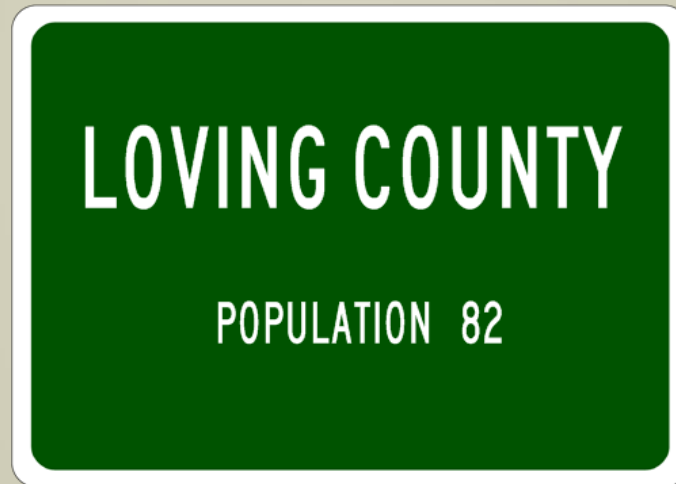


# **DyVar Thermal Cyclone Desalination A Very Small Town Leads Innovation**

**Loving County  
Mentone, Texas**

**James Busby, P.E.  
Burgess & Niple, Inc.**

**According to the Census Bureau,  
Loving County is the LEAST populated  
County in the United States.**



**As of Sept. 2015, Loving County Has**

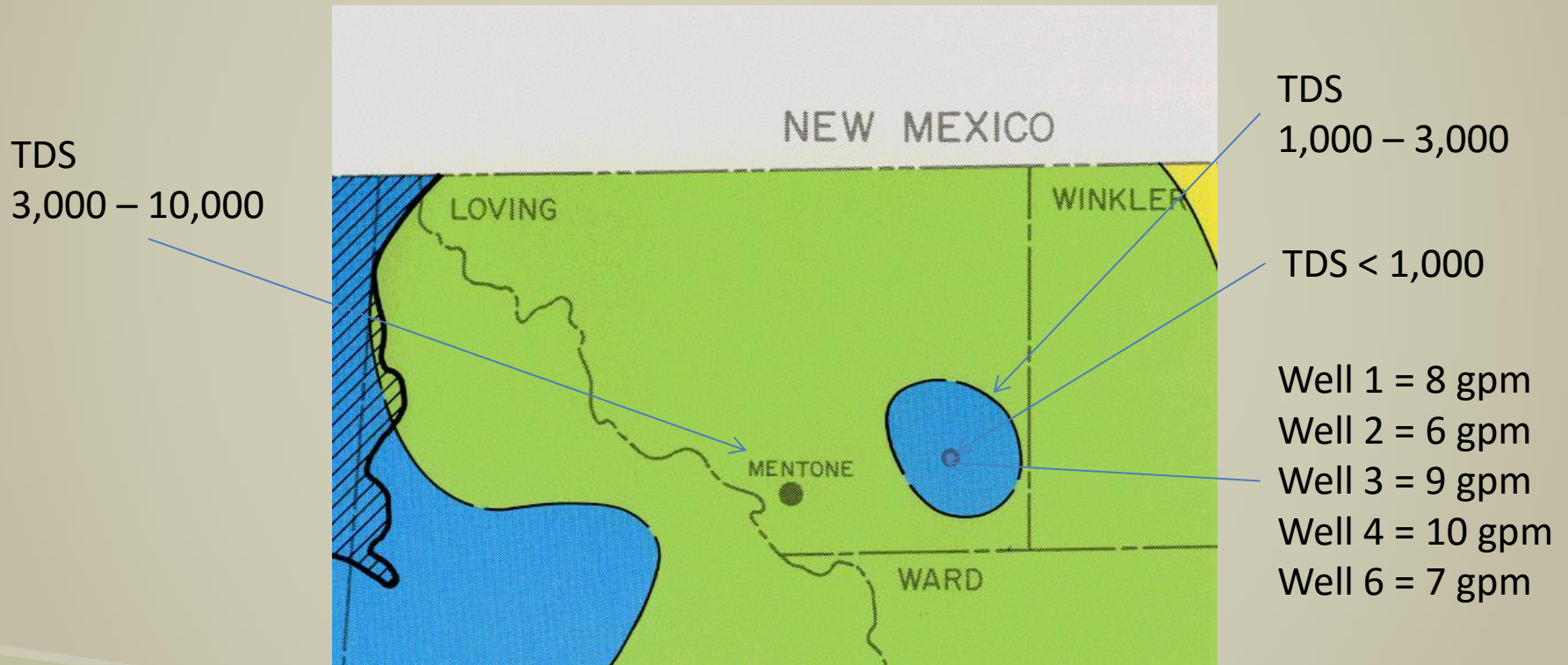
**925 Active Oil Wells**

**294 Active Gas Wells**

**116 Injection Wells**

**...and had 396 drilling permits for  
new wells issued through Nov 2015.**

