

**Recommendation Report prepared for EPBC Project 2007/3385 under Section 95C
of the *Environment Protection and Conservation Biodiversity Act 1999*
August 2007**

Gunns Pulp Paper Mill

Recommendation

That the proposed kraft pulp mill at Bell Bay, Tasmania, EPBC 2007/3385, be approved subject to the following conditions:

Condition	Relevant paragraph in Report
General	
1. The proposed works shall be as per the site maps at Attachment 1.	
Listed terrestrial flora and fauna	
2. To minimise impacts on the Wedge-tailed Eagle – Tasmanian (<i>Aquila audax fleayi</i>) the person taking the action must not carry out works during the breeding season within the exclusion buffers of 500 m or a 1 km line of sight from any recorded nest. Work is to cease immediately if a new nest is found within 500 m or a 1 km line of sight of clearing or construction activities. The breeding season buffer must be applied from August to December inclusive. The person taking the action must put in place and implement a plan that guarantees all staff and contractors working on the pulp mill site and waste facility are made aware of and comply with this requirement.	12
3. The person taking the action must cause an ecologist nominated by the person taking the action and approved by the Department of the Environment and Water Resources (the Department) to conduct monitoring checks on the Wedge-tailed Eagle nest known as #130 ‘Tippogoree Hills’ in the second week of September and in the second week of November each year for five years, in accordance with the ‘Forest Practices Authority, Fauna Technical Note Series – Eagle Nest Management’ ¹ . Results from the monitoring must be provided to the Department and to the Tasmanian Department of Primary Industries and Water. Should nest #130 ‘Tippogoree Hills’ be abandoned in the first season after the commencement of construction, the person taking the action must, within 6 months of becoming aware of the abandonment, submit an offset plan to the Department for approval. The plan should provide for the protection of a minimum of 20 ha surrounding an eagle nest that is not protected in a ‘formal reserve’ ² . The plan must include a site description, connectivity with other habitats and mechanisms for long term protection, conservation and management. The Department may request that the plan be revised or amended before approval; any such request must be responded to promptly. The approved plan must be implemented.	13

<p>4. Within 12 months of the date of this approval, the person taking the action must provide to the Department for approval, a plan to provide and rehabilitate an area of 200 ha of potential habitat for the listed threatened species <i>Sarcophilus harrisii</i> (Tasmanian Devil); <i>Dasyurus maculatus maculatus</i> (Spot-tailed Quoll – Tasmanian population); <i>Perameles gunnii gunnii</i> (Eastern Barred Bandicoot – Tasmanian); <i>Lathamus discolor</i> (Swift Parrot); and <i>Litoria raniformis</i> (Southern Bell Frog) as an offset the loss of 200 ha of land at the pulp mill site.</p> <p>The plan must include details of the 200 ha offset to be rehabilitated, including a map, site description, connectivity with other habitats, a rehabilitation program and mechanisms for long-term protection, conservation and management. The Department may request that the plan be revised or amended before approval; any such request must be responded to promptly. The approved plan must be implemented.</p>	<p>14, 15, 16, 17, 18</p>
<p>5. To protect potential habitat for the listed threatened species: <i>Sarcophilus harrisii</i> (Tasmanian Devil); <i>Dasyurus maculatus maculatus</i> (Spot-tailed Quoll – Tasmanian population); <i>Perameles gunnii gunnii</i> (Eastern Barred Bandicoot – Tasmanian); and <i>Lathamus discolor</i> (Swift Parrot). Within 12 months of the date of this approval, the person taking the action must provide to the Department for approval, a plan to establish a network of reserves totalling 150 ha within the Bell Bay pulp mill site. The plan must include details of the reserves at the site including a map, description of the flora and fauna, connectivity and mechanisms for long-term protection, conservation and management. The reserve network must include a minimum area of 34 ha of <i>Eucalyptus ovata</i> to maintain foraging habitat for the Swift Parrot. The Department may request that the plan be revised or amended before approval; any such request must be responded to promptly. The approved plan must be implemented.</p>	<p>14, 15, 16,</p>
<p>6. To minimise impacts on the Tasmanian Devil, Spot-tailed quoll and Eastern Barred Bandicoot, the person taking the action must:</p> <ul style="list-style-type: none"> • install trench ramps and trench plugs in open trenches to enable fauna to escape; and • ensure that a qualified ecologist checks all open trenches for trapped fauna each morning. Surviving fauna are to be relocated to suitable habitat by an ecologist trained in fauna handling procedures. Records must be kept of all live and dead animals removed from the trench. These records must be provided to the Department within 3 months of commencement of trench construction. 	<p>14, 15, 16</p>
<p>7. Disturbance of vegetation at the site must be confined to the construction corridors of the pipelines and the pulp mill site and associated infrastructure. All areas to be cleared must be clearly marked to prevent damage to listed species outside the project area. Access to project areas must be via established roads or access tracks located on areas that have been subject to flora and fauna surveys as described in the preliminary documentation.</p>	<p>14, 15, 16, 17, 18</p>

<p>8. The person taking the action must cause an ecologist nominated by the person taking the action and approved by the Department to assess areas of potentially suitable habitat for the Green and Golden Bell Frog (<i>Litoria raniformis</i>) prior to construction of the pipeline. Areas of identified habitat must be avoided through micro-siting of the pipeline route. The NSW National Parks and Wildlife Service (2001) hygiene protocol³ for the control of the Chytrid fungus is to be implemented on all areas of disturbance</p>	17, 18
<p>9. All areas of the pipeline corridors, with the exception of access tracks and roads, are to be progressively rehabilitated as each 10 km of pipeline is constructed and revegetated with endemic species sourced from local seed stocks with the aim of providing habitat for listed threatened species in the area</p>	14, 15, 16
<p>10. The person taking the action must cause an ecologist nominated by the person taking the action and approved by the Department to conduct surveys for the Central North Burrowing Crayfish (<i>Engaeus granulatus</i>) and the Mt Arthur Burrowing Crayfish (<i>Engaeus orramakunna</i>) prior to commencement of construction. If, as a result of these surveys these species are found then a management plan must be provided to the Department for approval. This plan may include:</p> <ul style="list-style-type: none"> • micro-siting of the pipeline alignment to avoid populations; • exclusion zones around the pulp mill site as necessary; and • translocation of individuals. <p>The plan must be approved by the Department prior to the commencement of construction. The Department may request that the plan be revised or amended before approval; any such request must be responded to promptly. The approved plan must be implemented.</p>	20, 21
<p>11. To minimise impacts on the listed <i>Xanthorrhoea aff. bracteata</i> species the person taking the action must provide a plan to minimise the risk of spreading the fungus <i>Phytophthora cinnamomi</i>. The plan must be approved by the Department prior to the commencement of construction. The Department may request that the plan be revised or amended before approval; any such request must be responded to promptly. The approved plan must be implemented.</p>	22, 23, 24
<p>12. The following practices must be carried out to minimise impacts on the <i>Xanthorrhoea aff. bracteata</i> listed species.</p> <ul style="list-style-type: none"> • A qualified ecologist will mark out on the ground the location of the <i>X. aff. bracteata</i> on the effluent pipeline route. This site will be protected from disturbance, through micro-siting of the pipeline. • Boring will be undertaken under the dune where the <i>X. aff. bracteata</i> is located to completely prevent disturbance. <p>All access tracks to this site must be located to avoid all localities of <i>X. aff. bracteata</i> species.</p>	22, 23 24

