



# ADVANCED ATAD at the Grand Chute Menasha West WWTF

MARCH 17, 2015

Chad T. Olsen, P.E. BCEE



WOWA Spring Biosolids Symposium

# *Grand Chute-Menasha West WWTF*

## ■ Serves the following communities

- Town of Grand Chute
- Town of Menasha – West side
- Town of Greenville
- Part of Town of Neenah

## ■ Completed Upgrade in 2012

## ■ Joint Project between McMAHON & CH2M Hill

## ■ Upgrade Design Loadings

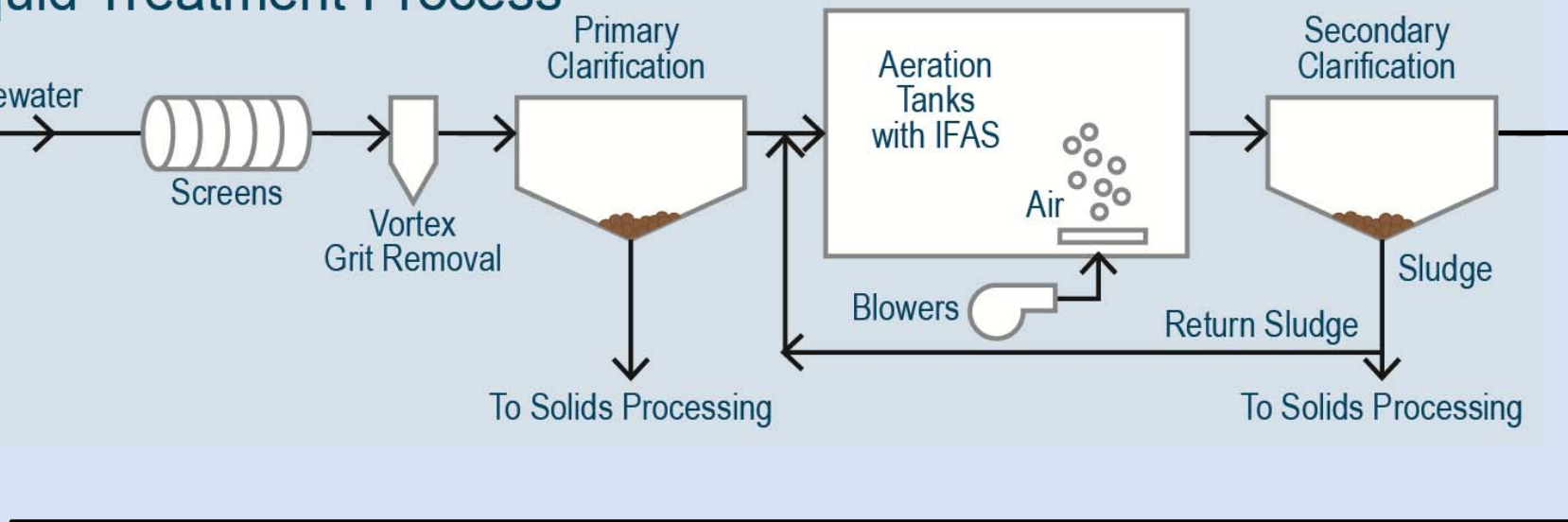
- Design Population 43,897
- Design Ave. Flow 8.2 MGD
- Peak Hour Flow 31 MGD
- Design BOD Loading 12,700 lb / d

# *Summary of Improvements Made*

- **Increased plant capacity**
- **Added capability to remove ammonia**
- **Replaced digestion process to reduce odors, reduce ammonia and increase capacity**
- **Replaced equipment with more energy efficient equipment**
  - Blowers
  - Ultraviolet light disinfection
  - Building heating systems
- **Improved odor control**
- **Replaced aging and obsolete equipment and facilities**

