

**BEFORE THE ENVIRONMENTAL PROTECTION AUTHORITY  
AT WELLINGTON**

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

**AND**

**IN THE MATTER** of a decision-making committee  
appointed to hear a marine consent  
application by Trans Tasman Resources  
to undertake iron ore extraction and  
processing operations offshore in the  
South Taranaki Bight

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**EXPERT REBUTTAL EVIDENCE OF DR MARK JAMES ON BEHALF OF TRANS  
TASMAN RESOURCES LIMITED**

**10 FEBRUARY 2017**

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## INTRODUCTION

1. My name is Mark Richard James.
2. I prepared Expert Evidence dated 15 December (First Statement) with respect to these proceedings on behalf of Trans Tasman Resources Limited.
3. My qualifications and experience as an aquatic ecologist are set out in paragraphs 1-5 of my First Statement.
4. I repeat the confirmation given at paragraph 6 of my First Statement that I have read the Code of Conduct for Expert Witnesses and agree to comply with it.
5. The purpose of this Rebuttal Evidence is to respond to matters raised in submitter evidence. It addresses the following matters:
  - (a) Scale extent and severity of the sediment plume;
  - (b) Ecologically sensitive and high value areas;
  - (c) Sensitivities of biota to Total Suspended Sediments (TSS) and sedimentation;
  - (d) Monitoring and conditions; and
  - (e) Uncertainty.
6. In preparing this evidence I have reviewed the following statements of evidence:
  - (a) Leigh Torres, Dougal Greer, John Cockrem, Shaw Mead, Elizabeth Slooten, Ngaire Phillips for KASM;
  - (b) Anton Leo Van Helden, Royal Forest and Bird Protection Society;
  - (c) Maria Cecilia Cashmore for Te Rununga o Ngati Ruanui Trust; and
  - (d) Helen Anderson, Douglas Saunders-Loder, Greg Barbara, Bruce Clarke, Andrew Smith, Jeremy Helson for Fisheries Inshore NZ Ltd.

## SCALE, EXTENT AND SEVERITY OF EFFECTS OF SEDIMENT PLUME

7. A number of submitters in their evidence conclude that the scale of effects is largely unknown or unquantified. I addressed these matters in my First Statement at paragraphs [103] and [113].
8. To further assist the DMC I have appended **Table 1** which shows the spatial extent of effects and the relatively small

area of the SMD where these effects are predicted to be above 5% reduction (<5% the area for water column production and <32% for benthic production).

9. In their evidence Shaw Mead and Andrew Smith discuss the effects of a continuous sediment plume rather than a pulsed effect, as would occur naturally. In my First Statement I provided time-series at key sites such as the Traps and Graham Bank that show that the sediment plume will be experienced as short-term pulses similar to that experienced naturally. Leigh Torres is concerned about the impact of sediments on distribution and availability of the krill *Nyctiphanes australis*. The distribution and abundance will not be affected by the ISR off the Taranaki Coast as it is the upwelling plume off Kahurangi that drives these populations.
10. John Cockrem raises concerns in his evidence about reductions in light intensity and carbon flux. The issue of primary production is dealt with by Larry Cahoon and in my First Statement. It is the utilisation of carbon by primary producers and the foodweb that is important and the main source of carbon to the soft-benthic habitat is water column production which is highly dynamic in space and time and there is continuous advection into and out of the SMD.
11. In his evidence Douglas Saunders-Loder is concerned about the impact on aquaculture at the top of the south. This concern is unfounded as there is no way the plume will extend into the Marlborough Sounds from the ISR, as shown in the plots produced by TTR. The mussel farming industry is also subject to considerably higher TSS levels in the Sounds than predicted from the ISR.

#### **ECOLOGICALLY SENSITIVE AREAS**

12. Shaw Mead and Maria Cecilia Cashmore along with other submitters state that key sites that are highly valued such as nearby rocky reefs are not assessed or acknowledged. In my First Statement I provide tolerance levels and time-series of TSS at more sensitive sites such as the Traps, Graham Bank and nearby reefs to show that the effects as a result of ISR will not be ecologically significant for invertebrates or biota that rely on them.