<p>13. The person taking the action is required to conduct a pre-construction survey for <i>Prasophyllum secutum</i> prior to works commencing. The pre-construction survey is to take place within the area of potential habitat for this species in dense coastal scrub within the construction corridor near Five Mile Beach. In the event that <i>Prasophyllum secutum</i> is recorded within the construction corridor, the person taking the action is required to submit a management plan for approval by the Department. The Department may request that the plan be revised or amended before approval; any such request must be responded to promptly. The approved plan must be implemented.</p>	25, 26
<p>Listed migratory birds</p>	
<p>14. To minimise impacts on listed threatened and migratory birds, the person taking the action must:</p> <ul style="list-style-type: none"> • carry out a pre-construction check of the shoreline for breeding shorebirds for a distance of 200 m on either side of the construction zone. In the event that nests are located within this area, they will be clearly marked and construction activities kept on the other side of the pipeline alignment from the breeding birds; and • restore the beach profile to its original shape after construction. 	27
<p>15. To minimise impacts on the White-bellied Sea-eagle (<i>Haliaeetus leucogaster</i>), the person taking the action must not carry out works during the breeding season within the exclusion buffers of 500 m or a 1 km line of sight from any recorded nest. Work is to cease immediately if a new nest is found within 500 m or a 1 km line of sight of clearing or construction activities. The breeding season buffer must be applied from 1 August to 31 January inclusive. The person taking the action must put in place and implement a plan that guarantees all staff and contractors working on the pulp mill site and waste facility are made aware of and comply with this requirement.</p>	28
<p>Commonwealth marine environment and listed threatened and migratory marine species</p>	
<p><i>Construction Impacts</i></p>	
<p>16. To minimise impacts on listed threatened and migratory marine species during construction in the Tamar River and the ocean outfall, the person taking the action must visually monitor for marine mammals near the construction area and implement:</p> <ul style="list-style-type: none"> • a 2 km radius alert zone for whales, with a 1 km radius safety zone, within which noise-generating activities will be ceased if a whale approaches; and • a 1 km radius alert zone for seals and dolphins with a 0.5 km radius safety zone, within which noise-generating activities will cease if a seal or dolphin approaches. 	33

<i>Effluent Impacts</i>																	
<p>17. The pulp mill must not operate if effluent from the pulp mill exceeds the discharge limits provided in the table below.</p> <table border="1" data-bbox="215 297 1165 734"> <thead> <tr> <th>Parameter</th> <th>Monthly average effluent concentration</th> </tr> </thead> <tbody> <tr> <td>Dioxins and furans</td> <td>3.4 pg TEQ/L</td> </tr> <tr> <td>Chlorate (ClO₃⁻)</td> <td>1.9 mg/L</td> </tr> <tr> <td>Total chloroacetic acids</td> <td>237 µg/L</td> </tr> <tr> <td>Total nitrogen</td> <td>2.5 mg/L</td> </tr> <tr> <td>Total phosphorus</td> <td>0.8 mg/L</td> </tr> <tr> <td>Total suspended solids</td> <td>20 mg/L</td> </tr> <tr> <td>Biological oxygen demand</td> <td>11 mg/L</td> </tr> </tbody> </table>	Parameter	Monthly average effluent concentration	Dioxins and furans	3.4 pg TEQ/L	Chlorate (ClO ₃ ⁻)	1.9 mg/L	Total chloroacetic acids	237 µg/L	Total nitrogen	2.5 mg/L	Total phosphorus	0.8 mg/L	Total suspended solids	20 mg/L	Biological oxygen demand	11 mg/L	40, 41
Parameter	Monthly average effluent concentration																
Dioxins and furans	3.4 pg TEQ/L																
Chlorate (ClO ₃ ⁻)	1.9 mg/L																
Total chloroacetic acids	237 µg/L																
Total nitrogen	2.5 mg/L																
Total phosphorus	0.8 mg/L																
Total suspended solids	20 mg/L																
Biological oxygen demand	11 mg/L																
<p>18. The person taking the action must prepare an effluent monitoring program prior to the commencement of pulp mill operations. This program must include but not be limited to the parameters described in Condition 17 and must include a re-assessment of the Risk Quotients (RQs) for hydrophobic substances, in all media, being taken into account in the monitoring program.</p> <p>The program must be approved by the Minister prior to the commencement of mill operations. The Minister may request that the program be revised or amended before approval; any such request must be responded to promptly. The approved program must be implemented.</p>	40, 41, 47																
<p>19. The person taking the action must prepare for the Minister’s approval prior to commencement of pulp mill operations, a plan for monitoring the impacts of the mill effluent on the marine environment. The plan must include but not necessarily be limited to:</p> <ul style="list-style-type: none"> • dioxin and furan concentrations in the benthic sediments surrounding the marine outfall progressively towards and including Commonwealth marine waters; • impacts of chlorate on the total area of brown algae adjacent to the marine outfall; • pollutant levels in sentinel benthic and pelagic species; • whole-effluent toxicity testing using species relevant to Commonwealth waters in Bass Strait; and • a mechanism or mechanisms for tracing the actual movement of the effluent plume. <p>The plan must be approved by the Minister prior to the commencement of mill operations. The Minister may request that the plan be revised or amended before approval; any such request must be responded to promptly. The approved plan must be implemented.</p>	47, 55, 57, 62																

<p>20. Additional modelling must be carried out in relation to the fate of dioxins (and furans) and chlorates, prior to the commencement of operations, to the satisfaction of the Minister and the results of that modelling used to update the environmental monitoring program referred to in Condition 19. The modelling must be carried out by an independent expert approved by the Minister. The updated monitoring program must be approved by the Minister and implemented as provided for in Condition 19.</p>	<p>44, 45, 47, 48, 56</p>
<p>21. Concentration of dioxins and furans in the benthic sediments must not exceed a concentration of 850pg TEQ/kg in benthic sediment in Commonwealth marine waters. To ensure that concentrations do not reach this level, trends in concentrations of samples collected in State and Commonwealth waters (in accordance with the plan provided under Condition 19), must be analysed and independently reviewed on a 6-monthly basis. The results must be provided to the Department within one month of each 6-monthly period.</p> <p>Within 90 days of it being identified that the trends in the concentrations in benthic sediment indicate a level of 850 TEQ/kg is likely to be reached within a three-year period, at any time within the life of the mill, a response strategy must be provided to the Department for approval and implementation. The Department may request that the strategy be revised or amended before approval; any such request must be responded to promptly. The approved strategy must be implemented.</p>	<p>56</p>
<p><i>General</i></p>	
<p>22. If the Minister believes that it is necessary or desirable for the better protection of relevant listed threatened species and ecological communities, listed migratory species or the marine environment, the Minister may request that the person taking the action make specified revisions to any of plan, program or strategy approved pursuant to Conditions 3, 4, 5, 10, 11, 13, 18, 19 and 20. The person taking the action must comply with any such request. If the Minister approves a revised plan, program or strategy pursuant to this condition, the person taking the action must implement that plan, program or strategy instead of the plan, program or strategy as previously approved.</p>	
<p>23. If, at any time after 5 years from the date of this approval, the Minister notifies the person taking the action in writing that the Minister is not satisfied that there has been commencement of construction of the pulp mill, then it must not thereafter be commenced.</p>	
<p>24. Upon the direction of the Department, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Department. The independent auditor must be approved by the Department prior to the commencement of the audit. Audit criteria must be agreed to by the Department and the audit report must address the criteria to the satisfaction of the Department.</p>	

¹Refers to the 'Forest Practices Authority (2006) Fauna Technical Note Series: Technical Note 1: Eagle Nest Searching, Activity Checking and Management, (Ed. W.E. Brown) DPIW & Forest Practices Authority, Hobart'.

²'Formal reserve' means State Reserves, National Parks, Coastal Reserves, Regional Reserves, Conservation Areas, or as determined by the Department.

³NSW National Parks and Wildlife Service (2001). Hygiene protocol for the control of disease in frogs. Information Circular Number 6. NSW NPWS, Hurstville NSW.

Definitions

Construction includes any preparatory works required to be undertaken including clearing vegetation, the disturbance of any soil, the erection of any temporary or permanent building, and the use of construction or excavation equipment on site for the purpose of breaking the ground.

Environmental outcomes

1. The environmental outcomes sought from the proposal and how they have been achieved are as follow.

Environmental outcome	How achieved?	Conditions
No unacceptable impact on the populations of listed threatened terrestrial flora and fauna and associated habitat.	Minimise clearance and disturbance of habitat. Protection of the remaining habitat reserves at the site. Provision of offset habitat.	2 – 13
No unacceptable short or long-term impacts on populations of listed migratory birds.	Avoidance of nesting sites.	14, 15
No unacceptable long-term impacts on the Commonwealth marine environment or on listed threatened and migratory species.	By limiting the concentration of pollutants in the effluent discharge, monitoring the discharge for compliance and monitoring the marine environment to ensure that effluent limits are effective.	16 – 21

Material on which the Recommendation Report is based

2. A list of the documents that constitute the basis for this Report is at Attachment 2. These include the referral form and attachments, the preliminary documentation, the proponent's response to public comments, additional material supplied to the Department by the proponent to clarify issues raised in public comments or by the Department, plus reports commissioned independently by the Department. The Department has also had access to material available from Tasmanian processes as well as a large amount of correspondence and reports provided to the Minister and the Department separately from the EPBC Act statutory processes.