# The Treatment Process

## Fluid Treatment Process

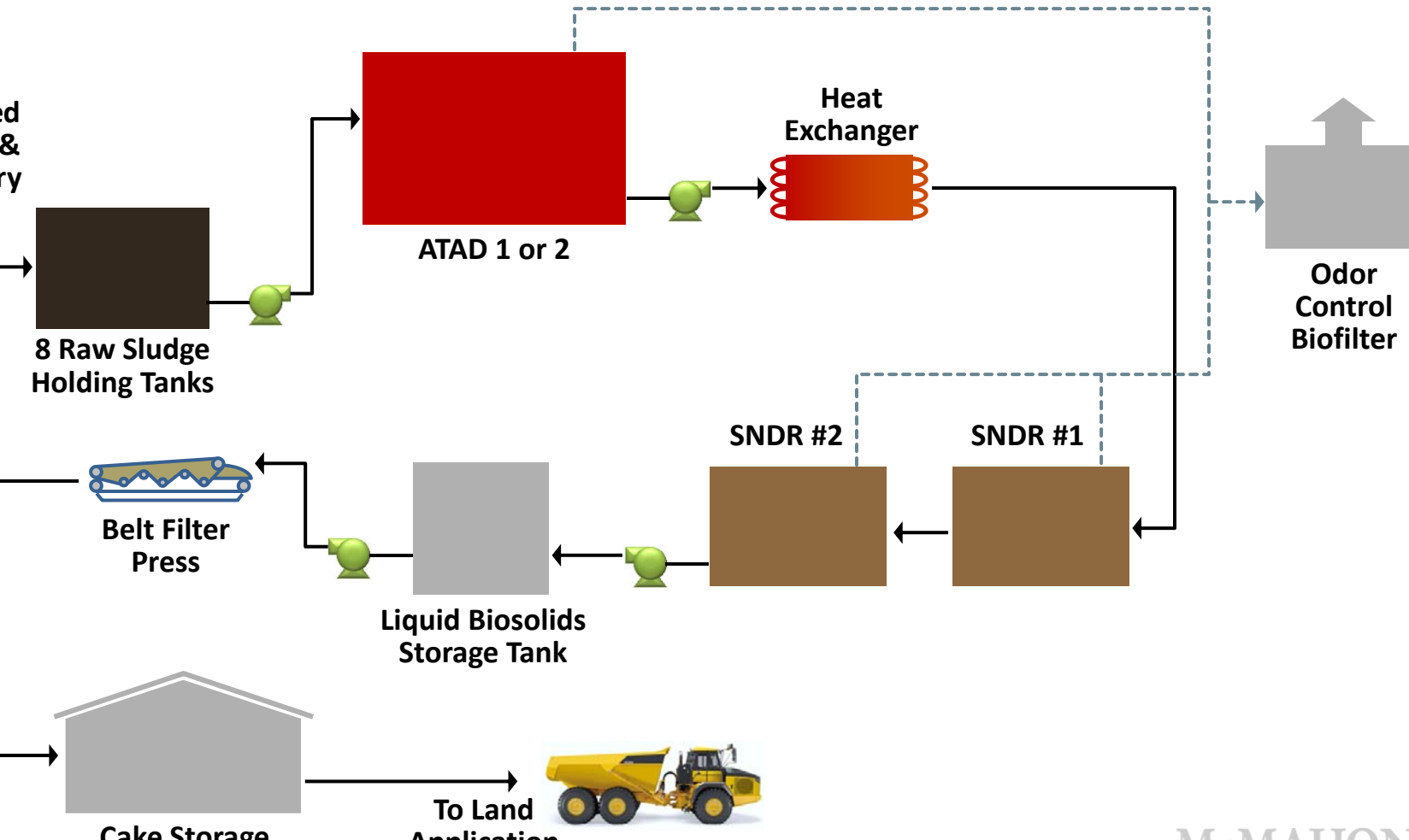


Ultraviolet  
Light Disinfection



Effluent to  
Little Lake  
Butte des Morts

# Solids Handling Process



# Major Facilities Constructed

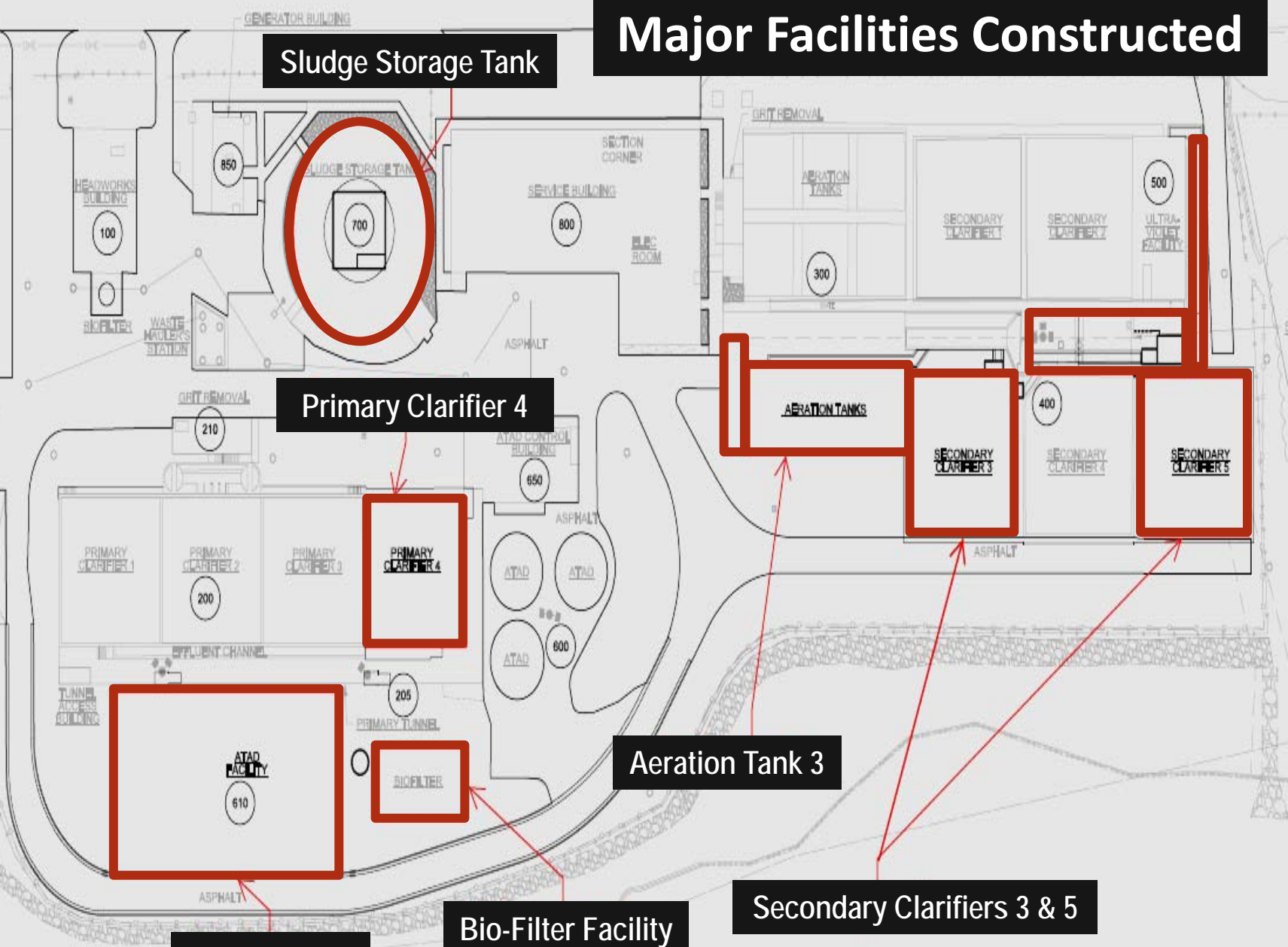
Sludge Storage Tank

Primary Clarifier 4

Aeration Tank 3

Secondary Clarifiers 3 & 5

Bio-Filter Facility



**Construction: After (2012)**

**New ATAD**



# *Design Solids Loadings*

Total Sludge Production	16,734 lbs/day
Total VSS	13,147 lbs/day
Design Sludge	Co-settled WAS + Primary
Design Total Solids	3.5%
Design Avg. Volume	57,308 gpd

## *What is ATAD?*

### **AUTOTHERMAL**

- Self-heating!!  
Exothermic Reaction

### **THERMOPHILIC**

- High temperatures,  
typically above 140°F

### **AEROBIC**

- Oxidic conditions  
high mixing intensity & aeration

### **DIGESTION**

- Biodegradation of volatile  
solids microorganisms  
degrade to CO<sub>2</sub> & H<sub>2</sub>O