# They may have Oil, but Drinking Water is in short supply



# The Groundwater in Mentone

<b>837</b>	<b>Chlorides</b>
<b>679</b>	<b>Calcium</b>
<b><u>2,270</u></b>	<b>Sulfate</b>
<b>589</b>	<b>Sodium</b>
<b><u>4,020</u></b>	<b>TDS</b>
<b>1,810</b>	<b>Hardness</b>

**In the early 2000s the County considered R.O.**

**At the time R.O. had drawbacks including:**

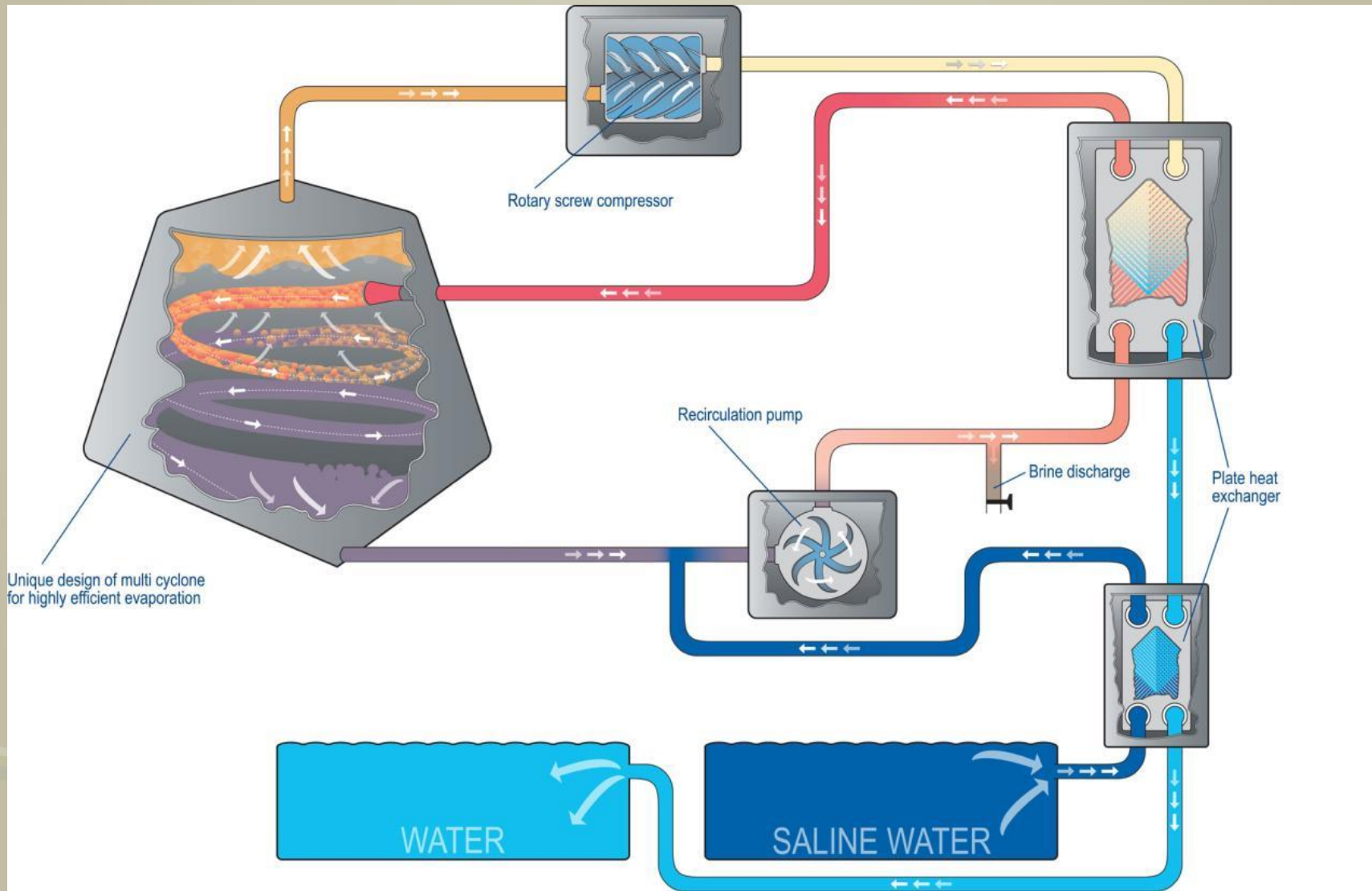
**Large Regulatory and Permitting hurdles**