Background

3. The proposal by Gunns Limited is to construct and operate a bleached kraft pulp mill and associated infrastructure, at Bell Bay, northern Tasmania. The life of the project is expected to be at least 30 years. The proposed location is on the eastern bank of the Tamar River, south-east of Bell Bay within a major industrial zone. The area of development is up to 310 ha including approximately 200 ha of native vegetation. Plans of the site and of the site location and pipeline network are provided at Attachment 3 to this Report. Associated infrastructure includes:
 - a wharf in the Tamar River for delivery of materials and export of pulp;
 - a waste disposal facility to accommodate up to 49 000 tonnes of non-hazardous waste per year;
 - a water reservoir;
 - a quarry;
 - a water supply pipeline from Trevallyn Dam to the pulp mill;
 - an effluent pipeline from the pulp mill to Five Mile Bluff, including an 2.7 km ocean outfall to Bass Strait; and
 - possible workers' accommodation at George Town.

Approximately 64 000 tonne/day of effluent will be discharged 2.7 km offshore in Bass Strait after being treated in a primary and secondary treatment facility.

Industries currently operating in the vicinity of the site include an aluminium smelter, a metallurgical plant, a gas-fired power station and a sawmilling and woodchipping facility. The area has been zoned Heavy Industrial under the local government planning scheme for at least the last 25 years.

Assessment approach and public consultation

4. On 2 May 2007, the Minister for the Environment and Water Resources determined that the proposal (EPBC 2007/3385) is a *Controlled Action* and will be assessed by Preliminary Documentation. On 8 May 2007, the proponent advertised the Preliminary Documentation in *The Australian* and *The Launceston Examiner* newspapers for public comment for 20 business days, until 5 June 2007. 279 submissions were received. Within these 279 submissions, 120 referred to Listed Threatened Species and Communities, and Listed Migratory Species and 220 referred to the Commonwealth Marine Environment. The proponent submitted its Response to Submissions to the Department on 4 July, triggering the 40-business-day period for the approval process.

State assessments

5. The proposal was being assessed under the *Tasmanian State Project and Policies Act 1983* at the level of an Integrated Impact Statement (IIS). The Tasmanian Resource Planning and Development Commission (RPDC) assessment process had been accredited under the EPBC Act for the purpose of assessment of a previous referral for the same project. A *Draft Integrated Impact Statement* document was released for public comment from July to September 2006. 780 submissions were received. On 14 April 2007, the proponent withdrew from this process.
6. On 17 April 2007, the Tasmanian Government introduced the *Pulp Mill Assessment Bill 2007*, which sets out the assessment process for the proposal. This bill disapples other Tasmanian laws and processes related to the proposal and provides for an independent report to be presented to the Tasmanian Parliament, which will then decide whether or not the pulp mill proposal will be approved. A draft report was presented to the State Government on 5 July 2007 and the Tasmanian Parliament is expected to debate the approval permit commencing 21 August 2007 for a maximum of 5 days and then make a decision on the proposal.

Alternatives to the proposed action

7. According to the proponent, the alternative to developing the pulp mill in Tasmania is to continue to export woodchips to international clients for pulp processing overseas. An alternative site at Hampshire was considered by the proponent for the pulp mill location. According to the proponent, the Hampshire chip mill would require a threefold increase in wood volume to meet the needs of the pulp mill and result in additional transport requirements. In addition, Hampshire is located approximately 35 km inland from the nearest port. The proponent states in its Preliminary Documentation that the two sites are equally preferred with regard to environmental considerations with Bell Bay being the preferred site for economic reasons. The Department assessed the impacts of the proposed Bell Bay site on matters of national significance, as this was the only action referred.
8. A number of public comments were related to the adoption of Elemental Chlorine Free technology rather than Total Chlorine Free for the Bell Bay mill. Whilst the assessment is required to be conducted on the proposal as referred under the Act, the options available to Gunns to make its proposal more environmentally friendly, were considered. The Department noted that different pulping technologies produce pulps of differing quality, strength and brightness and thus appeal to different markets. For example, TCF bleaching with ozone is harder to control and gives pulps of inferior strength and brightness to those produced with ECF processes. The Department also noted:

- 70% of the world's virgin papermaking fibre is made by the kraft process, because the process is the most cost-effective way of making market pulps with the highest value.
- It has been found universally that bleaching with ozone for the TCF process, is harder to control and gives pulps of inferior strength and brightness to those produced with ECF processes that use chlorine dioxide, hydrogen peroxide and oxygen. For this reason only 5 to 6% of the kraft pulp produced in the world is produced by TCF processes and the majority of that pulp is sold and used in Germany. In contrast, around 75% of the bleached kraft pulp produced worldwide is produced by ECF processes and is used to make high quality white printing and writing papers.
- Research has shown that there is no toxicological difference between wastewaters generated from ECF-based or TCF-based bleaching. When ecotoxicological studies are done on effluents from ECF and TCF bleaching following proper biological treatment (including microanalysis for the "dioxins", PCDF and PCDD), both types of effluent show very low levels of toxicity that is reduced to negligible levels by adequate dilution in the sea. These findings have been reviewed by the United Nations Environment Program (UNEP) who, in 2003, published the statement: *"The United Nations Environment Program (UNEP) considers the ECF and TCF bleaching methods to be equivalent with respect to their potential formation of PCDD and PCDF."*
- More trees are required to make paper with TCF compared to ECF. With TCF, 3-4% less paper is produced from the same amount of wood compared to ECF.

Public Submissions

9. Relevant matters raised in the public submissions were:

- impacts on listed terrestrial species as a result of site clearing;
- impacts on listed marine species as a result of accumulation of dioxins;
- the validity of the effluent modelling and the impacts of the effluent on the marine environment;
- the adequacy of the bleaching and treatment process for minimising pollutants in the discharge;
- disturbance of potentially toxic sediments at the wharf site;
- increased fauna mortality on the roads;
- inadequacy of the field surveys and assessment methodology;
- inadequacy of offsets;
- impacts on the Australian Grayling as a result of leachate from the landfill; and
- economic and social issues such as the potential impact on tourism and property values.

Many other issues were raised in the public submissions but they were not matters relevant to the assessment of the proposed action under the EPBC Act.

Environmental record

10. On the basis of the information available to the Department, Gunns Limited does not appear to be or have been, subject to proceedings in relation to a conviction or offence or ordered to pay pecuniary penalty, under Commonwealth, state or territory law for the protection of the environment or the conservation and sustainable use of resources. Gunns Limited has obtained AFS certification (AS4708) for its forestry management practices and undergoes independent AFS and ISO 14001 audits twice per year.

Assessment

11. This assessment is limited to impacts on the listed threatened species and communities, listed migratory species and the Commonwealth marine environment under Part 3 of the EPBC Act. The matters protected were found to be a number of listed threatened plant and animal species at the pulp mill site, the Commonwealth marine environment adjacent to the effluent outfall and migratory marine species in the vicinity of the effluent outfall.

Listed threatened species

12. The following species have either been recorded within the project area or suitable habitat for them is present.
- *Aquila audax fleayi* - Wedge-tailed Eagle (Tasmanian)
 - *Sarcophilus harrisii* - Tasmanian Devil
 - *Dasyurus maculatus maculatus* - Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (Tasmanian population)
 - *Perameles gunnii gunnii* - Eastern Barred Bandicoot (Tasmanian)
 - *Lathamus discolor* - Swift Parrot
 - *Litoria raniformis* - Southern Bell Frog
 - *Prototroctes maraena* - Australian Grayling
 - *Engaeus granulatus* – Central North Burrowing Crayfish
 - *Engaeus orramakunna* - Mt Arthur Burrowing Crayfish
 - *Xanthorrhoea aff. Bracteata* - Sand Grasstree/Shiny Grasstree
 - *Prasophyllum secutum* - Northern Leek Orchid
 - *Caladenia caudate* - Tailed Spider-orchid

Aquila audax fleayi (Wedge-tailed Eagle – endangered)

13. One active nest of the Wedge-tailed Eagle (Tasmanian) could be impacted by this proposal. Endemic to Tasmania, the total population size of Wedge-tailed Eagles (Tasmania) is estimated at less than 1000 birds, consisting of an estimated 95 successful breeding pairs. The Wedge-tailed Eagle breeds from late winter to summer, with eggs laid in a narrow window from late August to early September. Tasmanian Wedge-tailed Eagles are sensitive to disturbance when nesting and may abandon a nest site if that disturbance exceeds tolerance levels. The proponent has given an undertaking to maintain the breeding season buffer zone of 500 m, or 1 km if the activity is in line of site of known nests. On this basis the Department's judgement is that significant impacts on the Wedge-tailed Eagle are unlikely, however initial monitoring of the nest site will be required.
14. The Department also considers it appropriate that the proponent monitor the nest for five years after the commencement of construction near the nest site, or until the nest is abandoned. Information gathered from the monitoring will add to the body of knowledge on this species. Should the nest be abandoned within the first breeding season after the commencement of construction near the nest site, the proponent should be required to offset this loss by reserving a minimum of 20 ha surrounding an eagle nest not currently protected.

