



Innovative Desalination Research and Development

Trends in Emerging Desalination Technology Concepts and Applications

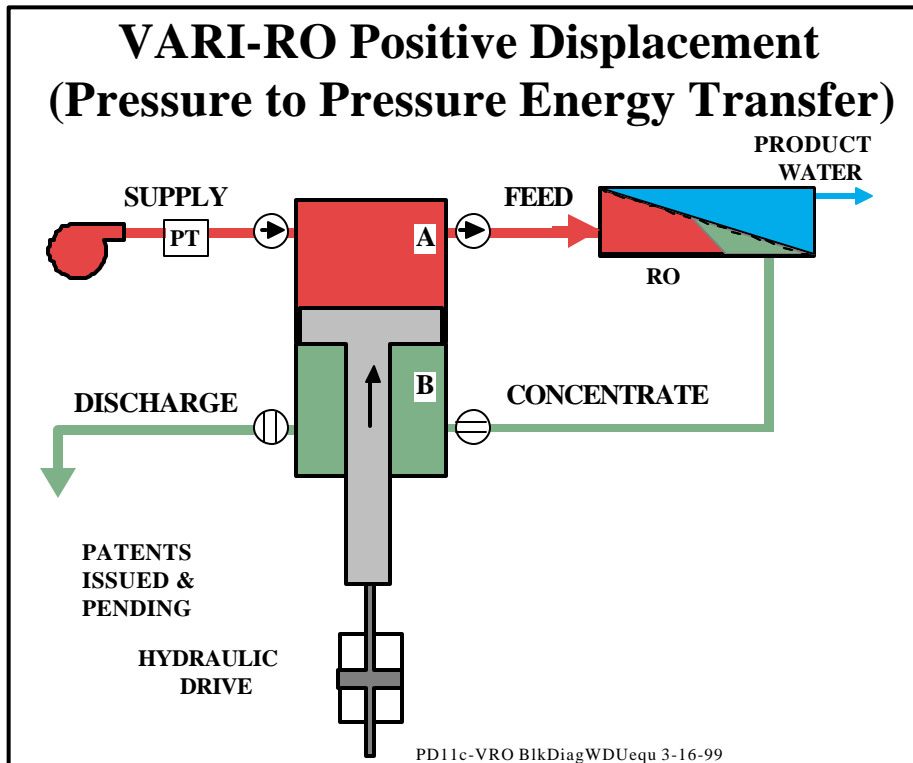
**New Mexico Forum on Reclaiming Produced Water
for Beneficial Use**

July 22-23, 2003

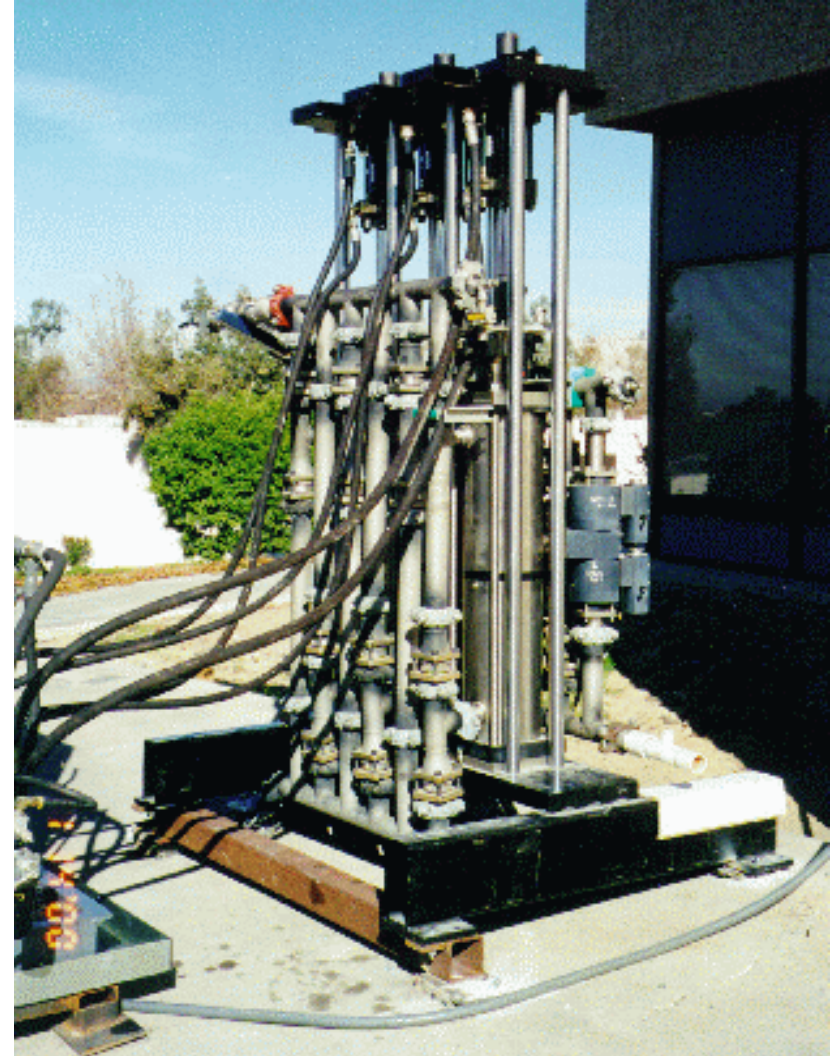
Energy Reduction Process

VARI-RO - Will Childs, Researcher

- System uses residual pressure energy to assist pumping input water
- Potential energy saving 25% (IPER Model) to possibly 70% (DDE direct energy conversion)



