Oswego Water System – Radium Removal Experience
Presentation Overview

• Water System Background
• Radium Removal Technologies
• Typical Oswego Installation
• Operating Performance
System Map
SCADA System

Well 11 to Well 3 Comm. Loss Alarm

Well 11 Water Table Level: 368.6 FT.

Cycle Mode Enabled

Enable Cycle  Start Well 11
Disable Cycle  Stop Well 11

Well 11 Flow: 0.0 GPM
Daily Total Flow: 0.000 MG
Prev. Day Total Flow: 0.514 MG

Well 11 Radium
Well 11 Trend

Pump Setpoints
Alarm Setpoints

Sump Alarm

Overview  Village Center  Ogden Falls  Fox Chase  W8&10 Sched.  Communications  Trend Menu  Totals
Setpoints and Data
Radium Removal Technologies

- Ion Exchange – Softening
- Lime Softening
- Hydrous Manganese Oxide – HMO
- Reverse Osmosis
- Selective Adsorption – Z-88 Media
Why Selective Adsorption?

- Controlled Disposal of Radium Residuals
- Ease of Operations
- No Backwashing Wastes
- Worker Safety
- Long-Term Budgeting
How was it Implemented?

- Village Builds Treatment Plant
- Village Contracts Out Operations of Radium Removal System
- Village Operates Finished Water System
Oswego Well 11 Facility
Oswego Well 11 Treatment Plant
Well 11 - Construction Details

- **Ironton – Galesville Sandstone Well**
- **1,400’ Deep**
- **300’ Open Hole**
- **1,200 GPM**
- **11 Radium**
- **235 Hardness**

<table>
<thead>
<tr>
<th>Depth (FT)</th>
<th>Ground Surface</th>
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<tbody>
<tr>
<td>0 to 100 FT</td>
<td>Glacial Drift</td>
</tr>
<tr>
<td>100 to 125 FT</td>
<td>Niagaran Limestone</td>
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<tr>
<td>125 to 195 FT</td>
<td>Maquoketa Shale</td>
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<tr>
<td>195 to 495 FT</td>
<td>Galena Platteville Dolomite</td>
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<tr>
<td>495 to 845 FT</td>
<td>Glenwood – St. Peter Sandstone</td>
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<tr>
<td>845 to 875 FT</td>
<td>Oneonta Dolomite</td>
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<tr>
<td>900 to 950 FT</td>
<td>Eminence – Potosi Dolomite</td>
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<tr>
<td>975 to 1125 FT</td>
<td>Eminence – Potosi Dolomite</td>
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<tr>
<td>1125 to 1305 FT</td>
<td>Fanconia Sandstone and Dolomite</td>
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<tr>
<td>1305 to 1380 FT</td>
<td>Ironton – Galesville Sandstone</td>
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<tr>
<td>1380 to 1420 FT</td>
<td>Eau Claire Dolomite and Shale</td>
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<tr>
<td>1400 FT</td>
<td>Bottom of Well</td>
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Treatment Plant Plan
Treatment Plant Section
Raw Water Inlet
Radium Removal System
Filter Skid
Finished Water Manifold
Chemical Feed Rooms
System Performance

Total Annual Gallons Pumped for System

Year | Gallons Pumped
--- | ---
2004 | 700,000,000
2005 | 800,000,000
2006 | 850,000,000
2007 | 900,000,000
2008 | 900,000,000
2009 | 900,000,000
2010 | 850,000,000
2011 | 950,000,000

6,982,898,000 GALLONS TREATED
System Performance

Annual Totals

Gallons Pumped

Year

Well 3
Well 4
Well 6
Well 7
Well 8
Well 9
Well 10
Well 11

2009
2010
2011
System Performance

Well 10: Monthly Flows

GALLONS TREATED PRE-EXCHANGE: 628,373,000

Media exchange
System Performance

Well 10: Combined Radium Removal

*Media exchange occurred in November 2009*
Village of Oswego, Illinois
Combined Radium On-line Results

System Performance

MCL = 5 pCi/L
Operator Effort per Treatment Plant

- 5 Hours per Week Village Operator Time
- 3 Hours per Week Contract Operator Time
  - Included in Contract Rate
Finished Water Quality

- 2005 IRWA “Best Tasting Water” Award