Sarcophilus harrisii (Tasmanian Devil – vulnerable), *Dasyurus maculatus maculatus* (Spot-tailed Quoll – vulnerable) and *Perameles gunnii gunnii* (Eastern Barred Bandicoot – vulnerable)

15. There were no recordings of Tasmanian Devils, Spotted-tailed Quolls or Eastern Barred Bandicoots during field surveys. However, suitable habitat exists along the pipeline routes and at the pulp mill site. Approximately 200 ha of potential habitat will be cleared at the pulp mill site. Vegetation along the pipeline will be rehabilitated. According to the proponent, the impacts that may occur as a result of clearing will be mitigated through: the provision of a 150-ha reserve system on site, including corridors linking habitat in the area; the installation of trench ramps and trench plugs in

open trenches to allow fauna to escape; and regular checks for fauna in trenches and removal and relocation by trained personnel. The proponent has also given an undertaking to offset the loss of 200 ha of potential habitat for listed threatened species at the pulp mill site by rehabilitating an equivalent area of habitat. The Department is satisfied with these measures.

16. Public comments were made about the potential for increased log truck traffic to service the pulp mill. The majority of these comments referred to concerns about the potential for increased traffic collisions resulting from the increased traffic. The Department did consider whether it was likely that the proposed increase in traffic would have an unacceptable impact on EPBC Act listed species. In noting that 85% of the pulp mill supply will come from the existing woodchip facility (Preliminary Documentation) the Department is of the view that a 15% increase in transport activities associated with the mill is unlikely to have an unacceptable impact on EPBC Act listed species in the proximity of the pulp mill site.

Lathamus discolor (Swift Parrot – endangered)

17. The Swift Parrot was not recorded during field surveys. The project area does not contain suitable nesting habitat for this species and is also outside the core range for this species. However, approximately 11.4 ha of *Eucalyptus ovata* forest (foraging habitat) will be cleared at the site. The proponent has proposed to avoid clearing approximately 34.2 ha of suitable habitat within the pulp mill site that will form part of an on-site reserve network. The Department considers this to be adequate mitigation for potential impacts to this species.

Litoria raniformis (Southern Bell Frog – vulnerable)

18. The Southern Bell Frog was not recorded in the project area. Comments were received that questioned the survey techniques applied by the proponent and that it therefore may be possible that this species does occur within the project area. Suitable, but not optimal, habitat for this species is located at the effluent outfall site and some of the drainage lines and wetland areas along the water supply pipeline route.
19. The proponent has proposed to mitigate potential impacts on this species by micro-siting the effluent pipeline to avoid vegetated wetlands and watercourses and by the implementation of a hygiene protocol for the control of the Chytrid fungus. The Department considers that the mitigation measures proposed by the proponent for this species are adequate.

Prototroctes maraena (Australian Grayling – vulnerable)

20. Construction of the water supply pipeline and the wharf in the Tamar River may potentially impact on this species via the physical change of fish habitats from sediment deposition, loss or degradation of fish inter tidal habitat, changes in water quality, indirect impacts on fish food resources, and construction-generated underwater noise. Given the temporary nature of the works, the Department is of the view that the impact on the population of the Australian Grayling would not be unacceptable.

Engaeus granulatus (Central North Burrowing Crayfish – endangered)

21. According to the Preliminary Documentation, the nearest known locality of this species from the site is approximately 14 km from the pipeline at George Town and 17 km from the pulp mill site. At the time of listing, the known range of this species was approximately 600 km² on the western side of the Tamar River. A submission was received relating to the burrowing crayfish that indicated, according to Dr Niall Doran, chair of the Burrowing Crayfish recovery team, the exact boundaries of the Central North Burrowing Crayfish are hard to define and highly fractured. Water courses such as the Tamar are not necessarily a barrier to the distribution of this species. It is therefore the view of the Department that surveys should be conducted prior to construction and if individuals are found in the vicinity of the works then a management plan should be prepared which may include, but not be limited to:

- micro-siting of the pipeline alignment to avoid individuals;

- exclusion zones around the pulp mill site as necessary; and
- translocation of individuals.

Engaeus orramakunna (Mt Arthur Burrowing Crayfish – vulnerable)

22. According to the Preliminary Documentation, the nearest known location of this species to the site is approximately 10 km to the east of the water supply pipeline alignment. Since the listing of the Mt Arthur Burrowing Crayfish, the area of occurrence has increased from 200 km² to 400 km². The submission that was received relating to burrowing crayfish also indicated that in relation to this species an extension of 10 km west of the proposed development is possible, and cannot be discounted as the area has not been surveyed for the species. It is therefore the Department's view that surveys should be conducted prior to construction and that if individuals are found in the vicinity of the works then a management plan should be prepared which may include, but not be limited to:
- micro-siting of the pipeline alignment to avoid individuals;
 - exclusion zones around the pulp mill site as necessary; and
 - translocation of individuals.

Xanthorrhoea aff. bracteata (Grasstree – vulnerable)

23. The Sand Grasstree/Shiny Grasstree is endemic to Tasmania and was recorded in field surveys within the project area. It occurs in nine separate patches on at least five of the east-west orientated, stabilised dunes at the effluent pipeline site on the coast of Bass Strait. One individual was also recorded adjacent to the effluent pipeline route.
24. Direct impacts on this species through destruction of individual plants and erosion of sand dunes will be mitigated by constructing a 50 m bored tunnel, using the pipe jacking method, underneath the section of hind dunes dominated by *Xanthorrhoea aff. bracteata*. The tunnel will be sufficiently deep to avoid damage to the deeper roots of the plants. Directional drilling was determined by Gunns not to be feasible for this activity at this location. The proponent has also proposed to mitigate the impacts on this species by confining disturbance to the construction corridor.
25. There is also a potential for an indirect impact on this species through the introduction or spread of the pathogen *Phytophthora cinnamomi*, to which *Xanthorrhoea sp.* is highly vulnerable. This impact will be mitigated by adopting best practice to prevent the introduction and minimise the spread of *P. cinnamomi* and by sourcing gravel for hardstand areas from a source known to be free of *P. cinnamomi*. The Department is satisfied with the mitigation measures proposed by the proponent.

Prasophyllum secutum (Endangered) and *Caladenia caudate* (Vulnerable) Orchid species

26. These two orchid species were not recorded in the project area. However because of the difficulty in observing these cryptic species and the presence of large areas of potentially suitable habitat, it is considered possible that these species may be present. Approximately 4 ha of potential habitat for *Prasophyllum secutum* occurs within the effluent outfall area and approximately 200 ha of potential habitat for the *Caladenia caudate* at the pulp mill site are proposed for clearing. The proponent proposes to mitigate potential impacts on these species through construction procedures to limit accidental loss or damage to vegetation outside the construction corridor.
27. The Department recommends that in addition to the mitigation measures proposed, the proponent conduct a pre-construction survey for *Prasophyllum secutum* prior to works commencing. In the event that *P. secutum* is recorded, the proponent should be required to submit a management plan for approval by the Department.

Listed migratory birds

28. Twenty-four listed marine and/or migratory species were recorded during surveys of the project area. The proponent has identified the shoreline of the Tamar estuary, over which the effluent pipeline will be crossing, as being an important area for breeding shore birds and sea birds. The proponent has committed to mitigation measures to reduce impacts on listed bird species during the breeding season. These commitments are considered appropriate by the Department and have therefore been formalised as recommended approval conditions for the proposal.
29. One nest of the White-bellied Sea-Eagle (*Haliaeetus leucogaster*) has been located 400 m to the east of the water supply pipeline route near Dilston. This species is listed as marine and migratory and occurs across all coastal areas of Australia. Despite its wide range, there are fewer than 200 breeding pairs in Tasmania. The proponent has committed to maintaining the breeding season exclusion buffers of 500 m or a 1 km line of sight from the recorded nest. The Department is satisfied with the mitigation measures proposed by the proponent.

