Construction Issues at WWTPs
What the Owner/Operator Needs to Know
General Overview

Basic Introduction to Construction Issues

- Common terminology (Or lingo)
- Owner and Engineer Relationship
- Happy Ending to Project (hopefully)
#1 - Common Terminology:

- Plans
- Specs
- Shop Drawings
- Change Orders
- Substantial/Final Completion
- As Built Plans
- Bonds
#2 - What the Owner should expect from the Engineer prior to and during the project:

- Involvement during the design phase
- Involvement during equipment selection
- Involvement during SCADA design
Topics Covered

#3 - What happens if the Contractor doesn’t finish the job?
Plans -

• Plans are the engineer’s vision, or blueprint, of what is to be.

• Plans provide a wealth of information.

• Piping plans, elevations, hydraulic profiles, flow diagram, etc.
Plans (continued)

• **Flow Diagram** - Details where process flows go
• **Piping Plan** - Shows piping runs
• **Legend** - Tells what symbols and abbreviations stand for
• **Hydraulic Profile** - Shows elevations starting at beginning of facility
• **Details** - Gives specifics to items such as manholes, outfall structures, wall sleeves, etc.
Specs

- Spec Sections in Project Manual provide detail of equipment specified.
- May not specify manufacturer, but provides enough detail to eliminate non-worthy equipment.
- Also details things such as door/hardware, masonry, pipe materials, contractor guidelines, etc.
Shop Drawings

Provide detailed information about particular piece of equipment.

- Submitted to engineer by equipment supplier for approval prior to purchase of equipment
- Model #, features, drawings, ancillary equipment, controls and spare parts
- Example- Blower + associated valves, filters and motor
Change Order

- A change in work due to unforeseen circumstances. It might include:
  - A time extension
  - Piping modifications
  - Equipment changes

- Request for information (RFI) usually precedes the Change Order

- Change Orders must be approved by Engineer/Owner. Note: NOT BY OPERATOR!
Substantial/Final Completion

- **Substantial Completion**
  Allows for start up of facility, with major work being completed. Facility must run effectively and meet all permit limits.

- **Final Completion**
  All items have been completed, including punch list (laundry list) items.
As Built Plans

Also known as “As Bulits”

• Revised plans/drawings due to changes in the field
• Example: Change in piping due to unforeseen circumstances
• Are the latest and most accurate drawings
As Built Plans

(continued)

What happens next?

• Marked up in field, dated and signed
• Original plan/drawing marked up

OR

• Marked up in field
• Redrawn, with original plan/drawing left in, but noted
Bonds

- Bid Bond
- Performance Bond
- Payment Bond
Bid Bond

• Required of a contractor submitting lowest bid
• Ensures contractor is serious about his bid
• If contractor negates, developer is paid the difference between that bid and the next lowest bid.
Performance Bond

- Replaces Bid Bond
- Ensures work is completed as specified
- Guarantees client will be compensated for any monetary loss up to the amount of the bond
Payment Bond

- Guarantees payment to laborers, suppliers and subcontractors in the event of the contractor defaulting
- Usually issued with the Performance Bond
Topic #2 - Expectations During Project

Involvement during design phase

- Owner involvement when developing vision
- Owner takes part in design meetings
- Engineer keeps owner involved along the way
Owner Involvement

- Owner/Operator need to contribute
- Should present/discuss
  - Past operational issues
  - Problems meeting permit limits
  - Equipment performance issues
  - Develop a “Wish List” for consideration
  - Discuss issues with staff
Equipment Selection

Owner should have input, based on:

- Past experiences
- Current needs/problems
- Preference
Flow Sheets

Plan sheets outlining each step of process

- Work with Engineer on Flow Sheets
- Discuss each process, and what you expect it to do
SCADA Design

• What are you trying to accomplish? Monitoring vs. complete control

• Be creative when controlling equipment

• Reporting

• Alarms
  - Who?
    - What?
    - When?
**SCADA Design**

Examples of screens:

- **General Overview**
  Provides a “quick glance” status report

- **Maintenance**
  Notification when maintenance is due

- **Trending**
  Provides history of events
General Overview
General Overview
General Overview

Downers Grove Sanitary District
SCADA SYSTEM

INFLUENT: 10.16 MGD
EFFLUENT: 8.74 MGD
EXCESS: 0.00 MGD
COMBINED: 0.00 MGD
ST. JOE'S #002: 0.00 MGD

5/28/2003
5:36:20 PM

Raw Sewage Wetwell

5.5 FT.

1
2
3
4
5

#1 VFD 632 RPM
#2 VFD 0 RPM

Interconnect 24" Valve

To Grit Tank No. 1 & 2
4.87 MGD

To Grit Tank No. 3 & 4
5.03 MGD

Excess Flow Wetwell

5.5 FT.

6
7
8
9

To Excess Flow Clarifiers

To Intermediate No. 1 Clarifier

From Sewer System

Raw Sewage Building Equipment
Excess Flow Building Equipment
Influent Pump Control
Alarm Summary
Main Menu
# Maintenance

## Downers Grove Sanitary District

### SCADA SYSTEM

**Maintenance**

**INFLUENT:** 10.13 MGD  
**EFFLUENT:** 8.59 MGD  
**EXCESS:** 0.00 MGD  
**COMBINED:** 0.00 MGD  
**ST. JOE’S #002:** 0.00 MGD

### RAW SEWAGE BUILDING EQUIPMENT

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<th>Status</th>
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**Raw Sewage Building Seal Water Supply:** EFFLUENT

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**Menu Options:**

- Influent Pump Control
- Influent Pumping System Overview
- Alarm Summary
- Main Menu
Trending

ABS Blower Speed & Average DO Tank Level

AERATION TANK NO. 5

AVG DO TANK LEVEL FOR ABS BLOWER 1.86
ABS BLOWER SPEED IN CFM 5221.00
AERATION TANKS #8&9 CURRENT AIR FLOW 3575.81
AERATION TANKS #10&11 CURRENT AIR FLOW 3286.67
# Reporting

Village of Somewhere  
Waste Water Treatment Plant  
NPDES Permit No. XX1234567

## Wastewater Treatment Facility Daily Report for September, 2006

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Printed on 24/09/2006 3:30 PM  From: M:\WON-CLIENT\MARKETING\SewerStats - g5WTRP_Monthly  
Page 1 of 5
Topic #3 - What Happens if the Contractor Doesn’t Finish?

- Performance Bond
- Engineer/Owner informs contractor that Bond Company will be notified
- 30-day period to respond
- If no action, Bond Company responds
- Contractor’s rating is affected
Summary

- Owner involvement critical
- Engineer and Owner need to work together
- Engineer and Owner need to have same long range goals
Questions?