**Difficulties with High Sulfate Water**

**Limited Operator Staff (People wear many hats)**

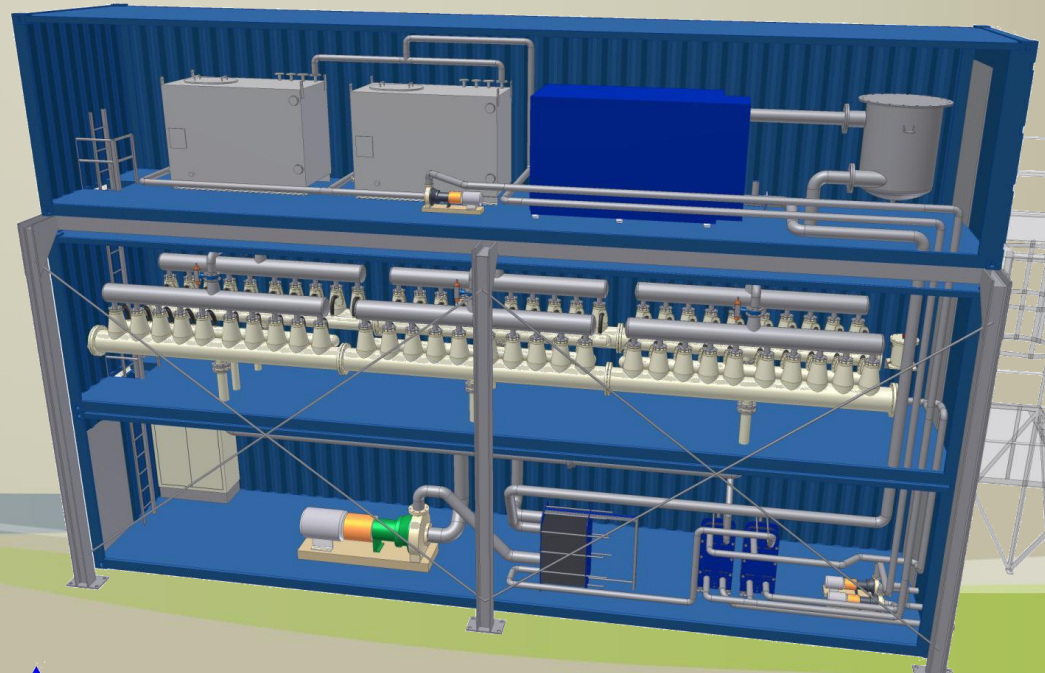
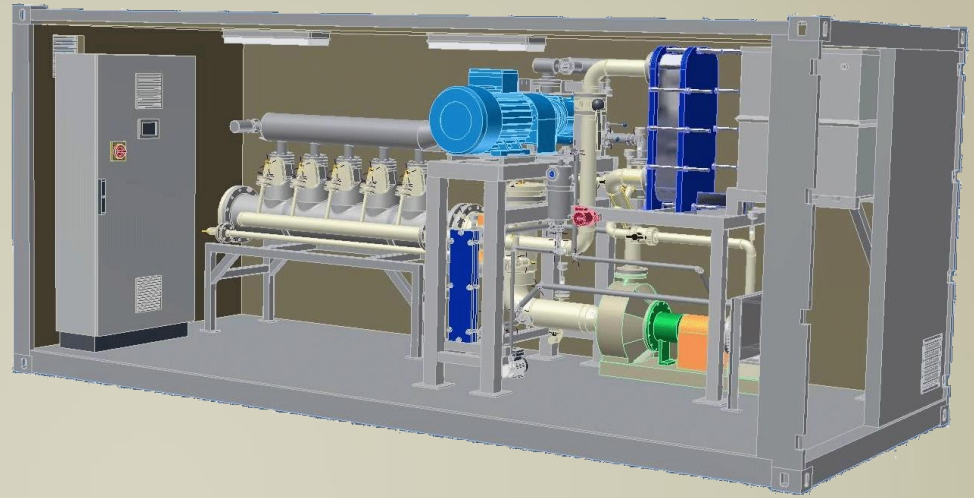
**Though there have been improvements in R.O. regulation and technology, a chance meeting with a Dutch company set Loving County on a path to implement a new take on desalination technology.**

