

Beneficial Uses of Reject Water from Electric Cooling Towers

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Cooling Tower Reject Water stored in a pond at El Paso Electric Newman power plant in northeast El Paso, TX.

BACKGROUND

El Paso Water Utilities (EPWU) supplies reclaimed water to Newman power plant of El Paso Electric Company for cooling processes. After several cycles, the reject water from cooling towers (blowdown water) is discharged into a 45 acre pond and about 3 million gallons of cooling tower reject water is produced per day. Current management of this water is non productive disposal on EPWU property located in the Bowen Ranch for evaporation. Blowdown water is slightly saline ($EC = 3.0 \text{ dS m}^{-1}$, $TDS \sim 2000 \text{ mg L}^{-1}$ and $SAR=17$). The purpose of this project is to evaluate the suitability of using cooling tower reject water for irrigating moderately sensitive to tolerant crops (e.g. Alfalfa-*Medicago sativa* L.). In water scarce areas such as El Paso, use of non-potable water sources such as electric power plant cooling tower reject water to irrigate suitable crops or landscapes may be a productive and efficient method to manage this water.

OBJECTIVES

Sustainability of cooling tower reject water agricultural irrigation depends on its effects on soil salinity, plant (alfalfa) performance and potential for groundwater contamination. The specific objectives of this project are to:

- Examine study site, soil and cooling tower reject water suitability for alfalfa cultivation.
- Evaluate performance of selected cultivar(s) of alfalfa and changes in soil salinity under cooling tower reject water irrigation using greenhouse soil columns.
- Determine fate of salts in the effective root zone and leachate to understand potential for groundwater contamination.

FINDINGS AND BENEFITS

Study site with gentle slope and well drained soil was suitable for cooling tower reject water irrigation. Chemical analysis of cooling tower reject water indicated its suitability for irrigation on well drained soils with naturally occurring calcium carbonates (caliche). Although past 32 years of limited land application and evaporation disposal had increased soil salinity it was below threshold level of alfalfa. Alfalfa cultivar SW 9720 was the most salt tolerant among cultivars tested. Alfalfa irrigated with cooling tower reject water produce three times the biomass compared to local cultivars grown with freshwater. Hay quality of alfalfa produced using cooling tower reject water was “prime grade”. Salinity of column soils irrigated with cooling tower reject water increased highlighting the need for soil management. Study results indicated minimum risk to groundwater contamination at the study site, however, nitrate contamination could be a concern in shallow groundwater areas. Research results indicated the potential for beneficial uses of about 3,350 acre-feet/year cooling tower reject water produced at the Newman Power Plant in Northeast El Paso.



Greenhouse soil column study evaluated cooling tower reject water irrigation effects on alfalfa performance, soil salinity, and leachate chemistry.