...HIGH TEMPERATURES PROVIDE

**HIGH-BIOKINETICS !!**

## *What is ATAD?* *continued*

### **Batch Process**

- Sludge withdrawn and added 1x/Day

### **EPA PFRP – Approved Process**

- Class A Biosolids
- Controls Verify Time & Temp Requirements

*AD Process  
at GCMW*

<b>ATAD REACTORS</b>	
No.	2
Volume	327,000 gals
HRT @ Avg. Design	11.3 days

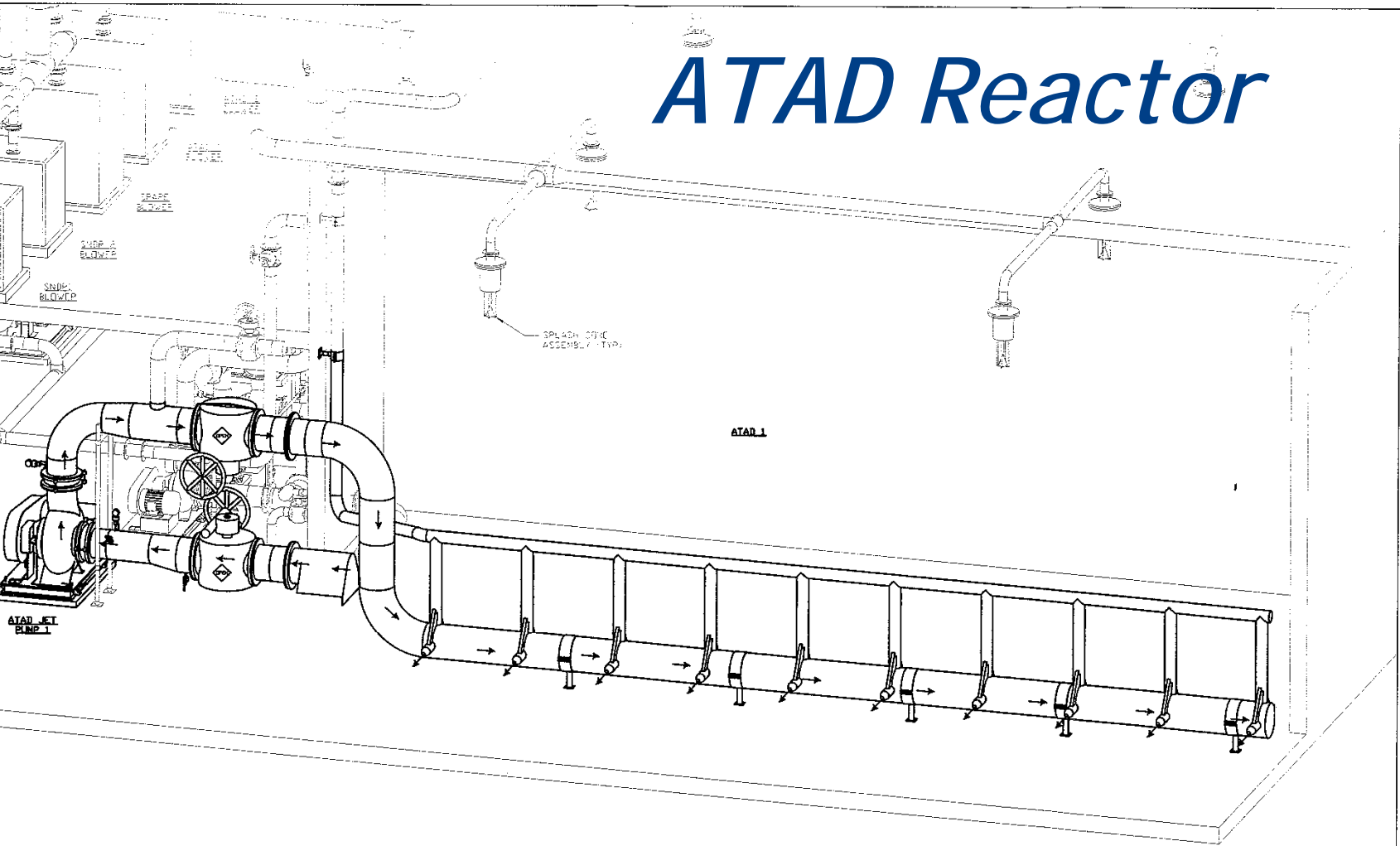
<b>SNDR REACTORS</b>	
No.	2
Volume	250,100 gals
HRT @ Avg. Design	8.7 days

<b>ODOR CONTROL SCRUBBER</b>	
No.	1
Media	Lava Rock / Wood Chips

# *ATAD Reactor*

- **Jet Mix Aeration System**
- **ORP Aeration Control**
  - Blowers and Mix Pumps on VFD's
- **Foam Control using Foam Cone Eductor**
  - Radar Gauge Measures Foam Level
  - Foam Control Pump on VFD
- **Typically Operates above 140°F**

