

---

## Support services for water treatment and hydrometallurgy.

---

5 July 2005

### Submission

Inquiry into supplying bulk Potable Water to Kalgoorlie-Boulder  
Economic Regulation Authority  
Level 6, Governor Stirling Tower  
197 St Georges Terrace  
Perth, Western Australia 6000

The following comments are provided by SLS Technology Pty Ltd, a Perth based company that provides a water treatment process consulting for Australian and overseas clients.

The objective of the ERA review has been to assess the best economic option between two potable water manufacturing options with the product delivery via alternative pipeline routes.

Whilst the ERA review must be complimented for its detail, the limiting terms of reference have not allowed the skilled analysts to apply their trade. The analysis is limited to the information supplied by the proponents and lacks

- any constructive vision of alternatives or improvements, thus entrepreneurial flair
- serious assessment of public health and asset management risks associated with pipeline length
- ideas outside of the very basic strategies proposed by the two proponents

Therefore, the ERA's review conclusions could have never indicated what is best for the community of Western Australia.

The following discussions will explain this opinion.

### **Mining and Industry consumption**

The review states that an attractive benefit will be gained by mining and other industry groups by using potable water for industrial purposes as opposed to hyper-saline water. However, potable water is more expensive than either recycled municipal wastewater or recycled industrial process water.

Whilst mining and industrial companies require clean water they do not automatically need disinfected or potable grade water for their processing purposes. As many as 90% of these companies would obtain greater profits by using a basic clean, water which can be supplied at a much cheaper unit cost.

Cheaper water can be provided to the mines in the Kalgoorlie region by recycling adequately treated wastewater.

---

## Support services for water treatment and hydrometallurgy.

---

Wastewater can be treated to any required quality for recycling purposes. Agricultural irrigation, horticulture, aquaculture, dredge mining, mineral processing and industrial applications have all been proven.

Recycling wastewater for industrial purposes is much cheaper than sea water desalination. An economic study is not required to confirm this fact.

Mineral processes, such as Nickel Laterite and Gold Cyanide processes would not be affected by the slight salinity in municipal wastewater as these ores already contain an amount of salt. The only processing required would be filtration such as Fabric Media filtration which would cost around \$15 per million litres and is applicable for direct filtration of suspended solids from untreated wastewater. This is a fraction of the cost of traditional filtration techniques, and the power of this novel filtration technology means that only small pipeline lengths out from the Kalgoorlie wastewater treatment plant would be required.

Kalgoorlie-Boulder has an existing deep sewerage pipeline network that transfers roughly 6ML per day plus larger stormwater volumes to their existing lagoon facility, from which this volume could be filtered and then piped to mine site customers.

The Kalgoorlie-Boulder community has a high degree of recycled water acceptance with most sporting ovals already being watered with a recycled product. Recycling nutrient rich treated wastewater provides a two fold community benefit with green sporting fields attained with less synthetic fertiliser requirement. However, the current wastewater treatment technique applied results in about 80% of the potential recycled wastewater volume being lost to evaporation.

The world has suitable technology to recycle municipal wastewater efficiently with above 95% recovery being practical, for whatever purposes. To support this statement the Water Corporation has invested heavily in a 22ML per day wastewater reclamation plant in Kwinana.

Nutrient removal is desired for specific industrial applications of recycled wastewater, such as cooling towers and heat exchangers. With Fabric Media filtration technology this water quality can be attained at costs that are significantly more rewarding than either expansion of the GAWS pipeline or sea water desalination.

Since recycling represents a fraction of the cost compared to the two assessed options of desalination or upgrading of the GAWS pipeline, and provides the benefit of a lower unit cost to customers it is logical that neither proposal studied by the ERA can be considered until full capacity for recycled municipal wastewater has been attained.

### **Pipeline asset management**

The GAWS pipeline uses Chlorine for disinfection at such levels that ammonia is required for stabilisation of the Chlorine. This disinfection technique has two concerns.

