Aquifer Exemptions and Desalination Concentrate Management: The El Paso, Texas Story

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Surface Water Plants
Hueco Bolson Wells
Mesilla Bolson Wells
Desalination Plant
EPW/Army Partnership Agreement

- All facilities constructed on Fort Bliss
- EPW leases land from the Army
- Army pays for all concentrate disposal studies and Environmental Impact Statements
- EPW conducts all planning, engineering, plant work, design, construction, and maintenance
- All facilities owned and operated by EPW
- EPW sells water to Fort Bliss
Kay Bailey Hutchison Desalination Plant

Opened in 2007 to deal with:
- Drought
- Emergency situations
- Growth
- Brackish water intrusion
Benefits of Desalination Plant

- Reserves fresh water in Hueco Bolson for drought periods
- Prevents brackish water from encroaching on fresh water wells
- Increases fresh water production for El Paso by 25%
Open-Hole Interval to ~ 4,000 feet.

13 3/8” Surface Casing

Injection Tubing 7”

9-5/8” Casing

Seal Assembly and Packer

Open-Hole Interval to ~ 4,000 feet.
Remote Concentrate Disposal Area

- Less costly and less environmental impact than evaporation ponds or surface water disposal
- 3 Class V Injection Wells
- Concentrate pipeline (22 mi)
Injection Well Construction

- Class I Standards
- Well 3 (2006) – 4,030 ft deep
- Well 2 (2007) – 3,720 ft deep
Adapted from Collins, E. W., and Raney, J. A., 2000, Geologic map of West Hueco Bolson, El Paso region, Texas: The University of Texas at Austin, Bureau of Economic Geology, Miscellaneous Map No. 40, 24-p. text, scale 1:100,000.
Safe Drinking Water Act (SDWA) prohibits injection which endangers an underground source of drinking water (USDW);

Injection zone is considered a USDW because the TDS is < 10,000 mg/L;

Class V injection well authorization prohibited injecting water that did not meet primary drinking water standards;
Regulatory Concepts (Cont.)

- The injection zone is brackish with a TDS > 8,880 mg/L and does not meet national and state primary drinking water standards for arsenic, gross alpha, nitrite, and radium;

- Membrane treatment would be required prior to use. It is not a source of drinking water; and

- Required to dilute concentrate to primary drinking water standards.
Most viable option was an “Aquifer Exemption;”

Aquifer Exemptions require modifications to State UIC Programs, including public notice and participation;

Exemptions are granted by the State with concurrence from the EPA;

Process includes submittal of application package to State for review. Once State reviews and approves, the request is sent to EPA for approval;
Aquifer Exemption (Cont.)

- Aquifer exemption application package was submitted jointly to TCEQ and EPA in August 2008. Aerial extent of aquifer exemption request was based on a plume that would be generated from the injection of concentrate at a constant rate of 3 MGD for 50 years;

- Application demonstrated that:
  - Injection zone was not currently a source of drinking water for human consumption;
  - Will not serve as a source of drinking water in the future because depth and location make it economically and technically impractical;
  - Suitable groundwater and surface water sources that could be treated through conventional means at a significantly less cost;
Aquifer Exemption (Cont.)

- Application also recognized:
  - No water supply wells penetrate the aquifer;
  - Quality of injected fluids does not significantly affect existing water quality of the Exempt Aquifer;
  - No measurable quantity of groundwater was encountered until the exempt aquifer is reached at depths ranging from 2,222 to 2,890 feet; and
  - Upper and lower confining zones present.
Aquifer Exemption (Cont.)

- TCEQ approved Aquifer Exemption in December 2011;
- EPA jointly approved the exemption in September 2012;
- Although the exemption was secured, the Class V authorization still required EPWU to dilute concentrate in order to meet primary drinking water standards;
- EPWU requested an amendment to the authorization from TCEQ in September 2012; and
- TCEQ issued amendment in August 2014.
What Did the Approval Mean?

- No dilution and no waste of fresh water;
- Can inject up to 3,360 AF/Year of concentrate;
- Continual well maintenance and monitoring;
- Quarterly reporting of injection pressures, rates, volumes, and water (injectate) quality; and
- Pressure Fall-Off Testing and annual MITs to ensure integrity of wells.
Future Planning

- Plant production to increase
- Continued to be used in drought relief and interruption of supply
- Additional Class V Injection Well
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