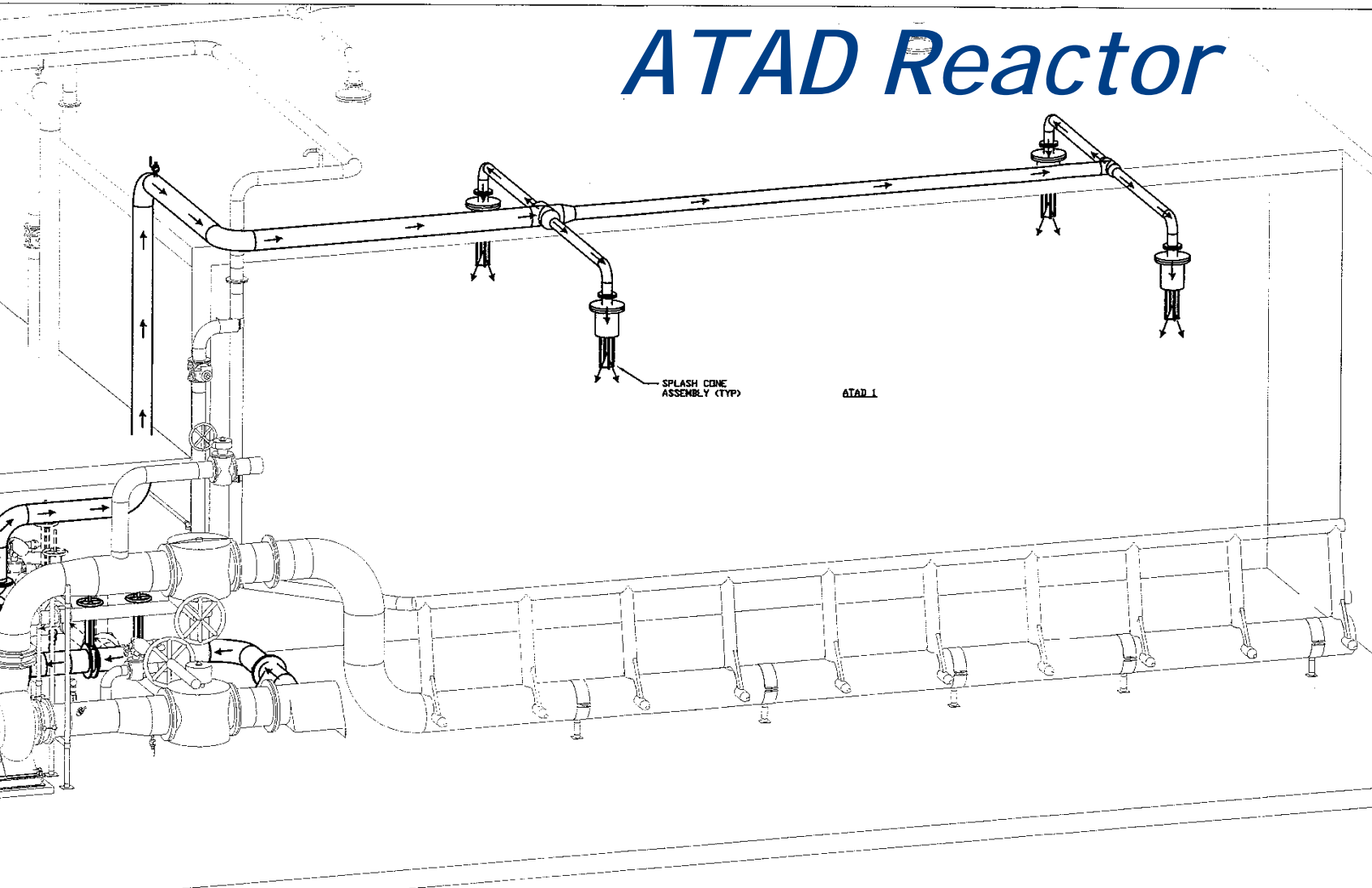
# ATAD Reactor




# *Jet Header*



# ATAD Reactor



Thermal Process Systems  
627 East 110th Avenue  
Crown Point, IN 46307

ATAD 1 FDAM CONTROL

Job: GRAND CHUTE, WI

Customer: GRAND CHUTE

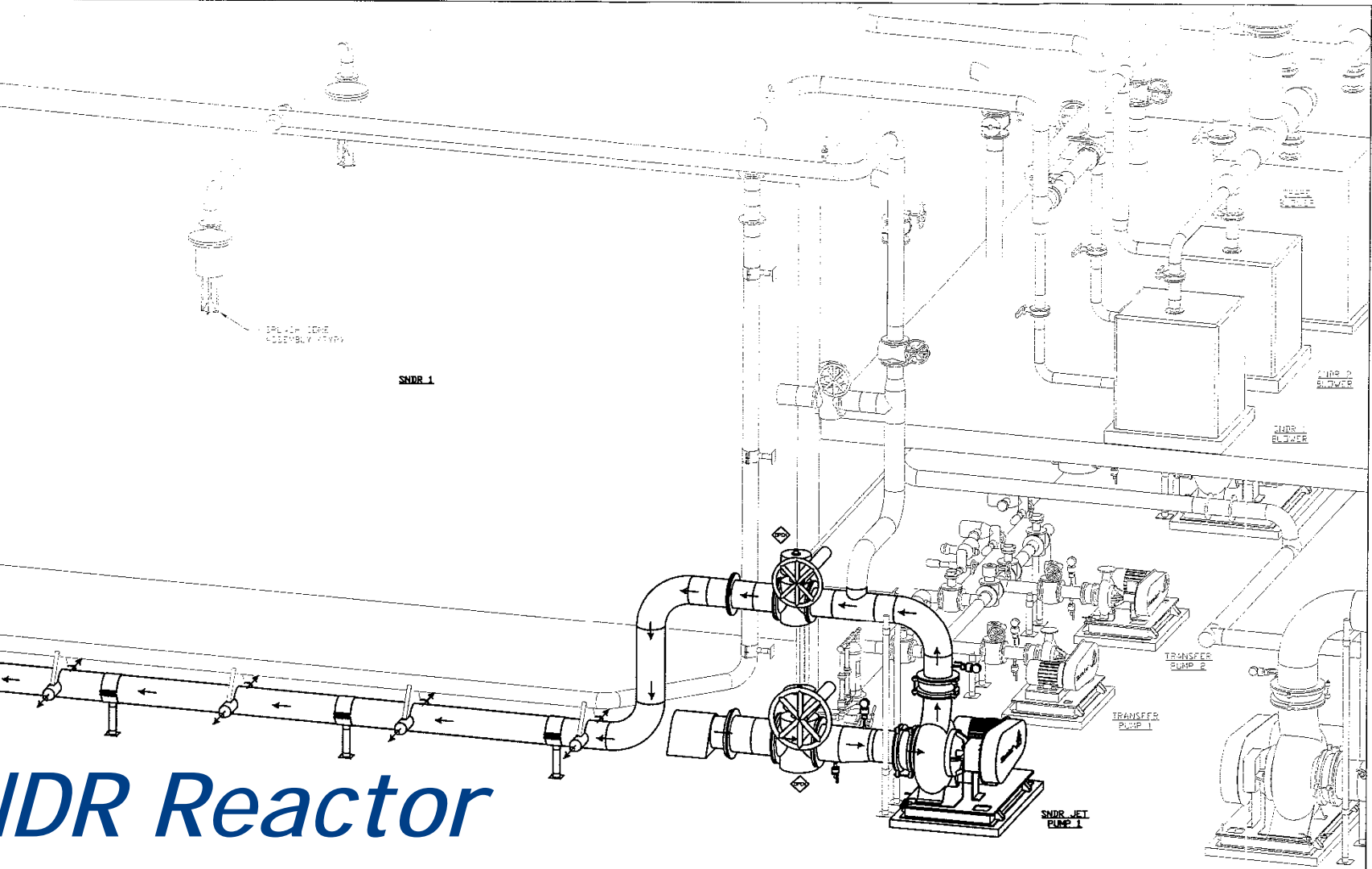
Engineer: CH2M HILL

Drawn By: KDS

Sheet: 3 Total Sheets: 36

# *SNDR Reactors*

- **Follows ATAD Reactors**
- **Operates in Mesophilic Temp Range ( 90 – 100 °F)**
- **Designed for Additional VS Destruction and Nitrification**
- **Jet Mix Aeration**
- **ORP + pH Control**
  - Cycle air On/Off based on pH to recover alkalinity
  - Drop in pH indicates nitrification