Firstly, the stabilized intermediate and disinfectant is "Chloramine" a chemical that is of increasing and accepted health concern worldwide and therefore from a public health

---

## Support services for water treatment and hydrometallurgy.

---

viewpoint serious consideration should be given to alternative technologies for the disinfection requirements. Neither cost study has included the potential future risk associated with this questionable disinfection technique.

Secondly, the Chlorine causes a corrosion rate of the steel pipeline which creates high maintenance costs.

Proven disinfection techniques such as UV and Iodine are attractive as they eliminate both the above concerns. Iodine is a well known medicinal approved disinfectant and not capable of corroding steel. One chemical would remove the need for both Chlorine and Ammonia and significantly reduce the maintenance of any steel pipeline.

An Iodine technology, such as that patented by Ioteg Australia Pty Ltd, ([www.ioteg.com](http://www.ioteg.com)) a Sydney based company will enable large sterilising dosages of Iodine to be applied with the ability to completely remove the residual Iodine and Iodide reaction product by resin exchange when the water exits the pipeline. Thus, creating acceptable potable water without consumption of the halide resource as the Iodine is regenerated and then recycled.

Corrosion of the GAWS steel pipeline represents a large maintenance cost over a 50 year period, and there is realistic potential for these proven lower cost techniques that should be included in the consideration of the respective pipeline costs.

### **“No supply” risk management**

Both proposals involve transporting potable grade water through the respective lengthy pipelines. Both pipelines will be subject to man made and natural destructive forces such as earthquakes that risk a catastrophic “no supply” situation.

If the Kalgoorlie and agricultural communities are without a reliable supply of water for even a short period the economic outfall will be significant to the wider Western Australian community and therefore any recommendation should address and minimise this potential disaster risk.

Providing the Kalgoorlie and agricultural communities with water from both sources presents practical risk management by diversification. However, maximising the potential to recycle the wastewater available in Kalgoorlie will minimise the “no supply” risk management.

Recycling treated wastewater does not add pipeline length and thus does not increase the risk of catastrophic pipeline failure. In the rare event of catastrophic pipeline failure recycled wastewater may be the saving grace for the Western Australian economy.

### **Potable Water for Esperance**

The ERA review discusses serious concerns with the Calcium hardness of the potable water currently. Industrial and commercial based concerns are highlighted in the ERA review, but the adverse public health impact currently being inflicted on people in Esperance is not stated.

---

## Support services for water treatment and hydrometallurgy.

---

In Singapore, the government utility is building a 115ML per day wastewater recycling plant to ensure supply of industry suitable quality water and in fact will upgrade some of that water to drinking water quality. As in Singapore, California and Europe the public will accept and consume potable water derived from recycled wastewater when the quality is superior and the supply is convenient.

Transporting 5 million litres per day by pipeline, of suitably treated wastewater from Kalgoorlie to Esperance will address the urgent Calcium hardness concerns at a fraction of the cost of a desalination plant for Esperance.

(Pumping from Kalgoorlie to Esperance is down hill!)

### **Environmental sustainability**

Each proposal forwarded by the proponents is energy consuming and creating Carbon Dioxide.

Recycling treated wastewater, or more correctly the post treatment of the organic matter can be performed to gain carbon credits which can be used to offset projects that have to generate the pollutant.

A Perth company, At Source Organics ([www.atsourceorganics.com.au](http://www.atsourceorganics.com.au)), is considered a world leader in composting municipal sludge from wastewater and could be contacted to assess the significant carbon credits potential.

### **Conclusion**

If the decision makers for our Western Australian community are to apply a sustainability based assessment technique with regard to conservation of our limited water and energy resources then our decision makers must be allowed to consider the possible benefits of new and proven technologies that can be applied to conserve our water.

The potential quality of the ERA review was hamstrung because the positive rewards of novel technologies were not forwarded by either of the two submitting parties and was not a component of the terms of reference instructions.

Interested readers may obtain further information on wastewater recycling from the SLS web site [www.watertechnology.com.au](http://www.watertechnology.com.au)