

## Removal of nitrates from groundwater in remote indigenous settings in arid Central Australia

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### ABSTRACT

Naturally occurring elevated levels of nitrates are detected in many of the groundwater bores in the arid zone of Central Australia. Such levels are associated with anemia in young babies, pregnant women and other vulnerable groups. Further, there is evidence that links long-term exposure to elevated levels of nitrates with gastric cancer. In many parts of arid Central Australia alternative sources of water are not available. The capacity to operate and maintain water treatment and supply systems in remote Indigenous communities varies due to access and levels of service provision, mobility of the residents and balance of skills within the communities. A need has thus been identified for a low maintenance nitrate removal system. Conventional treatment processes do not remove nitrates. Alternatives, such as reverse osmosis, ion exchange or biological denitrification are either complex, energy and water intensive, expensive, produce waste products requiring disposal or require continual maintenance and monitoring. Such preconditions are not able to be met in remote Indigenous communities. This paper reviews the problems of nitrates in the arid zone of Central Australia and explores existing technologies for their removal, relative to remote Indigenous settings. It identifies a need for further investigations to tailor technology to the unique social, economic and cultural characteristics of these settings.

*Keywords:* Nitrate; Groundwater; Physical processes; Physico-chemical processes; Central Australia; Denitrification

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