

**Kennedy/Jenks Consultants**



# **Design of a New Water Supply and Treatment Plant for the City of Longview, WA and Beacon Hill Water & Sewer District**

Janet Snedecor, P.E.

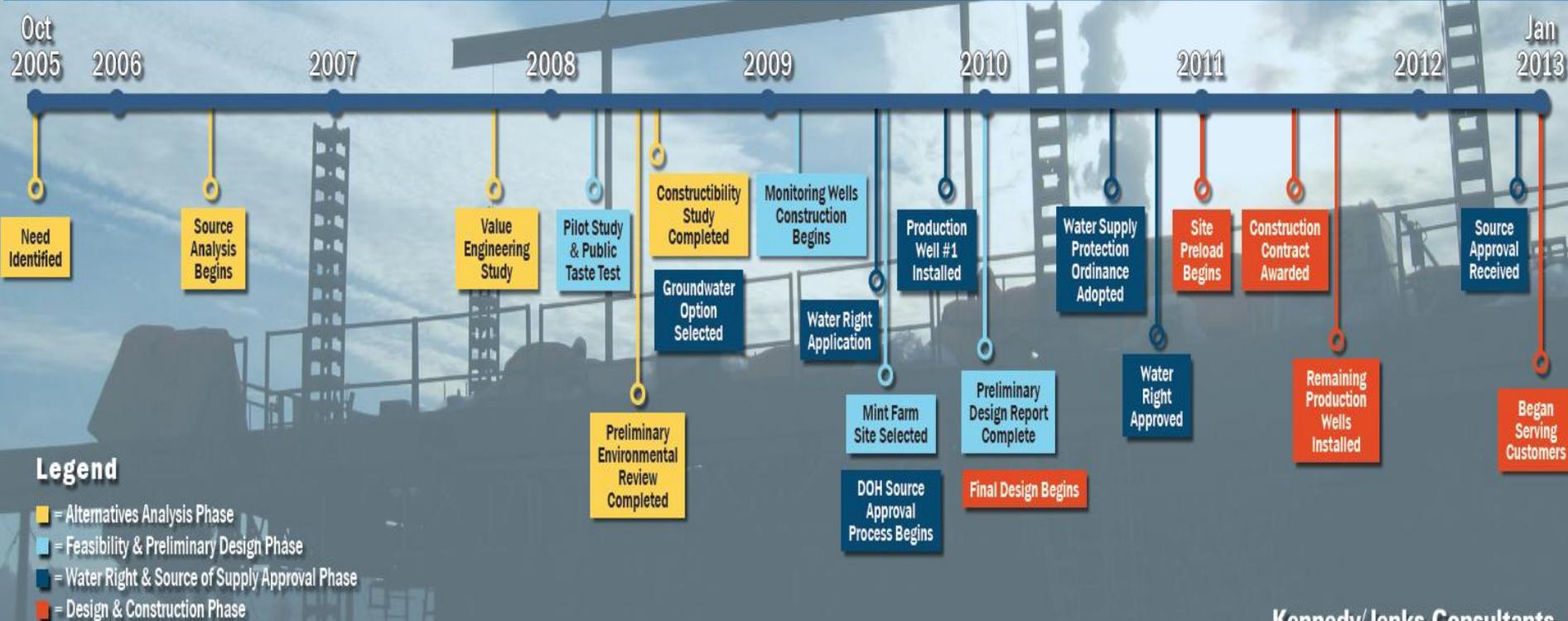
David Seymour, P.E.



# Presentation Outline

- **Project History**
- **Important Milestones**
- **Facility Design**
  - **Process Selection**
  - **Future Expansion**
  - **Conservation and Energy Efficiency Elements**
- **Construction Completion and Operation**
- **Source Transition**
  - **Distribution Start-up Plan**
  - **Proactive Flushing Program**
  - **Citizen Sentinels**

# History of the Longview Mint Farm Regional Water Treatment Plant



# Design Goals and Criteria

- **Capacity – 20 Yr Demand Expandable to 50 Yr Demand**
- **Produce High Quality Drinking Water**
- **Limit Waste Discharge Volume and Strength**
- **Automated Operations**
- **Reduce Operating Costs through Energy Efficiency**
- **Provide Cost Effective Treatment Options**
- **Accelerate Completion Schedule**



# Water Quality

## Well #1 - Raw Water

- Iron – 0.6 to 1.0 mg/L
- Mn – 0.4 to 0.65 mg/L
- Arsenic – 5.0 to 6.1  $\mu\text{g/L}$
- pH – 7.0 to 7.5
- Fluoride – 0.2 mg/L
- Ammonia – 0.19 to 0.21 mg/L
- Color – 5 to 25

## Treated Water Goal

- Iron -  $\leq 0.05$  mg/L
- Mn -  $\leq 0.05$  mg/L
- Arsenic -  $\leq 5$   $\mu\text{g/L}$
- pH – 7.5
- Fluoride – 0.8 to 1.0 mg/L
- Turbidity –  $< 1.0$  NTU



# Primary Design Elements

- **4 – 4,000 gpm Wells, Associated Equipment and Buildings**
- **6 Greensand Pressure Filters**
- **Backwash Storage/Recovery Tanks**
- **Chemical Systems**
- **Geobags for Solids Disposal**
- **6,400 ft of 30” Transmission Main**



