BEFORE THE ENVIRONMENTAL PROTECTION AUTHORITY

IN THE MATTER of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012

AND

IN THE MATTER of an Application for Marine Dumping Consent by Coastal Resources Limited

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SUMMARY POINTS BY DR CLAUS PEDERSEN
ON OCEANOGRAPHY/SEDIMENT MODELLING
Dated 27 November 2018

SUMMARY

1. To the best of my knowledge, the best available information has been used to describe the oceanographic environment
2. It is considered that combined with ocean current hindcast modelling, the available oceanographic data forms an adequate baseline for oceanographic conditions for informed decision making.
3. The plume monitoring of previous disposal had severe limitations which prevented it from predicting plumes outside the NDA. Numerical modelling is thus key to inform on this component.
4. The nearfield plume modelling (Appendix B of Andrews Evidence dated 25-10-2018) is considered in line with international best practice and results are in line with expectations.
5. The near field model predicts “stripping” of material from the descending convective plume in the order of 5%. This leads to predicted maximum “excess” (in addition to background) plume concentrations from a single disposal which can exceed 100 mg/l.
6. Best practice has been applied in estimating the stripped material in the near field model and transferring this to a far field model (Appendix C, of Andrews Evidence dated 25-10-2018)
7. The far field modelling included two key components: 1) Ocean Current Hindcast; 2) Dispersion of the passive plume through trajectory modelling. It is not possible to evaluate the setup and performance of the far field plume model) due to limited information on setup and lack of documentation of performance against measured current data.
8. The model output from the far field model provided in Andrews Evidence of 25-10-2018 was limited to monthly average suspended concentrations and sedimentation rates. Whereas the plots illustrate that longer term average concentrations and sedimentation rates are predicted to be negligible, they do not inform on the expected concentrations in the passive plume. It is considered that a description of intensity-duration-frequency relations would be informative for impact assessments.
9. Supplementary Statement by Connon Andrews provides additional information on suspended sediment concentrations, but there is lack of clarity in how the results are derived and what they represent, and there appears to be discrepancies between these and the near field results.
10. The near field model predicts maximum concentrations to exceed 100 mg/l, which is in line with what I would expect. An ambient net current of 0.1 m/s would transport this to the NDA boundary in 4 to 5 hours. Settling of the plume applied in the model was 1m/hour, and only a small fraction of sediment would have settled to the bottom within the 4-5 hours. On this basis, I would expect concentrations at the NDA boundary to be comparable to the initial concentrations, although lateral dispersion would lead to some reduction in concentrations.
11. I would expect that a significant proportion of the passive plume would be convected outside the NDA. The duration and frequency of these plumes would be short/low at a given location, and therefore likely not significant in terms of potential impacts.
12. The passive plume would disperse over a large area, and the associated sedimentation rates expected to be close to negligible outside the NDA.
13. Although not demonstrated through modelling, it is considered that any resuspension from the NDA would be insignificant.