# What is Thermal Cyclone Technology?

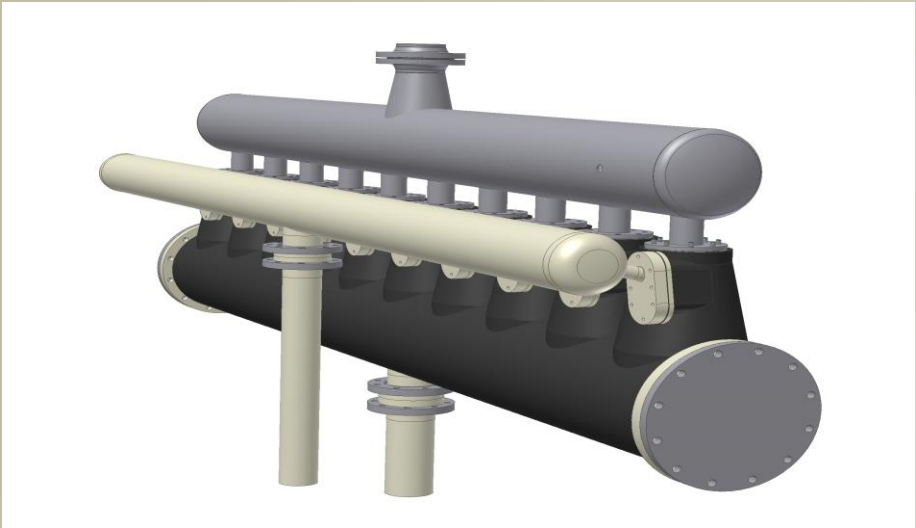




# Conceptual Designs







**Loving County wanted to Proceed with the Project,  
but needed Grant Assistance**

**Burgess and Niple made applications on behalf of the  
County for the following:**

**Drinking Water SRF Program  
Texas Windpower Desalination Grant Program  
2011 Bureau of Reclamation WaterSMART**

**We received one of four \$600,000 matching grants  
from the Bureau of Reclamation. Los Angeles got two  
and Glendale California got the other.**