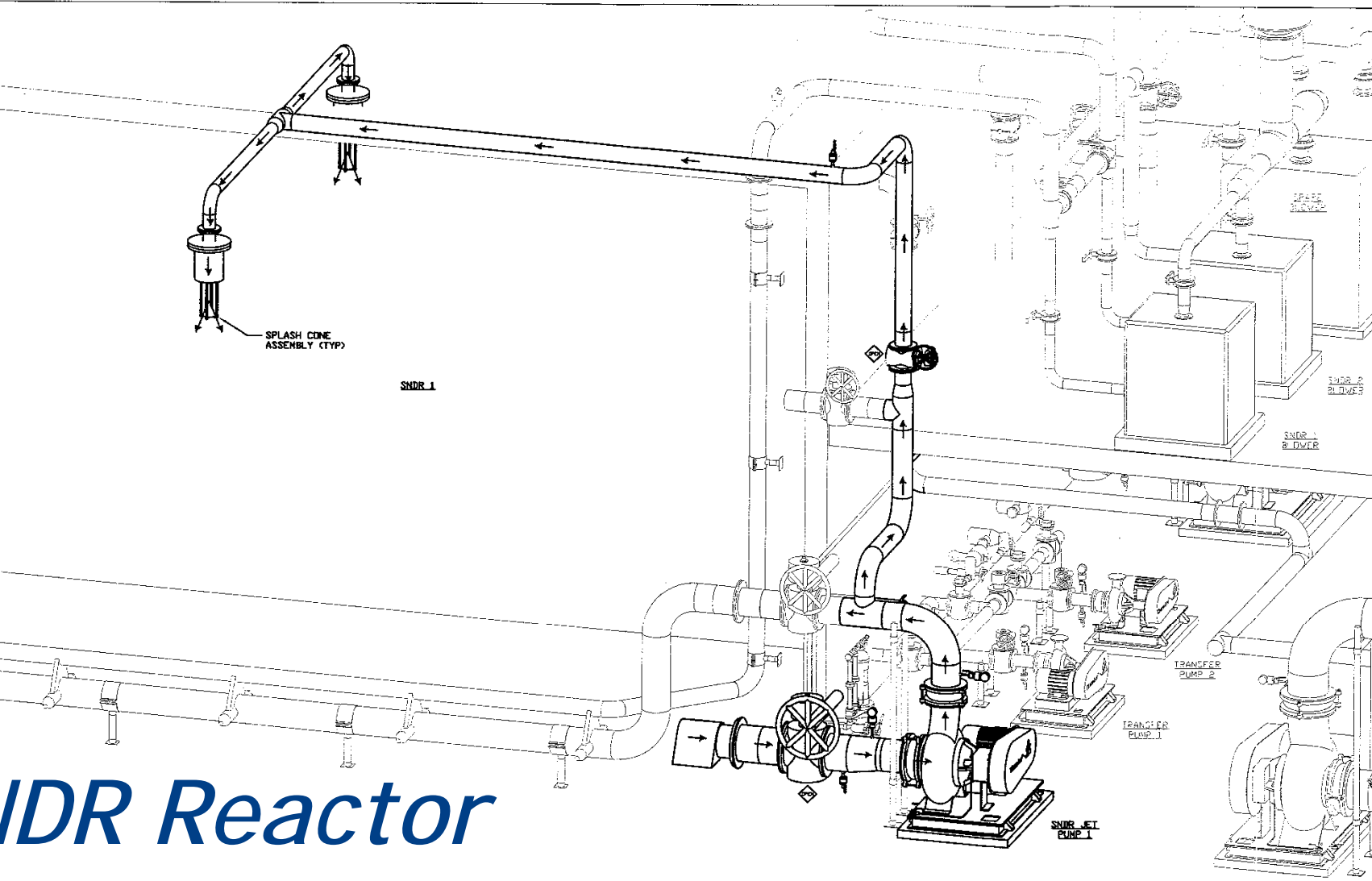


# SNDR Reactor

Thermal Process Systems  
627 East 110th Avenue

SNDR 1 JET MIX SYSTEM

Customer: GRAND CHUTE  
Engineer: CH2M HILL  
Drawn By: KDS



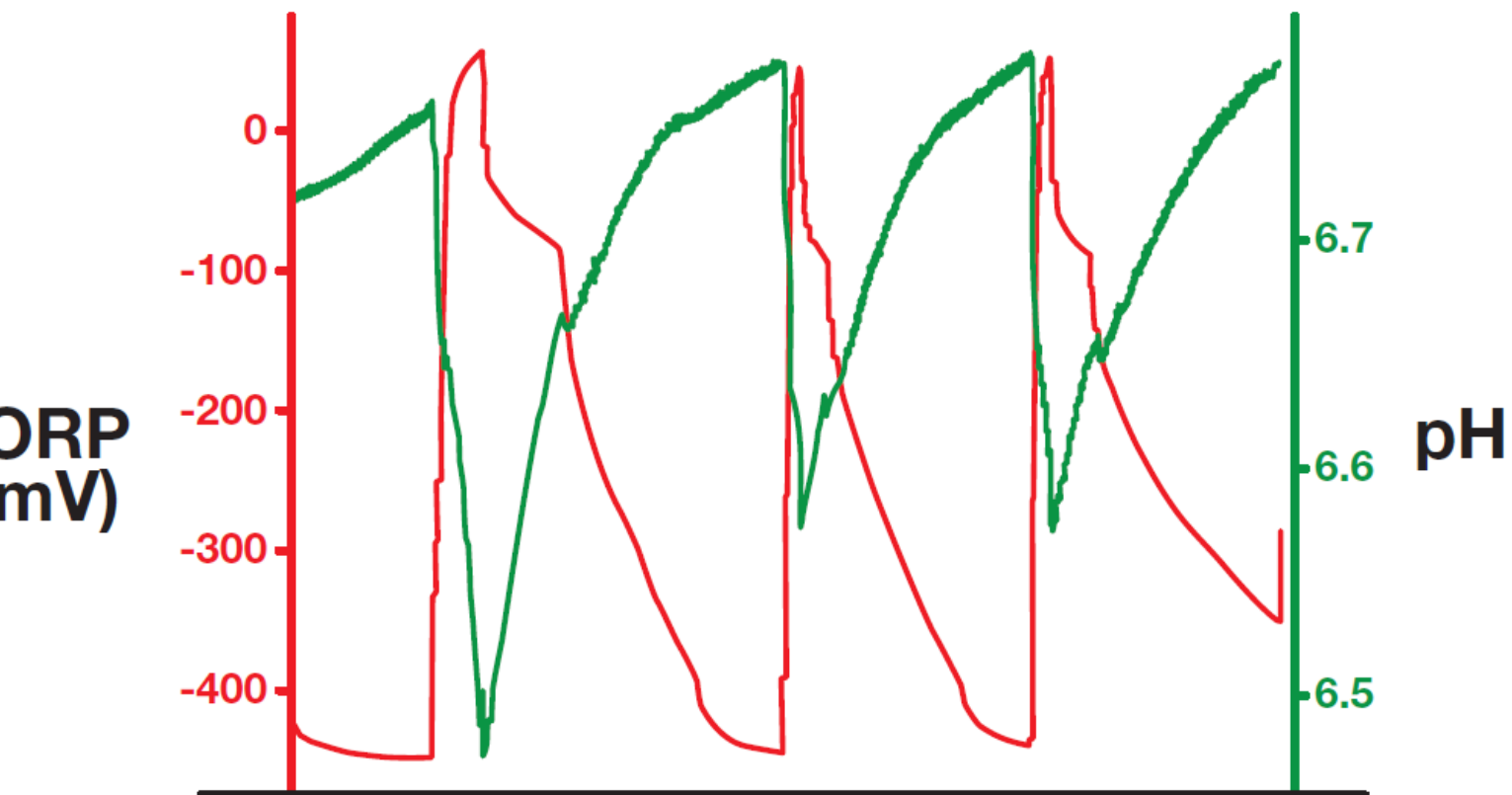
# SNDR Reactor

Thermal Process Systems  
627 East 110th Avenue

SNDR 1 FOAM CONTROL

Customer: GRAND CHUTE  
Engineer: CH2M HILL  
Drawn: BJK/DS

# *SNDR Reactor OPR/pH*





**ATAD Pump Room**

11/28/2011 14:32

# ATAD & Bio-Filter



2011/09/12

# Results

	ATAD FEED	DIGESTED SLUDGE NH <sub>3</sub>	V.S. DESTRUCTION THROUGH DEWATER	CAKE SOLIDS
2012	29,133 gpd	282 mg/l	66.2%	31.2%
2013	35,093 gpd	285 mg/l	64.4%	28.8%
2014	49,373 gpd	447* mg/l	66.4%	30.0%

SNDR 1 Off-line due to pump failure

# *Acknowledgements*

**Mr. Jim Kirk, Superintendent, Grand Chute-Menasha West**

**CH<sub>2</sub>M Hill**

**Thermal Process Systems (TPS)**

