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Mr Howard Reed
Manager Mining Projects
Major Project Assessments
NSW Dept of Planning & Infrastructure

cc Mr Clay Preshaw

18th December, 2013

Dear Mr Reed,

**Re: Subsidence Impact Assessment – Gujarat NRE No. 1 Major Expansion Project
Part 3: Review of NRE Preferred Project Report (PPR) – Subsidence Assessment**

Supplementary Advice to My Report on above: Report No. 1303/02.3 (17th November, 2013)

As per instruction from Mr Clay Preshaw, this supplementary advice has been prepared in relation to the question of possible inter-connective cracking from the mining horizon to surface above the end section of proposed Longwall 7. Separate reports from myself and Mr Paul Tammetta, of Coffey, had indicated some possible inconsistencies of opinion with respect to the above matter, and the subsequent hydrological implications, if such connectivity might occur. I was instructed to speak further with Mr Tammetta concerning his findings and also to speak with Dr Ken Mills, from SCT, who had authored the work for Gujarat contained within the PPR on the subject of Subsidence Assessment.

Discussions and related further correspondence took place both with Mr Tammetta and Dr Mills on this subject. From my perspective, I offer the following summary comments arising from such discussions, which I trust will also be reflected similarly in further advice from Mr Tammetta.

- There is only very limited data available with respect to prediction of cracking above multiple mined coal seams, leading to a calculation of height of desaturation, or depressurisation (H), as discussed by Tammetta.
- Mr Tammetta has done considerable work on this issue and has collated valuable data to enable prediction of this parameter, H, though primarily from single seam sources.
- In the case of multiple mined (extracted) seams, the initial approach for calculation of H is to use an accumulated seam thickness from the multiple seam thicknesses.
- It is agreed by all parties that if the height of desaturation intersects the surface, then there is a real risk of water loss from any intersecting surface water flows.
- It is understood that Mr Tammetta's original reported results which suggested an intersection with the surface were based on using the sum of all three mined or proposed to be mined seams, i.e. Balgownie, Bulli and Wongawilli. However, further analysis by Dr

Mills suggests that in the area in question above Wongawilli LW7, the Bulli Seam workings only consisted of development roadways, not extraction. As such, it is considered inappropriate to include the thickness of the Bulli Seam workings in the calculation for H. Without the Bulli Seam thickness, the calculated value of H using Tammetta's equations, does not intersect the surface. Therefore based on the above interpretation, the risk of inter-connective cracking is considered low in the vicinity of LW7 (or any other part of the proposed workings).

- It is agreed by all parties, however, that whilst the Tammetta approach and the database from which it has been developed is the best available, it still lacks sufficient data and understanding with respect to the effects of multi-seam workings on the height of desaturation, and hence cracking propagation and continuity; and should therefore be backed up by further investigation in a multi-seam environment.
- All three parties to these discussions agree that it would be prudent with respect to the Gujarat planning; as well as invaluable for future industry understanding; for some instrumented boreholes to be installed to measure the appropriate hydrological data in a multi-seam environment. It is agreed that an instrumented borehole over the current Longwall 4 workings where all three seams have been mined would be extremely beneficial. A further similar borehole ahead of the proposed longwall 7 workings would also provide invaluable data on this subject. It is therefore recommended that both such holes be requested as part of the planning and approval process. Furthermore, the data and interpreted results from such boreholes should be reported to the Department and to the wider mining and technical community.

I trust that these comments clarify and previous apparent inconsistencies and add further understanding to the situation under consideration. Please do not hesitate to contact me should you require further information.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Bruce Hebblewhite', written in a cursive style.

Bruce Hebblewhite