Unattended Operation Using Remote-Monitoring and SCADA Optimizes Dryer Capacity and Performance
Case Study: Wisconsin Dells - Lake Delton WWTP

Dryer

Storage
Wisconsin Dells: History & Vitals

- Population: 6000 (including Lake Delton)
- Tourism: >4 million visitors/year!
- Attractions: Water parks and Wisconsin River
- $1B industry; 15,000 jobs
Wisconsin Dells: Water-Treatment Vitals

- **Service Area:** 6000-75000!
- **Throughput:** 1.2 - 3 MGD, seasonal
- **Staff:** 3 Operators; 40-hour week
- **BOD** 3.7 mg/L, **TSS** 3.6 mg/L
- **Oxidation ditch + aerobic digester**
- **Biosolids:** Class A, >75% solids, land applied
- **Weather:** Snow, October to April

![Aerial view of Wisconsin Dells water treatment facility]
Wisconsin Dells: Indirect Drying Flow Diagram
Wisconsin Dells: Dryer Selection Criteria

- Seasonal capacity requirements
- Limited staffing
- **Schedule**
- Footprint
- Storage and odor
Wisconsin Dells: Dryer System

Feed hoppers:
• Dual with weigh cells
• Auto switch-over

Dryer:
• Indirect heated
• Onboard condenser
Wisconsin Dells: Dryer System

Product loadout:
- 5-station, bag filling
- Auto switch-over
Wisconsin Dells: Availability Versus Schedule

- Typical 5-day schedule
- Impact of dryer system startup and shutdown
  - Non-feeding operation
- Thermal energy penalty
Example (hypothetical):

- 13,250 tons wet-cake/year
- Option 1: 5 days x 13-hr batch
  - Yields 45 hours/week feeding
  - 10,000 lb/hr evaporation
- Option 2: 5 days x 24-hr continuous
  - Yields 120 hours/week feeding
  - 3,600 lb/hr evaporation
- $1.75M capital savings

Q: How to accomplish 24/5?
A: Configure for unattended operation!
Wisconsin Dell: Batch vs Continuous

- Visualize run (aka feeding) time!
- Compare startup + shutdown time as percent of total
- Steady-state not achieved for short runs

Batch (12 hr/day):

Continuous (24 hr/day):
Hypothetical high-level comparison:

- Continuous operation saves
  - >$1.7M Capex
  - >$5K/year Opex
Wisconsin Dells: Design Considerations

Unattended operation requires:
• Safe and reliable dryer operation & controlled shutdown when necessary
• Remote/secure 2-way Internet connection
• Reliable alert page-out protocol
• Matched plant process interfaces
  • Dewatering to drying
  • Large off-hours hopper capacity
  • Large off-hours product storage capacity
Wisconsin Dells: Hardware/Connectivity Requirements

ON-SITE

- DRYER PLC
- DRYER
- DRYER HMI PANEL

OFF-SITE

- PLANT SCADA w/INTERNET & CELLULAR MODEMS
- WEB
- HOME MODEM
- CELL TOWER
- CELLULAR
- PAGE-OUT
- INTERNET/VPN
- TEXT ALERT

WIRELESS VPN

TABLET PC or iPad w/DRYER HMI EMULATION
**Wisconsin Dells: Response Options**

**ALERT:** The plant is remotely monitored using cellular phones and tablet computer with wireless VPN connection. The tablet computer has full remote emulation of dryer system HMI controls. If a problem occurs, the plant SCADA system pages out an alert.

**RESPONSE:** Off-hour options include:

- Allow the system to shutdown safely. Correct the issue the following day.
- Use tablet computer to connect and make process adjustments.
- Return and resolve in person.
Wisconsin Dells: Summary of Benefits

Unattended operation yields:
• More throughput/capability during summer months when needed
• Avoided labor costs
• Smaller dryer
• Increased utility efficiency
• Avoided cycling and fewer upsets
• Product quality and consistency

In total, all these add up to significant annual- and capital cost savings
Thank You!

Questions?

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