UPDATES ON THE DESALINATION DATABASE FOR TEXAS

Presenting To
The South Central Membrane Association
Annual Conference
South Padre Island, TX

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Background

• The desalination database for Texas was developed in 2005

• It was accurate as of March 2005
Objectives

First Phase
• To update the database
  – Add, remove or modify records

Second Phase
• To develop a web-enabled data entry application
Sources of Information

- Final Report - ‘A Desalination Database for Texas’ October, 2005
- TCEQ
- AMTA
- SCMA
- IDA
- Personal Contacts
Information From the Survey

1. General Information
2. Plant Information
3. Raw Water Supply Source
4. Feed Pre-treatment
5. Membrane
6. Throughput Post-treatment
7. Concentrate Post-treatment
8. Concentrate Disposal
9. Problems Encountered
10. Cost Issues
Desalination in Texas

Sources

- **Seawater**
  - Facilities: None
  - Capacity: None

- **Brackish water**
  - Facilities: 44
  - Capacity: 116 MGD

- **Surface water**
  - Facilities: 12
  - Capacity: 50 MGD

- **Groundwater**
  - Facilities: 32
  - Capacity: 66 MGD
Desalination in Texas (Cont.)

Desalination Process Types

- **RO**
  - Facilities: 42
  - Capacity: 104.9 MGD

- **EDR**
  - Facilities: 2
  - Capacity: 11.1 MGD
Desalination Design Capacity

Number of Facilities

Design Capacity (MGD)

- 22 MGD
- 30 MGD
- 75 MGD
- 116 MGD

Year

1999 2001 2005 2010

Design Capacity (MGD)

- 12
- 14
- 38
- 44
## Desalination Design Capacity (Cont.)

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<th>Desalination Capacity (MGD)</th>
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<th>Desalination Capacity (MGD)</th>
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Locations of Desalination Facilities in Texas
Start Up Year of Desalination Facilities

- **2005-2010**: 6 facilities
- **2001-2005**: 12 facilities
- **1991-2000**: 10 facilities
- **1991-1995**: 3 facilities
- **1986-1990**: 6 facilities
- **1980-1985**: 1 facility

**Remarks**:
- 1 facility replaced EDR with RO in 2009.
- 1 facility replaced EDR with RO in 2007.
Reasons for Building Desalination Facilities in Texas

- TDS: 27 facilities
- Hardness: 11 facilities
- Alkalinity: 9 facilities
- Chloride: 15 facilities
- Sodium: 13 facilities
- Sulfate: 12 facilities
- Nitrate: 10 facilities
- Arsenic: 3 facilities
- Radionuclides: 3 facilities
- Fluoride: 2 facilities
- Fe and Mn: 2 facilities
- Other: 7 facilities
- Not Responded: 2 facilities
TDS Variations in Feed Water

Number of Facilities

Feed Water TDS Conc. (mg/L)

<1000 1000-1500 1501-2000 2001-2500 2501-3000 >3000 Not Responded
Types of Membrane Fouling in Desalination Facilities of Texas

- Inorganic: 16
- Silica: 14
- Metal Oxide: 10
- Colloidal: 12
- Biological: 14
- Other: 10
- Not Responded: 8

Number of Facilities

Types of Fouling
Membrane Cleaning Frequencies

- Other
- As Needed
- Biannually
- Annually
- Semi Annually
- Quarterly
- Bimonthly
- Monthly

Number of Facilities

0  2  4  6  8  10  12  14
Membrane Replacement Frequencies

- Never Changed: 16
- Less than 2 Years: 6
- Between 2 and 4 Years: 2
- Between 4 and 6 Years: 12
- Greater than 6 Years: 10
- Not Responded: 8

Number of Facilities
Post-treatment of Concentrate

- Other
- Scaling Control
- Gas Removal
- Disinfection
- Dechlorination
- Corrosion Control
- Blending
- Aeration
- pH Adjustment
- No Treatment

Number of Facilities
Challenges

• The title - “Survey Form for Desalination Facilities” is confusing

• Key personnel for obtaining the required information

• Slower than expected response to the survey
Potential Sites for Future Desalination Plants in Texas

- North Alamo WSC - Donna
- Stephens Regional SUD
- Central Texas WSC
- City of Ballinger
- Fort Hancock WCID
- Sylvester-McCaulley WSC
Conclusion and Future Plan

- Desalination capacity in Texas increased from ~75 MGD to ~116 MGD in the past 5 years.
- Database information will be revised periodically.

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