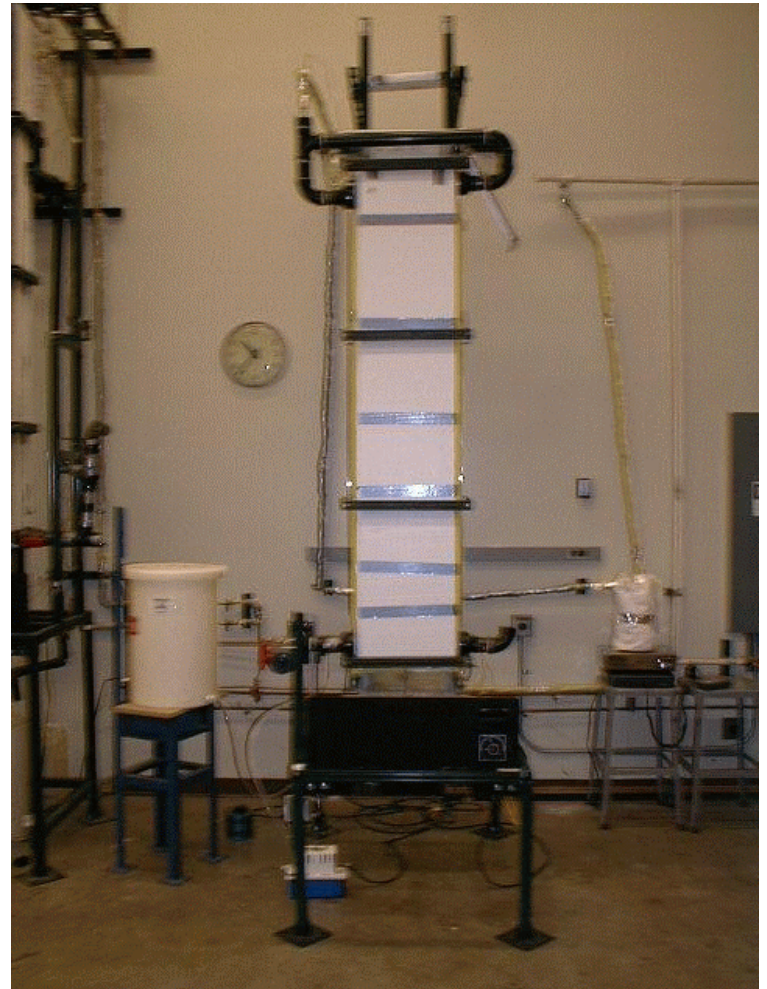
Pilot Plant



Dewvaporation

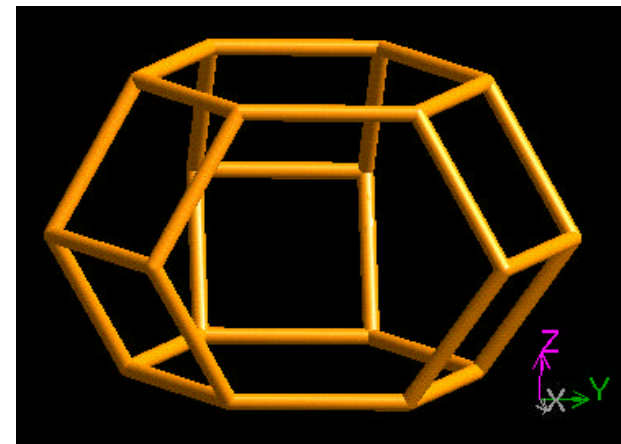
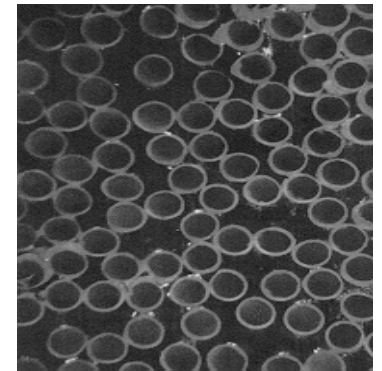
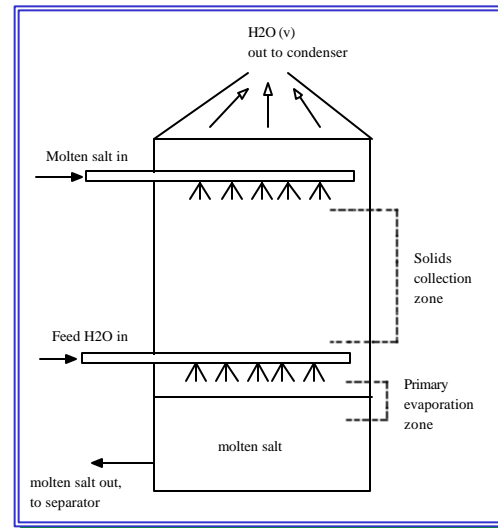
Researcher, James Beckman, Arizona State University

- Air evaporates water from saline feeds and forms pure condensate at atmospheric pressure with humidification-dehumidification.
- Process naturally transfers heat released by dew condensation to assist evaporation on opposite sides of a heat transfer wall.
- The process is highly energy efficient (80% saving)
- Shows minimal fouling
- The external heat source can be from waste heat, solar collectors, or fuel combustion.



Desalination Technology Research

- Research Technologies
 - Pervaporation
 - Forward Osmosis
 - Insitu crystallization
 - Direct contact distillation
 - Clathrate (methane hydrate) separation
 - Capacitive discharge separation



Salt Adsorption and Sequestration

Researcher, Tina Nenoff, Sandia National Laboratories

- Certain classes of layered materials will sequester salt in non-leachable solids
- Solids may be added as construction materials
- Reactions occur at ambient conditions
- Economics under investigation for a variety of potential compounds