# Mint Farm RWTP Overview



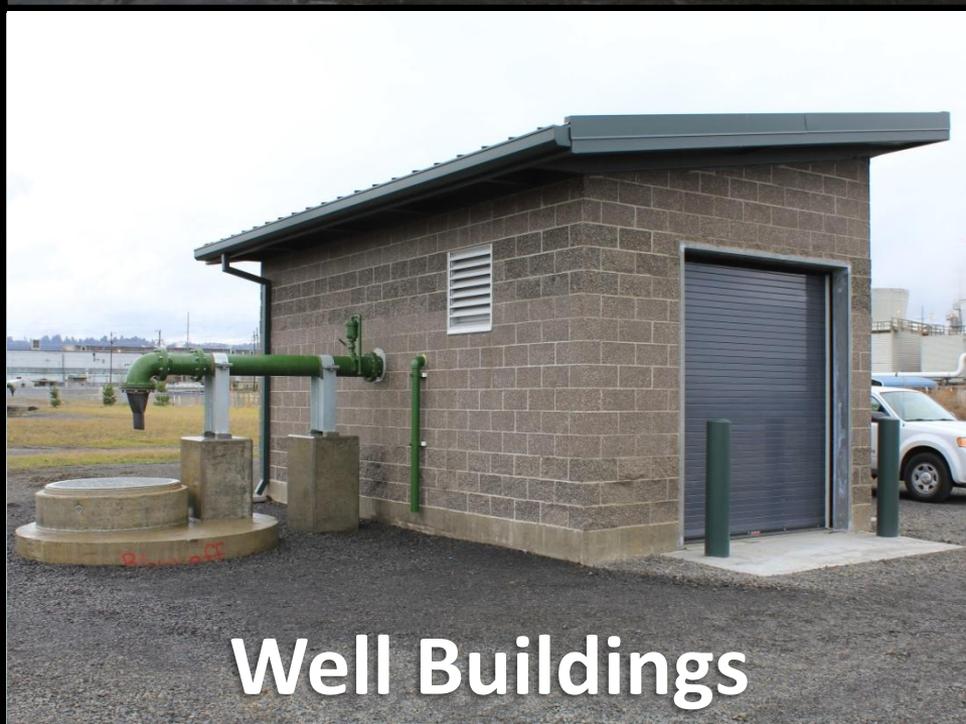
# Operations Building



# Backwash Tanks



# Filter Gallery



# Well Buildings

# Treatment Process Performance

## Raw Water

- Iron – 0.6 to **1.9** mg/L
- Mn – 0.5 to 0.7 mg/L
- Arsenic – 5-7 µg/L
- pH – 7.3
- Fluoride – 0.2 mg/L
- Ammonia – 0.2 to **0.5** mg/L
- Sulfides - Variable
- Color – 20 to 30

## Treated Water (Typical)

- Iron - < 0.02 mg/L
- Mn - < 0.05 mg/L
- Arsenic - < 2 µg/L
- pH – 7.6 to 7.8
- Fluoride – 0.8 to 1.0 mg/L
- Turbidity – < 0.05 NTU



# Drinking Water Quality

Raw

Chlorinated  
Raw

Filtered



# Waste Flow Limits – Backwash Recovery



# Waste Flow Limits – Backwash Recovery



# Waste Flow Limits – Backwash Recovery



# Waste Flow Limits – Backwash Recovery



**Backwash**  
0.4 MG/d



**Backwash Decant**  
98% Recovery



**Backwash Solids**  
6,000 – 12,000 gpd

# Process Automation



# Process Automation



# Reduce Operating Costs - Energy Efficiency

- **Pump Through Design**
- **Water Conservation**
- **Premium Efficient Motors**
- **Energy Efficient Lighting**
- **Energy Efficient HVAC**
- **IGEA Condition of DWSRF and PWTF Loans**
  - **Third-Party Review by Ameresco Quantum recommended no additional improvements for “obtainable” energy savings**

Only 37% of 2012  
PWTF Projects  
Have No  
“Obtainable”  
Energy Savings

Source: AWC



Kennedy/Jenks Consultants

# Cost Effective Treatment Options – Geotextile Bags



# Cost Effective Treatment Options – Geotextile Bags



# Cost Effective Treatment Options – Geotextile Bags

Bag  
Filtrate

Backwash  
Solids

>99% Solids  
Removal



# Overall Project Costs

## Groundwater Treatment Facility and Distribution Pipeline

- Preliminary Design, Design, Pilot Tests \$4.6 million
- Property Acquisition \$1.0 million
- Building Permits and Water Rights \$0.2 million
- Site Preload \$1.0 million
- Well Construction \$0.8 million
- WTP and Pipeline Construction \$20.0 million
- Wellhead Protection \$0.6 million
- CM, Programming, Startup & Optimization \$3.6 million

**Design and Construction Cost** **\$31.7 million**

- Admin/Legal/City Costs (Estimated) \$1.3 million

**Total Project Cost (Estimated)** **\$33.0 million**

**Original Estimate** **\$38.7 million**



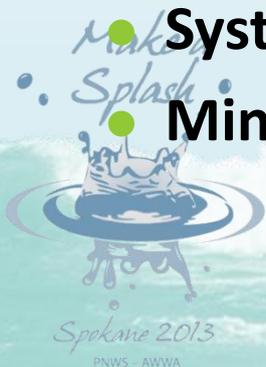
# Serving Customers

## ■ Preparations

- Long-Range Planning
- Identify Distribution System Flow and Pressure Changes
- Develop and Implement Proactive Flushing Program
- Citizen Sentinel Program
- Fluoride as a Tracer

## ■ The Big Day – January 31, 2013!

- Turning of the Valve
- System Wide Flushing Activities
- Minimal Customer Complaints



# Success!

- ✓ Producing High Quality Drinking Water
- ✓ Reduced Waste Volume With Backwash Recovery
- ✓ Automation Enables Staff to Participate in New Programs
- ✓ 3<sup>rd</sup> Party IGEA Audit - No Obtainable Energy Savings
- ✓ Project ~\$6M Under Original Estimates
- ✓ Serving Customers Since January 31, 2013