#### **SENSITIVITIES OF BIOTA TO TSS AND SEDIMENTATION**

13. In their evidence a number of submitters including Elizabeth Slooten, Shaw Mead and Maria Cashmore question the information used to establish thresholds and recovery for biota. This is discussed in my First Statement based on my work with the Port Otago Dredging Programme which involved extensive reviews of existing knowledge including

following recovery from dredging. I consider the assessment is based on the best available information and observations that provide an appropriate basis for the assessment.

14. John Cockrem notes in his evidence that the threshold for birds of 25 mg/L is unreferenced. The Port of Melbourne EMP refers to 25 mg/L for cormorants and as a suitable threshold for terns and gannets.
15. Helen Anderson and Greg Barbara are concerned that the plume and subsequent sedimentation will pose a threat to macroalgal reefs and other biological communities. However the level of deposition is predicted to be considerably less than tolerance levels for biota and will have no more than a minor effect at distances over 2 km downstream.

### **MONITORING AND CONDITIONS**

16. Leigh Torres suggests there are no surveys offshore included within the monitoring. This is covered in the monitoring plan.
17. Shaw Mead is concerned that the monitoring framework is based on maximum limits. In response I note that to ensure that the frequency of different levels of TSS are no more than background there is also a requirement under Condition 20 to assess frequency of 25<sup>th</sup> and 50<sup>th</sup> percentiles.

### **HEAVY METALS**

18. Ngaire Phillips and Greg Barbara are generally in agreement with the assessment of effects of heavy metals but are concerned that more attention should have been given to arsenic, nickel, mercury and copper, particularly with regard to long-term exposure and that some of these were approaching or exceeding the ANZECC guidelines. I consider that the proposed dilution will rapidly decrease concentrations of these elements to levels that will not have an adverse effect on biota.
19. ANZECC guidelines are based on levels "in the environment" and therefore dilution needs to be taken into account. I support the approach to monitoring heavy metals which is to measure concentrations in sediments downstream in order to confirm my assessment. As recommended by Ngaire Phillips and Greg Barbara, I agree that mercury and arsenic should be included in the heavy metal parameters.

### **BASELINE MONITORING**

20. In their evidence Helen Anderson and Bruce Clark consider baseline monitoring should have been undertaken prior to the applications being made. I agree with the response in

Dan Govier's rebuttal about the purpose of baseline monitoring (and the distinction between the information needed to assess effects on the environment and that needed to enable "before and after" comparisons to be made). Such an approach is consistent with cases I have been involved with.

### **UNCERTAINTY**

21. Various witnesses have suggested that there is insufficient information available to reliably assess the effects of the proposal and that there is an unacceptable level of uncertainty that can only be addressed by collecting additional data. I do not agree. The area potentially impacted by different levels is well defined and a range of sediment concentrations, including time-series has been provided which form the basis for compliance.
22. I consider there is sufficient knowledge to make a valid assessment of effects and there is a comprehensive monitoring programme in place to detect unexpected effects, if they were to occur.

### **CONCLUSIONS**

23. The points raised by submitters have not affected by conclusions in my First Statement.
24. I agree that the BEMP and the EMMP should be revised to take into account important sites identified by submitters and include parameters (metals) not already covered, as addressed by Dan Govier.



A handwritten signature in blue ink, appearing to read 'M. James', is written over a light blue rectangular background.

**Dr Mark James**

**10 February 2017**

**Table 1.** Predicted changes in primary production by phytoplankton in the water column and by microphytobenthos on the sea-bed (benthic) as a result of changes to light intensities due to mining at site A and at site B. Changes are shown in terms of the area (km<sup>2</sup>) of the seabed in the sediment model domain (Hadfield & Macdonald, 2015) with a change in the given range, and with

Changes	Water column primary production		Benthic primary production	
	Mine A	Mine B	Mine A	Mine B
	km <sup>2</sup>	km <sup>2</sup>	km <sup>2</sup>	km <sup>2</sup>
<1%	9956	10,374	6059	5365
1-5%	2705	2710	3018	3189

*this area expressed as a proportion (%) of the total area of the sediment model domain.*

5-20%	704	282	2758	3450
20-60%	1	0	1466	1344
>60%	0	0	65	18
Total	13,366	13,366	13,366	13,366
	%	%	%	%
<1%	74	78	45	40
1-5%	20	20	23	24
5-20%	5	2	21	26
20-60%	0	0	11	10
>60%	0	0	0.5	0.1
Total	100	100	100	100