Listed threatened and migratory marine species

30. A number of listed threatened and migratory marine species are likely to occur in the vicinity of the effluent outfall. These include:
 - Blue Whale (*Balaenoptera musculus*)
 - Southern Right Whale (*Eubalaena australis*)
 - Humpback Whale (*Megaptera novaeangliae*)
 - Great White Shark (*Carcharodon carcharias*)
 - Pygmy Right Whale (*Caperea marginata*)
 - Dusky Dolphin (*Lagenorhynchus obscurus*)
 - Killer Whale, Orca (*Orcinus orca*)
31. Potential impacts on the marine species arise from the discharge of treated effluent into the marine environment, the construction of the wharf, effluent pipeline and outfall and potential increase in boat traffic in the area. Impacts on these species would be as a result of short-term exposure when migrating through the area indirectly through the food chain for some of this species. The impacts of effluent discharged to the marine environment are discussed in the Commonwealth marine environment section below.
32. According to the proponent, for estimated shipping movements for the first 14 years, peak vessel movement will be only slightly higher than the current average of 56 vessels per year accessing the woodchip berths. From Year 15 onward, the total vessel movements would be approximately 10 to 20 more but similar to projected levels without the pulp mill.
33. Pile-driving operations for the wharf construction will be the greatest noise generating activity. The proponent has proposed to visually monitor marine animals near the construction area. A 2 km radius alert zone for whales (1 km for seals and dolphins) will be implemented with a 1 km radius safety zone (0.5 km for seals and dolphins), within which noise-generating activities will cease if a whale approaches. According to the proponent, the noise from construction on the effluent outfall would be localised and temporary. A 1 km radius alert zone with a 0.5 km radius safety zone for whales will be implemented. The Department is satisfied with the measures proposed to address these short-term impacts.

Australian fur seal (*Arctocephalus pusillus doriferus*)

34. There has been public comment on the potential impacts on the Australian fur seal. There is a number of breeding sites for this species in Bass Strait, with Tenth Island, a relatively small colony, located approximately 12 km north-east of the proposed outfall site. An Australian fur seal was observed within the 1 km radius of the outfall site during a survey carried out by Aquenal (2005, Volume 11, Appendix 24 in the Draft IIS) on behalf of the proponent, indicating that the outfall occurs within the foraging zone for this species. The species is not listed under the EPBC Act but

has conservation significance in relation to the Commonwealth marine environment. It is, therefore, important that the potential impacts of effluent on the fur seals' food sources is included in the agreed monitoring program.

The Commonwealth marine environment

35. Potential impacts on the Commonwealth marine environment may result from the effluent discharge into Bass Strait. The marine outfall would be situated 2.7 km offshore from Five Mile Bluff, 2.9 km from the boundary of Commonwealth marine waters, itself 3 nm (5.6 km) offshore. (See map at Attachment 4.) Of the 279 public submissions, 220 raised concerns about the potential impacts of the effluent being discharged into Bass Strait on the Commonwealth marine environment. The key issue relating to effluent is the lack of available environmental impact data relating to the operation of elemental chlorine free (ECF) mills around the world. Existing mills in Europe, the US and Canada have generally been operating for many years and originally used chlorine bleaching, although many have been retro-fitted with ECF technology. Consequently, they have legacy levels of dioxins in waterways into which effluent has been discharged. Although these levels are claimed to be decreasing, they are much higher than could be expected from this proposal, a "greenfields" ECF mill.
36. Based on the available evidence, the Department has not identified any likely significant impacts on the marine environment in Commonwealth waters from the proposed pulp mill. However there are indications that levels of pollutants that may accumulate in Tasmanian waters may be of concern. There is therefore some possibility that, over time, there may be indirect impacts on Commonwealth waters. Given the absence of a reliable model for predicting possible sediment and biota concentrations, the lack of effluent and sediment field data from comparable "green field" ECF mills and the different possible interpretations of the hydrodynamic model, it is essential that competent monitoring programs are in place to provide early warning of any unexpected trends and adequate opportunity to correct them.
37. The Department considers that competent monitoring programs should give early warning of any unexpected trends and that there would be adequate opportunity to take corrective action to avoid unacceptable impacts on the Commonwealth marine environment. In order for this monitoring to identify trends and risks of pollutants extending into the Commonwealth marine area effectively, monitoring results from Tasmanian waters must be provided to the Department, in addition to monitoring in the Commonwealth marine area. A Departmental report analysing the proponent's assessment of the impacts is at Attachment 5.

Alternatives to the marine discharge

38. Alternatives to a marine outfall are given in the report *Treatment and recycling options Bell Bay Pulp Mill Project* commissioned from UNSW (New South Global, 2007, Attachment 6). In summary, the UNSW report states that:
 - in-process recycling (with no resultant effluent) is not practical given current technology;
 - agricultural recycling with no further treatment of effluent would require a highly salt-tolerant crop and probably be impractical given climate and other factors such as contamination of groundwater;
 - agricultural recycling with further treatment would be possible but would be at a cost of \$45.7 to \$53.3 million for removal of phosphorus and suspended solids and to reduce the salt content between \$77 and \$104 million;
 - recycling with further salinity reduction or with complete desalination would involve a marine outfall for the concentrate and thus defeat the purpose of avoiding any marine discharge; and
 - industrial recycling with complete desalination and only solid waste would be very expensive (up to \$400 million total and \$21 million pa operation and maintenance cost).
39. The proponent's response to this report with regard to the use of effluent for irrigation is as follows.

- Salt content was believed to be prohibitive and without sufficient leaching (by rainfall) soil structure may be adversely affected.
- Water storage over winter months would be required when demand for irrigation was low – this was estimated at approximately 200ha to store approximately 13 GL.
- If the mill effluent was desalinated prior to use in irrigation there would still remain an environmental issue with the disposal of the remaining concentrates.
- The use of and reliance on not sufficiently proven technology may be detrimental to the success of the project.

The Department has concluded that, given the current state of technology, there would be very limited scope for additional in-process recycling in the Bell Bay pulp mill and that land-based disposal of effluent is possible, but varying in practicability and cost.

Effluent characteristics

40. According to the proponent, the effluent would be approximately 64 000 tonnes/day and would comprise a solution of a large number of salts and compounds, given by the proponent as in Table 6.1 of the Preliminary Documentation. Among these, the Department has identified the following as being particularly important for consideration for possible impacts upon the marine environment.
- dioxins and furans (polychlorinated dibenzo-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). (PCDDs and PCDFs are collectively known as ‘dioxins’);
 - chlorate;
 - chloroacetic acids; and
 - nutrients and suspended solids.
41. The relevant Australian standard for effluent is the *Recommended environmental emission guidelines for any new bleached eucalyptus Kraft pulp mill in Tasmania* (Resource Planning and Development Commission, 2004).

The concentrations in the effluent compared with these guidelines are presented in the table below.

Parameter	Monthly average effluent concentration	RPDC emission guidelines	Estimated total/year**
Effluent volume			23 Mt (23 GL)
Dioxins and furans	3.4 pg TEQ/L*	13 pg TEQ/L	79 mg
Chlorate (ClO ₃ ⁻)	1.9 mg/L	10 mg/L	44 tonne
Total chloroacetic acids	237 µg/L		5.5 kg
Total nitrogen	2.5 mg/L		58 tonne
Total phosphorus	0.8 mg/L		19 tonne
Total suspended solids	20 mg/L		467 tonne
Biological oxygen demand	11 mg/L		258 tonne

* TEQ refers to ‘toxic equivalent’. This expresses all dioxins and furans of differing toxicities in terms of an equivalent mass of 2,3,7,8-Tetrachloro dibenzo-*p*-Dioxin (TCDD), the most toxic.

** Assuming that the effluent has a specific gravity of one, whereas it will be in fact be greater than one due to the presence of solutes.

The Department is of the view that, providing the proponent achieves its estimated concentration of dioxins and furans in the discharge effluent, the mill effluent meets world's best practice and is unlikely to impact significantly upon any of the controlling provisions for the proposal.

