

# AQUENAL

PTY LTD

ABN – 86 081 689 910

GPO Box 828, Hobart, Tas 7001

Ph 6234 3403 Fax 6295 0878 Email admin@aquenal.com.au

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## PROJECT

Gunns Limited proposed bleached kraft pulp mill in northern Tasmania

## SUMMARY OF MARINE ECOLOGICAL MONITORING WORK PERFORMED TO DECEMBER 2006

### 1 STUDY BRIEF

Aquenal was commissioned by Gunns Limited through GHD to carry out studies addressing the marine ecological aspects of the following sections of *Recommended environmental emission limit guidelines for any new bleached eucalyptus kraft pulp mill in Tasmania*, RPDC 2004:

- D.3.20 - D.3.23 Baseline biological survey
- D.4.13 - D.4.18 Biological monitoring surveys

To date the design and purpose of biological monitoring performed has been to gather background information to enable the design of a statistically valid monitoring program timed to start in autumn 2007.

### 2 TIMING OF WORK PERFORMED

- Baseline survey fieldwork was completed in April 2005, with the report submitted to GHD in July 2005, Pulp Mill Integrated Impact Statement Volume 11 Appendix 24.
- Biological pilot monitoring survey carried out in autumn 2005 and submitted to GHD in July 2005.
- Biological pilot monitoring survey carried out in spring 2005 and submitted to GHD in February 2006, Pulp Mill Integrated Impact Statement Volume 11 Appendix 27.
- Biological pilot monitoring survey carried out in winter 2006 and submitted to Gunns Limited in October 2006.
- Biological pilot monitoring survey carried out in spring 2006, report is nearing completion and is expected to be submitted to Gunns Limited in February 2007

Highest priority at present is being given to analysis of all data collected to date to enable the designing of a final monitoring program for commencement in autumn 2007.

### 3 METHODOLOGIES

The baseline survey area included the pipeline route and an area of 1 km radius around the diffuser site. Methodologies included a literature review, bathymetric survey, video camera tows and drops, seabed

photography, benthic grab sampling, baited video surveys and intertidal transects. Complete details of methodologies may be found in Gunns' IIS Appendix 24.

Biological monitoring surveys were designed to test natural temporal and spatial variability in aspects of the marine biota thought to best reflect ecological health in the vicinity of the proposed outfall. Those studied were benthic infaunal diversity and abundance, benthic epifloral and epifaunal community composition and percentage cover and bottom frequenting fish diversity and abundance. The surveys were designed to conform with the RPDC guidelines and the methodologies recommended in the report *Protocols for designing marine ecological monitoring programs associated with BEK mills* (Keough and Mapstone 1995). Based on the latter report, the statistical design chosen for the monitoring program is the MBACI approach (i.e. multiple before-after and control-impact sampling). Due to the limited toxicological information available the studies were designed with a broad scope and this design was repeated for statistical conformity throughout the subsequent monitoring surveys. Toxicological information which has come to light during the intervening period will be taken into account in the final monitoring program design. **Benthic infauna** was sampled using a 0.07 m<sup>2</sup> Van Veen grab then sieved over a 1 mm mesh and identified to family level. Number of species per sample was also recorded. Sediment particle size distribution within benthic infaunal samples is being assessed to assist in interpreting infaunal data. Benthic **epifloral and epifaunal** communities were sampled using a remotely controlled quadrat capture technique which photographed an area of seafloor 0.5 m square. Species present and percent cover were tabulated however at this stage only percent algal cover has been assessed statistically. The photographic record can be revisited to assess a wide range of community and visual characteristics of the seabed should any other changes be noted in the future. **Fish** communities were sampled using a baited video technique where species and numbers approaching within camera view of a bait bag during a 15 minute interval were recorded. Complete details of methodologies may be found in Gunns' IIS Appendix 27.

#### **4 WORK IN PROGRESS**

Collection of data from all four pilot surveys is complete and reports on all surveys except the spring 2006 survey have been submitted to either GHD or Gunns Limited as noted above. All data are now being analysed by Aquenal personnel and an independent consultant statistician Dr Leon Barmuta of the University of Tasmania. On completion of this analysis, and using effect size and power parameters provided by government agencies, Aquenal in conjunction with Dr Barmuta will make recommendations on the most appropriate monitoring design based on Keough and Mapstone's MBACI principles. These recommendations will be submitted to Gunns Limited in the first week of February 2007. It is anticipated that following discussions with regulatory authorities in February 2007, a final design will be approved in time for the first monitoring event of the 2.5 year pre-operational monitoring program to be conducted in autumn 2007, should it be required.