screen 4

OK

23:57:03 09.02.2015

TT-001

189.6 °F

QT-001 TDS

24479 ppm

TT-002

89.5 °F

QT-003 TDS

1 ppm

MENU

CAL

DIAG

HOLD





# Installation of Solar Power Plant to Offset Power Consumption







**BURGESS & NIPLE**  
Engineers ■ Planners

**With any new commercial process  
there have been issues:**

**Poor Rural Power Quality  
Calcium Sulfate Water  
Ancillary Equipment Issues  
Low Velocity Plumbing Areas**

# Loving County

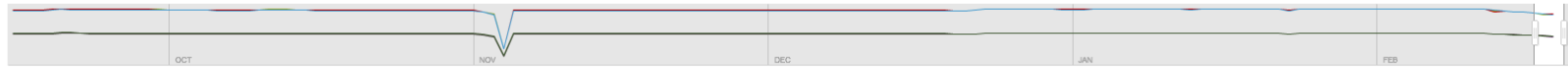
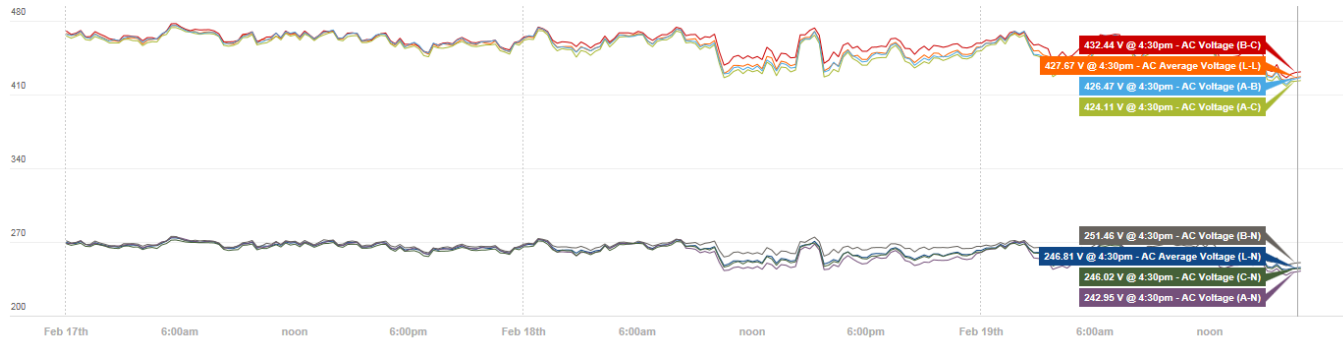
Overview Solar Statistics **Analytics** Alarms Downloads Notes Extensions Settings

Generation/Power Volts & Amps Power Information Generation by Inverter **Voltage Monitoring** Advanced

Graph Table

Selected Range: 12:00am Tue Feb 17, 2015 - 12:00am Fri Feb 20, 2015

- Legend**
- Utility Meter: AC Average Voltage (L-L) (V)
  - Utility Meter: AC Average Voltage (L-N) (V)
  - Utility Meter: AC Voltage (A-C) (V)
  - Utility Meter: AC Voltage (A-N) (V)
  - Utility Meter: AC Voltage (B-C) (V)
  - Utility Meter: AC Voltage (B-N) (V)
  - Utility Meter: AC Voltage (C-N) (V)
  - Utility Meter: AC Voltage (A-N) (V)



# Loving County

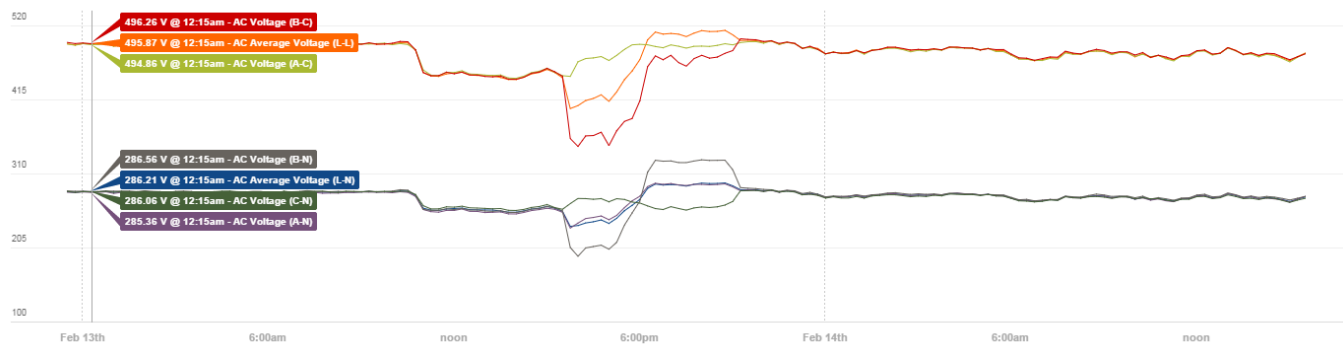
Overview Solar Statistics **Analytics** Alarms Downloads Notes Extensions Settings