Description of the environment at the effluent outfall

42. The marine outfall would be situated 2.7 km offshore from Five Mile Bluff, 2.9 km from the boundary of Commonwealth marine waters. The outfall diffuser site is located in approximately 26 m of water. The average tide-induced current in this area is 0.08 metre/s with a tidal range of 2 m and a superimposed wave-driven current for much of the time.
43. The area in the vicinity of the outfall forms part of the Boags Marine Bioregion. A number of estuaries, including the Tamar River Estuary enter the marine environment near the diffuser and provide nursery and breeding grounds for migratory fish. Other species include crustaceans, polychaetes, sponges and molluscs. Plant communities consist mainly of green algae and isolated brown algae. No EPBC-listed species have been identified as being present in the vicinity of the outfall.

Hydrodynamic modelling of the effluent stream

44. Modelling of the behaviour of the effluent in the marine environment was carried out by GHD (Draft IIS, Vol 18, Appendix 63). The modelling predicted that a 1:100 dilution is reached within 70–100m of the diffuser. According to the proponent, this would result in most constituents meeting ambient guidelines with the exception of chlorate, which is predicted to meet ambient standards within 400 m. The GHD modelling also predicted that at the boundary of Commonwealth waters, the predicted minimum dilution is between 9000 and 10 000 times the discharge concentration.
45. The GHD modelling was reviewed for the Department by Patterson Britton and Partners (Patterson Britton, 2007, Attachment 7.1) and BMT WBM (2007, Attachment 7.2). These reviews identified a number of inadequacies in the modelling including rate and extent of spread of pollutants, flushing rates and accumulation of pollutants over time. The Patterson Britton report considered that the actual daily flushing of the pollutants would be in the order of 1– 2%, less than the 15% predicted by GHD. The BMT WBM report stated that the modelling methodology requires strengthening in several key areas before sufficient confidence can be placed in its predictions.
46. A report provided by Dr Stuart Godfrey (Aug 2007) describing perceived inadequacies of the hydrodynamic modelling performed for the Gunns pulp mill assessment is at Attachment 7.3). According to Dr Godfrey, pollution is almost certain to occur, particularly on sunny summer days at nearby beaches. Dr Godfrey also concludes that ribbons of polluted water with concentrations not much less than those near the outflow will almost certainly reach nearby Commonwealth waters. This report was reviewed for the Department by BMT WBM (Aug 2007, Attachment 7.4). BMT WBM agrees with the general premise of the Godfrey paper (if not with all details and stresses given to particular points). The uncertainty associated with the original modelling in (is) unacceptably high. Should Dr Godfrey's predictions regarding surface layer "ribbons of polluted water" reaching Commonwealth waters prove to be correct, however it would not necessarily imply a significant impact on the environment in Commonwealth waters. The Department considers proposed conditions regarding additional modelling to be carried out prior to any operation of the mill should ensure no unacceptable impacts in Commonwealth waters. The Department also sought advice as to what might be the effect of extending the effluent pipeline diffuser further offshore. BMT WBM (Aug 2007, Attachment 7.5) advised that moving the outfall further offshore will increase the diffusion/ dispersal of pollutants and reduce the changes of them being driven ashore. However, the Department is of the view that moving the outfall further offshore would proportionately increase the likelihood of effects in the Commonwealth marine area.
47. The Tasmanian Government-commissioned Sweco Pic Report (*Assessment of the Gunns Limited Bell Bay Pulp Mill against the Environmental Emission Limit Guidelines*, Sweco Pic Oy, 2007) also raises concerns. This report contains a number of recommendations which are likely to be imposed in the permit conditions by the Tasmanian Government.

48. The Department is of the view that a comprehensive monitoring program will be required over the life of the project to measure the concentrations of pollutants in the effluent and the impacts of those pollutants on the environment. If monitoring indicates that pollutants are at levels that are unsafe for flora and fauna in the Commonwealth marine area or for listed threatened and migratory species in the discharge area, then measures will be required to address those impacts and take corrective action should adverse impacts be anticipated. The Department is also of the view that more accurate modelling using an agreed hydrological model will be required to determine the most appropriate sampling locations in the receiving environment.

Pollutants of concern

Dioxins and furans

49. There appear to be no examples in the scientific literature of the modelling (equations) used in this assessment being used to predict dioxin and furan sediment concentrations. There are also no monitoring results for both effluent and sediment levels of dioxins and furans for new ECF pulp mills in previously uncontaminated locations.
50. Dioxins are produced by human activities, including pulp and paper mills, waste incineration, chemical manufacturing, fuel combustion in vehicles, wood burning, and electric power generation and are also produced by natural events such as forest fires and volcanic eruptions. Dioxins released into the environment become attached to organic particles and, having a half-life of 10 years, may accumulate in sediments and benthic organisms. Effects on animals include decreased food consumption, less weight gain, lower growth rates and problems with the reproductive and nervous systems.
51. The proponent has used United States Environment Protection Agency (US EPA) equations to predict that the future level of dioxins and furans in the sediment will be below the Canadian Sediment Quality Guideline of 850 pg TEQ/kg sediment. Public submissions have criticised the appropriateness of values used in the calculations and have predicted much higher levels of dioxins and furans in the sediments. Both Toxikos, the consultants for Gunns, and Professor Wadsley, who criticises Toxikos, have used the US EPA equations to predict the likely concentration of dioxins and furans in the marine sediments and in biota. They have come to dramatically different conclusions, not only because of different methods of using the equations, but also because of the different values they have chosen to give the parameters in the equations.
52. The Department agrees that some of the assumptions in the Preliminary Documentation calculations can be questioned, as can some of the assumptions in the public submissions. The Department is not confident that the results of the US EPA equations currently provide an appropriate model for predicting realistic outcomes in the Bell Bay context. The US EPA has advised that the equations were developed for water bodies such as lakes and rivers rather than ocean outfalls. The application of the US EPA equations to an ocean outfall is unpredictable as assumptions need to be made about the values of different parameters in the equations. There appear to be no examples in the scientific literature of these equations being used to predict dioxin and furan sediment concentrations from pulp mill effluents.
53. In the absence of a reliable model, field data from a new ECF mill in a “greenfields” site might have allowed direct comparison of effluent and sediment levels over time. No such data from a “greenfields” site are yet available; however, overseas experience demonstrates that conversion from elemental chlorine to ECF pulp mills, as is the proposed Bell Bay mill, with non-measurable dioxin effluents has resulted in dramatically reduced levels of dioxins and furans in sediment and biota, rather than producing environmental or health problems caused by dioxins. As a result, regulators have endorsed the ECF process and PCDD/PCDF effluent guidelines. The RPDC limit of 10 pg/L for 2,3,7,8-TCDD and 30 pg/L for 2,3,7,8-TCDF (equivalent to 13 pg TEQ/L) is equal to or improves upon the levels set by the US EPA, Environment Canada, and the European Commission amongst others. It also meets the UNEP Stockholm Convention Best Available Techniques (BAT) and Best Environmental Practices (BEP) guidelines.

54. The ECF process meets regulatory requirements in all major producing regions. Industry supporters of the ECF process have claimed that ECF captured 85% market share of the world's bleached chemical pulp market in 2005 (Scandinavia 78%, North America 99%, Japan 55%, South America 90%). It was widely adopted in the 1990s to replace elemental chlorine mills, driven by such initiatives as the US EPA Cluster Rule 1998 which included ECF as a Best Available Technology. ECF produces dramatically lower “non measurable” dioxin and furan levels compared with elemental chlorine mills, while having commercial advantages over TCF pulp mills. A number of examples of decreases in dioxin and furan levels in sediment and biota following conversion from elemental chlorine to ECF are provided in Toxikos (July, 2007) and the Department’s report at Attachment 5.
55. The Department is not aware of any examples of regulatory agencies predicting significant build up of dioxins and furans from such low effluent concentrations. The confidence of regulators consulted by the Department in the dioxin and furan performance of modern ECF pulp mills was high, especially for mills with ocean outfalls.
56. On balance, the Department considers that such field data as are available and the experience of overseas regulators do not suggest that there is likely to be a significant impact on Commonwealth waters from dioxins and furans, given that the proposed pulp mill is designed to meet best practice international guidelines for effluent levels and is discharging via an ocean outfall. The Department recommends that programmes for monitoring long-term dioxin and furan sediment levels in the sediment and biota be implemented. The hydrodynamic modelling should be used to inform the choice of sampling locations. If monitoring indicates trends that are of concern, then a form of tertiary treatment may be needed. This may include the use of either settling ponds, with a long settling time, or membrane based tertiary treatment to remove the particulates. Consideration would need to be given to all options and their commercial practicality.

