

Fishbeck, Thompson, Carr & Huber, Inc.

Pump Station Emergency Power: Decisions, Decisions, Decisions

OWEA
2010 Collection Systems Specialty Workshop



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Reliability is a Top Priority

- Wake-up calls
 - January 1, 2000
 - September 11, 2001
 - August 14, 2003
 - Severe weather
- Bioterrorism Act
 - Vulnerability assessments
 - Emergency response plans
- The nation's power grid is suspect

Pump Station Emergency Power

- ❑ Rules and regulations?
- ❑ Permanent or portable?
- ❑ Sizing?
- ❑ Type of fuel?
- ❑ Connection and distribution?
- ❑ Ancillary equipment?
- ❑ Requirements after startup?
- ❑ Options to generators?

Rules and Regulations?

- **Recommended Standards for Wastewater Facilities – 2004 Edition**
 - “Emergency pumping capability is required unless on-system overflow prevention is provided by adequate storage capacity. Emergency pumping capability shall be accomplished by connection of the station to at least two independent utility substations, or by provision of portable or in-place internal combustion engine equipment which will generate electrical or mechanical energy, or by the provision of portable pumping equipment. Such emergency standby systems shall have sufficient capacity to start up and maintain the total rated running capacity of the station.”

Rules and Regulations?

- **National Electrical Code – 2008 Edition**
 - Article 700 – Emergency Systems
 - Article 701 – Legally Required Standby Systems
 - Equipment shall be approved
 - Authority having jurisdiction shall witness testing of complete system
 - Source permitted to supply legally required and optional standby systems
 - Transfer equipment shall be automatic, identified, and approved; must transfer within 60 seconds
 - Sign at service entrance
 - Wiring permitted to occupy same raceways with general wiring
 - Fuel for a minimum of 2 hours of operation
 - Article 702 – Optional Standby Systems

Permanent or Portable?

- **Recommended Standards for Wastewater Facilities – 2004 Edition**
 - “Where portable generating equipment or manual transfer is provided, sufficient storage capacity with alarm system shall be provided to allow time for detection of pump station failure and transportation and connection of generating equipment. The use of special electrical connections and double throw switches are recommended for connecting portable generating equipment.”
- **Know your system and establish standards**

Sizing?

- Loads
 - ▣ Starting KVA
 - ▣ Running KVA
- Motor starting method
 - ▣ Recommend VFDs for larger motors
- Starting sequence
 - ▣ Include time delay relays
- Do not oversize!
- Require system supplier to size generator

Type of Fuel?

- Natural gas, propane, or diesel
- Size matters
- May need a letter from natural gas company
- Need to turn over diesel fuel regularly
- Contract with fuel supplier
- Beware of bi-fuel

Connection and Distribution?

- KISS – Keep It Simple Sparky!!!
- Service entrance rated disconnect
- Over-current protection
- Plug/receptacle
- Kirk-key interlocks

Connection and Distribution?

- KISS – Keep It Simple Sparky!!!
- Transfer switch
 - Manual or automatic
 - Number of poles
 - Bypass-isolation capabilities
 - Momentary paralleling
 - Sync check versus neutral-off position
- Transient voltage surge suppression

Ancillary Equipment?

- Fuel storage
 - Location
 - Containment
 - Venting
 - Fill station
 - Pressure testing
- Day tank
- Radiator

Ancillary Equipment?

- Enclosure
 - Weather protected
 - Sound attenuated
- Ventilation
 - Damper actuators
- Battery charger
- Heaters
- Battery-operated emergency lighting
- Alarm dialer

Requirements After Startup?

- Exercising
 - Without load
 - With load
- Load bank testing
- Infrared scanning
- Emissions
- Maintenance contract

Options to Generators?

- Dual electrical services
- Solar
- Wind
- Fuel cells
- Microturbines

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Questions???



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Thank You!!!



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