RECLAMATION
Managing Water in the West

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Desalting and Water Purification Research Program

Cost Effective Volume Reduction of Silica-Saturated RO Concentrate

DWPR Report #125, A. Tarquin, U of T – El Paso

Background:

In many brackish groundwater sources, silica is the component that limits recovery in the desalination processes. Concentrate from reverse osmosis in such areas is supersaturated in silica. This project sought methods of reducing the volume of such concentrates and finding a beneficial use for the solids.

Objectives:

- Test lime softening and ion exchange (IX) softening for reducing concentrate volume.
- Test the process with a secondary RO system to treat softened effluent.
- Find uses for the solids.

Results:

- 96% overall recovery was achieved. Silica was reduced to <30 mg/L in the primary RO concentrate using 600 mg/L lime at pH < 4.0. Limiting component at 96% was Calcium Fluoride (CaF_2).
- Lime sludge was tested as an arsenic removal media and silica removal media. It is not economical for arsenic, but may be for silica if the sludge is recycled.
- Mortar made with lime sludge was not as strong as the control. There isn't enough demand for weak mortar to use significant quantities of sludge.