the pulp mill via a water supply pipeline.

This 26 GL represents approximately 1% of the average yearly flow into the Tamar Estuary.

In a dry month, such as at the end of a summer season, the pulp mill requirement would represent an estimated 3 to 4% of the flow into the Tamar estuary.

Environmental flows in Cataract Gorge will be maintained at all times, and will not be compromised by the pulp mill's water extraction from Lake Trevallyn. Similarly, drinking water supply requirements for Esk Water will take precedence over supply to the pulp mill.

***Log truck traffic***
The proposed mill is a downstream processing venture to add value to a significant portion of the pulpwood already being harvested and transported to processing facilities within the state.

The impact of the pulp mill on road traffic overall will therefore not be significant as 85% of the pulpwood the mill will process is available from the north east of the state and within a reasonable haul distance. This resource currently supplies the existing Gunns woodchip facilities. Indeed, if Gunns' preferred strategy to utilise rail, where practicable, is progressed there will be a reduction in log truck activity and a corresponding benefit to the community.

***Impacts of the mill on tourism and the wine industry***
Concerns have been raised about the potential for the mill to impact on tourism and the wine industry in the Tamar Valley.

The mill will be located within the IN3 (Bell Bay Major Industrial) Zone. This zone has been established for several decades, and was formally reflected in the George Town Planning Scheme in 1991. The zone's origins go back to the Comalco aluminium smelter's construction in the mid-1950's. The boundaries of the zone encompass the original land title owned by the smelter, and the pulp mill will be built on land still owned by Comalco (now Rio Tinto Bell Bay).

The intent of the Bell Bay Major Industrial Zone as described in the George Town Planning Scheme includes:

> *The Bell Bay Major Industrial Zone represents a unique opportunity to identify and make available land suitable for the expansion of industrial use and development at Bell Bay and its consolidation as one of the principal industrial estates in the State….The intent of this zone is to promote the use of the area as a strategic location and clear focus for the establishment of major industries for value added resource processing and requiring the locational advantages the site has to offer.*

The development of a pulp mill on land expressly zoned for heavy industry is consistent with the intent and objectives of the George Town Planning Scheme, the purpose of which is to guide the development of land for many and varied purposes within the municipality, including heavy industry and including tourism and wine making.

The development of the tourism and wine industry within the region has occurred in full awareness of the planning scheme and its encouragement of heavy industry within the Bell Bay Major Industrial Zone, and in full awareness of the heavy industry that already exists within that zone. These industries include two wood chip mills, a power station, an aluminium smelter, an aluminium powder plant, a ferro-alloy smelter, wood processors, a municipal sewage treatment plant, a municipal landfill, an electricity substation and the Port of Launceston. Indeed, the pulp mill will be located between a wood chip mill to its immediate south and a power station to its immediate north.

The tourism and wine making industries can continue to develop and prosper as they have done to date amongst the variety of land use, including heavy industry, that occurs within the region in accordance with the strategic guidance of the George Town Planning Scheme. Gunns itself has significant investments in the wine and tourism industry in the Tamar Valley, and is an integral part of these industries.

The growth in the number of employed persons in Tasmania as a result of the proposed mill (modelled to be a 2% increase in the operating phase of the mill) would result in greater recreational activity and expenditure being undertaken in Tasmania, which is likely to create a positive rather than a negative impact on the tourism industry.

The environmental impact assessments undertaken for the Bell Bay Pulp Mill against the Emission Limit Guidelines have demonstrated that there will be no significant impacts from the mill on the air or marine environments, and this means that there would be no significant impacts on other industries reliant on those environments.