The engineer in his own way is an artist too - and not just a dead fish with a slide rule.
**Jørgen Varming**

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STEENSEN VARMING

Att. Andy Nixey
Department of Planning and Environment
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**Sydney June 22, 2018**

**Joe Martin**
Senior Mechanical Engineer

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Dear Mr Nixey

The below letter provides Steensen Varmings responses to the queries raised in the EPA response to submission. The specific queries have been extracted from the EPA letter and answered directly below.

**A**

> The EPA notes that the design of Seawater Heat Exchange System described in Appendix H to the Report appears different to the design described in the related document accompanying the EIS, including an increase of:
>
> - net heat rejection capacity from 1,600 to 2,600 kilowatts (~60% increase); and
> - twin outlet pipe diameter from 300 to 400 millimetres
>
> The EPA notes that the EIS states that the outlet pipe design diameter is 300 millimetres, however the modelling assumes a pipe diameter of 400 millimetres as a worst-case scenario.

The total heat rejection from the system has been calculated at 2366.4kW. To allow for a percentage of future correction, a value of 2600kW was use for calculation purposes. The net rejection given before of 1,600kW was inaccurate based on early estimates.

The sea water return pipe has been designed to have a diameter of 400mm to accommodate the minimum discharge velocity.

**B**

> *(b) Use of pesticide (anti-foulant)*
>
> Section 5.3 to Appendix H (revised Seawater Heat Exchange Report) to the Report consistently refers to the proposed anti-foulant as 'Mexcel' however the APVMA product is known as 'Mexel 432' the registration of which is due to expire on 30 June 2018.

Given expiration of the mexcel registration and its increased ventilation requirements, the design is now proposed to use 'Veolia A32' as an anti-fouling agent. It has an APVMA approval No. 55270 / 25902 and requires no specialist ventilation.

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**C**

> Section 5.3 of Appendix H to the Report indicates the system be dosed not more than 30 minutes once in any 24 hours and that the dosing system should be automatically disabled should the concentration reach 8 ppm which it goes on to suggest is well below the acceptable limit for concentration in seawater.
>
> However, the product label indicates the product be applied at a maximum 8 millilitres per cubic metre of flow (i.e. 8 ppm) for up to one hour, no more than once a day. And importantly, ensure that the discharge water contains less than 0.5 milligrams per litre of product.
>
> The proponent should clarify that –
>
> (a) the anti-foulant is 'Mexel 432',
>
> (b) the maximum application rate is 8 millilitres per cubic metre of flow for not more than 30 minutes not more than once per day, and
>
> (c) constant monitoring will be implemented to ensure that at all times the concentration of Mexel 432 in water discharged from the system is less than 0.5 milligrams per litre.

The design is now proposed to use 'Veolia A32' as an anti-fouling agent.

The proposed dosing rate for the Sydney Modern Seawater System is set at 2mL of A32 per kL (i.e. 2ppm) per system (3 systems total). The A32 product label indicates that the "MAXIMUM" dosage should not exceed 8 mL per kL of seawater "up" to 1 hour and no more than once a day, the proposed dosing rate is 2 mL per kL of seawater only for 30 minutes once every 24 hours.

Constant monitoring will be implemented to ensure that concentration of A32 in the water discharge from the system is less than 0.5 milligrams per litre and the monitoring of chemical concentration is via the water treatment control system and BMS.

The dosing values are as follows:
2mL A32 per kL seawater = 60L/sec x 3600sec x 2mL / 1000 = 216mLs per hr per unit for 30 mins per day per train = 324mLs/day in total for 3 trains = 118.26 Ltrs / year.

**D**

> Section 5.3 of the Seawater Heat Exchange Report accompanying the Report further indicates that intake pipework has been kept as linear as possible ".. to allow for a conventional pigging system to be utilised ...". The EPA remains unclear whether conventional pigging is to be used to clear the intake pipework of marine growth, particularly given that there is no indication of where the pigging waste would be collected/stored or how the proponent would dispose of that waste.

It is proposed to use a conventional pigging system as per industry standard. Divers will not be entering the pipes but will instead collect waste safely as per industry good practice. The disposal of the waste will be via the specialist contractor carrying out the cleaning.

Kind regards

Joe Martin

Joe Martin
**Senior Mechanical Engineer**