Environment Institute of
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ABSTRACT SPECIFICATIONS

Title: Solar drying of brine - better understanding leading to improved decision making

Author: Chris Gimber

Organisation: KBR

Country: Australia

Email: chris.gimber@kbr.com

Abstract:

The CSG industry is grappling with the problem of managing large volumes of brine waste. One potential management method which is gaining increasing attention is solar drying of brine followed by permanent storage of crystalline salt in a hazardous waste facility. While solar drying of brine is a simple and reliable method of drying in many parts of Australia, it is not without risk. Some of the more substantial risks include wet climatic sequences during the salt harvesting period and diminished evaporation caused by the ionic composition of the brine.

This paper outlines the key aspects that need to be considered when assessing the suitability of solar drying for a particular application. Some of these include:

- the brine chemistry and its effect on evaporation rates, particularly as it becomes highly concentrated
- the level of intervention/maintenance activity that is available at different stages of the drying process
- the degree of flexibility around the target end date for completion of drying/crystallization and the trade-off between evaporation area and certainty.

Many assessments of solar drying rely on empirical relationships between salinity and evaporation (called the "salt curve"). These relationships are derived for a specific water type in a specific location, and therefore are often not appropriate for waters of different chemistry in locations with different climatic conditions (e.g. relative humidity). This paper explains how to derive a relationship for the specific brine being considered, either through geochemical modelling or bench scale testing.

The design and operation of the drying ponds has a major influence on the rate at which crystallisation occurs and the moisture content of the salt. Improvements can be made through simple management practices and design features, which are described.

The considerations described in this paper should lead to a more complete understanding of solar drying and more reliable performance prediction, allowing for improved decision making.