Chlorate

57. The impacts of the chlorate ion (ClO_3^-) in the marine environment are principally due to toxic effects on algae, particularly brown algae (Phaeophyta). While agreement on the hydrodynamic modelling is needed to predict the fate of chlorate in the marine environment, it is unlikely that chlorate would have a direct impact on Commonwealth waters as the brown algae species which may be sensitive to it do not appear to occur in Commonwealth waters. If the Patterson Britton prediction (ibid) is correct, the Department concludes that there is a potential contaminant problem through elevated concentrations around the effluent outfall, as well as the Tasmanian coastline. If the Tasmanian coast line is exposed to high chlorate concentrations, then the local algal habitat could be adversely affected. This may have an indirect impact on Commonwealth waters through food chain impacts on species in Commonwealth waters.
58. While the Department does not anticipate any direct effects on Commonwealth waters, it suggests that a monitoring program be established to detect whether there is any impact from chlorate on inshore brown algae which could result in food-chain or other indirect impacts on biota in Commonwealth waters.

Chloroacetic acids and aluminium

59. Initial concerns were held for possible adverse environmental effects of (mono-, di- and tri-) chloroacetic acids. Further information requested from the proponent (Poyry Technical Report 16B0104 of 19 July 2007 at Attachment 8), however, has indicated likely effluent concentrations of about 230 $\mu\text{g/L}$. This is not considered significant by the Department. Similarly, aluminium, initially considered a chemical of concern by the Department, is not considered to be likely to have an impact.

Nutrients and suspended solids

60. High concentrations and loads of nutrients such as nitrogen and phosphorus may result in excessive algal growth and subsequent de-oxygenation of the water column when the algae die and break

down. The concentrations of total nitrogen and total phosphorus are predicted to be diluted below the ANZEC guidelines within 100 m of the diffuser and algal blooms due to effluent discharge are considered unlikely. Suspended solids cause turbidity in the water column and can smother benthic organisms if they settle out. Suspended solid concentrations are also predicted to be at an acceptable level within 100 m of the diffuser. The Department is satisfied that if the predicted concentrations in the marine environment are achieved then the impacts of these effluent constituents on Commonwealth marine waters and on listed migratory marine species would be acceptable.

Whole-effluent toxicity

61. The toxicity testing of whole effluent samples from pulp mills in Thailand and Chile was not designed with enough scientific rigour to demonstrate whether or not the effluent would adversely affect biota in the marine environment. If new samples from the foreign mills can be obtained under proper scientifically rigorous conditions, the whole effluent toxicity testing should be repeated. Should the Bell Bay mill be approved, whole-effluent toxicity testing should be conducted on appropriate species using the Bell Bay mill effluent.

Treated effluent assessment

62. The Preliminary Documentation has assessed the potential risk for most substances in the effluent as being very low. While the analysis was adequate for hydrophilic substances, the Department considers that it was not suitable for assessing potential risks associated with hydrophobic chemicals, (e. g., chemicals such as resins, fatty acids, sterols, chlorophenols and dioxins/furans etc.).
63. The Department recommends that the Risk Quotients (RQ) for hydrophobic substances be further considered, as part of the environmental monitoring program, considering all media rather than only the water column. Should this identify further substances with an $RQ \geq 1$, the need for these to be included in the monitoring program or other action should be discussed and agreed with the Department.

Indirect Impacts on Matters of National Environmental Significance

Timber supply

64. Section 38(1) of the EPBC Act provides that Part 3 of the Act does not apply to a Regional Forest Agreement (RFA) forestry operation that is undertaken in accordance with an RFA. Section 75(2B) provides that the Environment Minister must not consider any adverse impacts of any RFA forestry operations in deciding whether or not an action is a controlled action under the EPBC Act. The following comments on forest resource use are therefore provided purely as background information.
65. Until at least 2017 wood chips required as feed for the proposed Gunns pulp mill will be sourced from forestry operations undertaken in accordance with the Tasmanian Regional Forest Agreement (TRFA), which was signed by the Australian and Tasmanian Governments in 1997. Forest products will not be accepted as feed for the proposed action unless sourced from TRFA forestry operations. The primary wood source for the proposed mill would be plantation-grown eucalypts, regrowth forest eucalypts and a small proportion of plantation pine. No old growth logs will be used in the pulp mill. The pulp mill will not require additional intensification of forestry operations. The wood resource that otherwise would have been exported in chip form will instead be utilised in the pulp mill for value-added processing.
66. The TRFA will nominally expire in 2017, during the anticipated life of the proposed mill. A scheduled review of the TRFA in 2012 will consider processes for the renegotiation of the TRFA. When the time comes to negotiate a future RFA, it would be reasonable to expect the Australian Government will not accept a reduction in the level of protection for Tasmanian Forests.

Water Supply

67. Mill operations will require a total of 26 GL of raw water per annum. A water supply pipeline is proposed to be constructed between Lake Trevallyn, near Launceston, and the pulp mill. This system may further link to the existing water supply from Curries River dam. Environmental flows through the Cataract Gorge in summer will be maintained at current levels. There are no

downstream Ramsar sites or other water dependent ecosystems protected by the EPBC Act likely to be affected by the proposed water supply works or extractions for the Gunns pulp mill.

Materials

68. Quantities of various chemicals and materials will be required as inputs for the proposed pulp mill and the potential sources of these chemicals and materials are numerous and varied. However, the likelihood for significant impact would appear low given likely sourcing from existing suppliers, all of which should be operating under appropriate state and local government permits, licences and planning requirements.

Greenhouse

69. The proposed mill would incorporate an electricity co-generation facility. With the exception of mill start-ups, the mill is proposed to be self-sufficient in electricity, and will be capable of generating excess power that can be connected to the national electricity grid for sale as a by-product. Energy and steam for mill operations will be derived from the burning of approximately 500,000 green tonnes per annum of wood residues such as bark, wood waste and other forest residues.
70. Activities associated with pulp mill operations, including transport of materials and burning of forest residues to produce electricity, will contribute to greenhouse gas emissions currently produced by Australia. With regard to electricity generation, using biomass (a renewable fuel) would have less greenhouse impacts than if the proposed operations were to use electricity generated from the use of coal or oil. The contributions from the proposed pulp mill operations are likely to be negligible compared to total Australian greenhouse gas emissions.

Economic and social matters

Economic

71. Economic factors are addressed in Section 2.4 of the Preliminary Documentation. A report was produced by the Environmental Economics Unit of the Department (EEU) (Attachment 9). The EEU report concluded that the analysis presented on behalf of Gunns was reasonable on the basis of the model used, the publicly available assumptions and data utilised. The CGE model used in this project is widely accepted as a credible model for examining this type of major project development. However, while the model attempts to include all aspects of the economy it is still only a model and does not completely replicate all activities occurring in the actual economy.
72. According to the proponent, Bell Bay pulp mill will constitute the largest investment (\$1.5 billion) by the private sector in Tasmania. The project has been granted Major Project Facilitation status by the Australian Government. Gunns engaged the Centre for Policy Studies at the Monash University to model the impacts of the proposal on the Tasmanian and national economy. Based on this model, the Net Present Value of Gross Domestic Product between 2007 and 2030 is \$6.7 billion for Tasmania and \$3.8 billion for Australia. During this period, the project will add 2.5% to the Gross State Product each year. Most of the economic gain will be delivered to the Bell Bay region at increased Gross Regional product of \$4.9 billion. According to modelling by MMRF-Green for the proponent, approximately 3400 more jobs would be expected in Tasmania in 2008 as a result of the pulp mill and, on average, during the operational phase 1617 jobs would be created.
73. There is also substantial support in the community for the proposal because of the economic and employment benefits that would arise. The impact on population and social structure is assessed in the Centre for Policy Studies report as moderate and positive based on increased employment and skills as a result of the project.

Social

74. From the public comments received, it would appear that there is a large proportion of the local community who are concerned with the operation of a pulp mill in the area, particularly in regard to air quality issues and the association of this mill with forest harvesting in Tasmania. Some members of the community have stated that the construction of the mill will lead to a tarnishing of the 'clean

and green' image of Tasmania as a source of healthy agricultural products such as wines, cheeses and seafood. Concern has been expressed about the project altering tourists' appreciation of local foodstuffs and wine in George Town, Launceston and the Tamar Valley. According to the Tasmanian Government's report (ITS Global, 2007, Attachment 10), while a visual impact is unlikely, odours and emissions may be considered unpleasant by some tourists. However, the report considered that tourism and industry can co-exist successfully, as they already do in the local area and region.

