

## Tikitere Zeolite Trial

### Trial to assess the ability of zeolite to remove ammonia from a geothermal stream within the Lake Rotorua Catchment

#### Summary

- The trial gave similar results to a trial undertaken by Mowatt et al in 2005.
- Although still awaiting final zeolite analysis, the results to date suggest that technically zeolite can be used to remove up to 25 tonnes/yr of ammonia from the Tikitere Stream (Lake Rotorua catchment). The economic viability is being investigated.

#### Key Points - To be read in conjunction with the attached Powerpoint Presentation;

- Tikitere Stream flow averages 700,000m<sup>3</sup>/year of low pH(2-3) water with an average ammonia content of 30-40g/m<sup>3</sup>
- Slide 5 (Phase 1 Graph1). Shows similar results to Mowatt Trial at the same flow rate (1m<sup>3</sup> water per m<sup>3</sup> zeolite per hour). Zeolite adsorbency ability plateauing at 30-35mg/litre. At high loading, zeolite can become unstable and desorb the ammonia (spike 25th December). Previous recommendations that the zeolite be replaced when discharge water ammonia reaches 30mg/litre seem to be confirmed.
- Slide 6 Phase 1 Graph 2. Zeolite analysis at time of changing showed Ammonium N content ranging from 5930-8600mg/kg (average 7265 mg/kg = 0.73%). Mowatt Trial results were 0.78%
- Slide 8 (Phase 2 Graph 1). Flow rate 50% of previous trial using cells in parallel with three different grades of zeolite. Coarse and medium grades performed similar. There may have been flow issues which affected the fine grade. Trends similar to phase 1 but plateau level was 35-40 rather than 30. NB the stream ammonia levels were generally higher. One spike occurred, but did not result in desorption.
- Slide 9 (Phase 2 Graph 2). The stream carries a very high sediment load. There were no obvious differences between the different grades in reduction of turbidity, but generally turbidity after treatment was <100 ntu compared to instream turbidity of +/- 300.
- Slide 10 (Phase 1 and 2 Graph 3) Compared results for the same (medium) grade at different flow rates. Slower flow rate adsorbed more ammonia but reached same point after 11 days. Note difference is stream ammonia levels - will this affect adsorbency rate?
- Slide 11. Spot comparisons indicate that ammonium N removal is similar for both flow rates.
- Slide 12. Compares high stream ammonia levels with rainfall. Some spikes coincide with high rainfall, but the general increasing ammonia trend from 24 Jan to 7 Feb occurred at a time of zero rainfall (except for one 25mm event).
- Slide 13. The acidic stream water ( pH 2-3) created corrosion problems with new galvanised connectors corroding in a few weeks. Sediment accumulated in the header tank contained large numbers of live bloodworms. On one day (only) two cells contained iron floc and the third one didnt.

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