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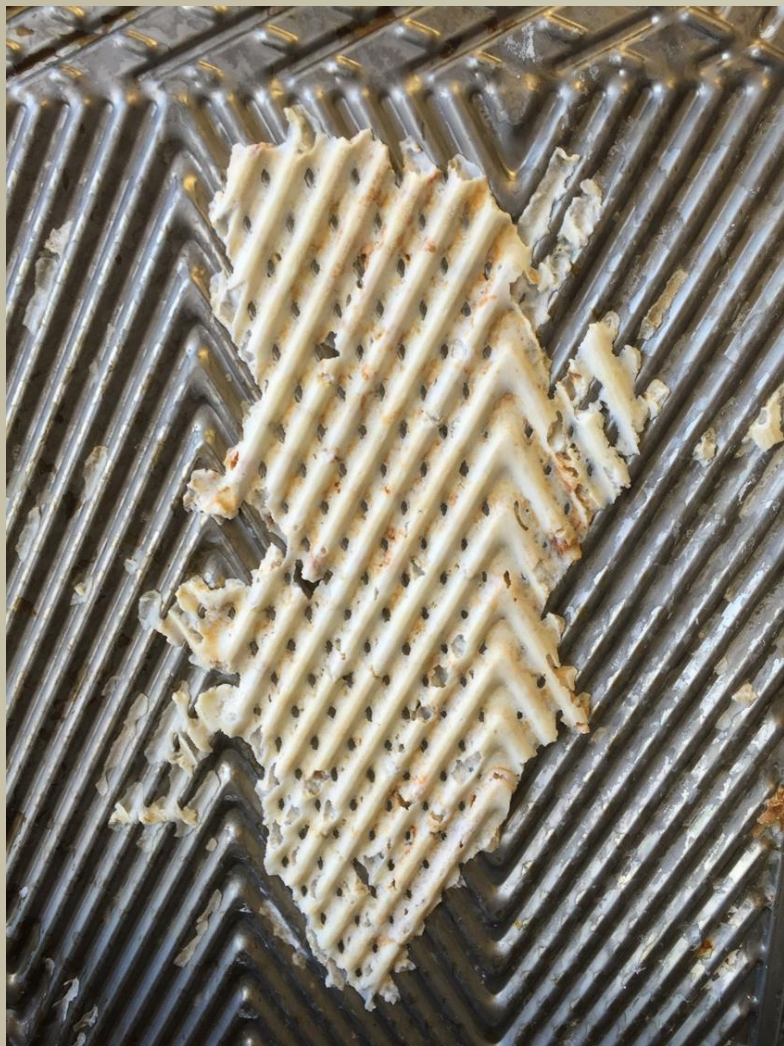
Graph Table

Selected Range: 11:18pm Thu Feb 12, 2015 - 12:00am Sun Feb 15, 2015

- Legend**
- Utility Meter: AC Average Voltage (L-L) (V)
  - Utility Meter: AC Average Voltage (L-N) (V)
  - Utility Meter: AC Voltage (A-C) (V)
  - Utility Meter: AC Voltage (A-N) (V)
  - Utility Meter: AC Voltage (B-C) (V)
  - Utility Meter: AC Voltage (B-N) (V)
  - Utility Meter: AC Voltage (C-N) (V)
  - Utility Meter: AC Voltage (A-N) (V)







**Calcium Sulfate (Gypsum)  
deposition in the main  
heat exchanger.**

**Implemented injection of  
treated water as a mist to  
cool vapor stream just  
prior to the heat  
exchanger to control  
temperatures on the  
brine side.**



**Our project challenges have translated into refinements of the process and expanded its potential uses.**

**This past November DyVar was the Aquatech Amsterdam category winner for Oil & Gas waste water treatment and the show's overall Innovation Award Winner.**

# Next Steps:

**Improve “low contact operation”**

**Power Reliability**

**Complete 90 Day Pilot for TCEQ**

# Contact Information:

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**Burgess & Niple, Inc.**

**432-689-8909 x6402**

**[james.busby@burgessniple.com](mailto:james.busby@burgessniple.com)**