75. The mill is proposed to be located in an established industrial estate zoned for heavy industrial use in the Shire of George Town approximately 40kms from Launceston. An aluminium smelter, amongst other industries, has been operating at the estate since 1955. The Department could find no evidence that the operation of the existing industries within this industrial estate have impacted adversely on tourism or the establishment of new industries in the area.
76. Gunns are attempting to operate a near-odourless mill. The mill would incorporate a three-tier odour abatement system to capture odorous gases. Treated emissions to air originate from the recovery boiler, the power boiler and the limekiln, all of which are part of the recycling technology planned to be used in the mill. The proposed pulp mill would exceed the requirements of the Tasmanian pulp mill guidelines by having two incinerators as additional back up systems.
77. The proposed mill would release a range of pollutants to the atmosphere. However it will meet the background guideline values determined by the National Environment Protection Measure (NEPM) for Air Quality and the Tasmanian air quality objectives in the *Environment Protection Policy (Air Quality) 2004* (Tas). Air emissions from the operational pulp mill have been modelled to predict air quality impacts at peak running capacity at maximum pulp production. The modelling indicates that the contribution of emissions from the pulp mill to the local airshed is minor compared with other sources, particularly those from domestic wood heating in the winter months.
78. Concerns have also been raised by the public regarding the impact of the mill on property values in the area. According to the ITS Global report, the increased employment generated by the project would be expected to lift the value of residential housing and land and reduce the amount of untenanted housing stock. When considering the environmental acceptability of proposals there is a need to take into account perceptions of risk. 'Popular' community perceptions of risk often differ substantially from the assessment of risks provided by 'scientific' analysis. The Preliminary Documentation submitted that the impacts on the environment and on community health and safety had been comprehensively assessed and there was no 'scientific' basis for concern.
79. The proposal has been highly controversial in Tasmania and those on both sides of the argument have attempted to rally support. A demonstration in support of the proposal was reported to attract – 5000 while one against it reportedly had 11 000 attending.

Ecologically sustainable development

80. The proposed decision takes account of the principles of ecologically sustainable development, including the precautionary principle, as discussed above and summarised below. The Department considers that the proposal would be consistent with the principles of ESD if strict conditions on the effluent discharges to the marine environment and controls and offsets related to site disturbance were imposed as spelled out in this Report. There is clearly a lack of full scientific certainty about the proposal but the Department recommends a range of measures to prevent degradation of the environment. Any lack of certainty related to the potential impacts of the effluent discharge on the Commonwealth marine environment and listed migratory marine species is addressed by conditions that restrict the discharge of pollutants to prescribed levels, impose strict monitoring of the effluent and the receiving environment and adopt environmental standards which, if not achieved, require the application of response mechanisms in a timely manner to avoid adverse impacts.

The impacts on listed threatened species associated with clearing and disturbance to vegetation may impact on some individuals within a listed threatened species population, but this would not

constitute an adverse or unacceptable impact on the populations as a whole given the scale of clearing and the mitigation measures to be adopted.

Other legal considerations

81. The proposed decision does not contravene any recovery plan or threat abatement plan and is not inconsistent with any approved conservation advice. Of the listed threatened species recorded within the project area, or having suitable habitat within the project area, or likely to occur in the vicinity of the effluent outfall, the following have recovery plans, which are at Attachment 11:
- *Prasophyllum secutum* - Northern Leek Orchid
 - *Aquila audax fleayi* (Wedge-tailed Eagle) and *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
 - *Lathamus discolor* (Swift Parrot)
 - *Engaeus orramakunna* (Mt Arthur Burrowing Crayfish)
 - *Xanthorrhoea aff. Bracteata* (Sand Grasstree/Shiny Grasstree)
 - *Balaenoptera musculus* (Blue Whale)
 - *Eubalaena australis* (Southern Right Whale)
 - *Megaptera novaeangliae* (Humpback Whale)
 - *Carcharodon carcharias* (Great White Shark)
82. Any other listed threatened species occurring within or near Tasmania, whether having recovery plans or not, are not considered likely to be impacted by the proposal. Conservation advice for the following species, also at Attachment 11, was also taken into account.
- *Engaeus granulatus* – Central North Burrowing Crayfish
 - *Sarcophilus harrisii* - Tasmanian Devil
 - EPBC Act Policy Statement 3.6 - Tasmanian Devil, *Sarcophilus harrisii*
83. The threat abatement plan for the spread of the root fungus *Phytophthora cinnamomi* is at Attachment 12.
84. There is no information in the Register of the National Estate that is relevant to the approval decision in relation to this proposal that is not covered elsewhere in this Report or in the accompanying documents.
85. The proposed decision also takes account of Australia's obligations under international conventions and agreements. The proposed approval conditions are seen as appropriate for minimising impacts on listed threatened species and, if the action is taken in accordance with those recommended conditions, it will not be inconsistent with Australia's obligations under the Biodiversity Convention, the Apia Convention or CITES. The text of these conventions is at Attachment 13. Similarly, provided the proponent complies with the proposed approval conditions, the action will have no unacceptable adverse impact on listed migratory species and the approval will not be inconsistent with Australia's obligations under the Bonn Convention, CAMBA or JAMBA. The text of these instruments is at Attachment 14.
86. While not a requirement of the EPBC Act, it should be noted that the proposed decision would also be consistent with Australia's obligations under the Stockholm Convention on Persistent Organic Pollutants which is at Attachment 15.
87. If the proposal is to be approved, the approval decision must specify the period for which the approval has effect. The proposed start date for construction is the second half of 2007 with commissioning of the mill expected in 2010. The life of the plant is expected to be at least 30 years. Given these timeframes, it is recommended that approval be valid for 50 years.

88. A full list of legal obligations to be considered when deciding whether or not to approve the taking of an action and what conditions to attach to an approval is at Attachment 16.

Conclusion

89. The Department is of the view that, based on the available evidence, the impacts of the proposed action on the Commonwealth marine environment, listed threatened and migratory marine species and listed threatened and migratory terrestrial species will be acceptable, subject to a number of conditions.
90. The conditions related to the effluent discharge into the marine environment include restriction of the constituent pollutants to prescribed levels, the requirement for strict monitoring of the effluent and the receiving environment and the adoption of environmental standards which if not achieved require the application of response mechanisms in a timely manner. These conditions are considered necessary to ensure that acceptable impacts on the Commonwealth marine environment and on listed threatened and migratory marine species, as predicted by the proponent, are achieved.
91. The conditions related to the impacts on listed threatened terrestrial flora and fauna ensure that the area of disturbance to habitat is minimised and that in addition to the protection of 150 ha of reserve at the site, a further 200 ha of suitable habitat will be provided to offset the 200 ha of potential habitat cleared.

List of Attachments

1. Maps of the site
2. List of the documents that comprise the Preliminary Documentation for the proposal
3. Plans of the site, the site location and pipeline network
4. Map showing the marine outfall
5. Departmental (Environment Quality Branch) report: *Review of the Marine Impact Assessment of effluent from the proposed Bell Bay Pulp Mill*
6. Report commissioned from UNSW *Treatment and recycling options Bell Bay Pulp Mill Project*
- 7.1. Patterson Britton and Partners review of GHD (IIS) hydrodynamic modelling
- 7.2. BMT WBM review of the above
- 7.3. Inadequacies in the Hydrodynamic Modelling performed for Gunns Pulp Mill IIS, Stuart Godfrey, August 2007.
- 7.4. BMT WBM review of the above
- 7.5. BMT WBM advice on effect of moving the outfall further offshore
8. Poyry Technical Report 16B0104
9. Departmental (Environmental Economics Unit) economics report.
10. ITS Global Report: *Review of the Social and Economic Benefits of the Gunns Limited Pulp Mill Project*
11. Recovery Plans and conservation advice.
12. Threat abatement plan for the spread of the root fungus *Phytophthora cinnamomi*.
13. Biodiversity Convention, the Apia Convention and CITES.
14. Bonn Convention, CAMBA or JAMBA
15. Stockholm Convention on Persistent Organic Pollutants
16. Legal Obligations