Lessons Learned for Utility Disaster Preparedness

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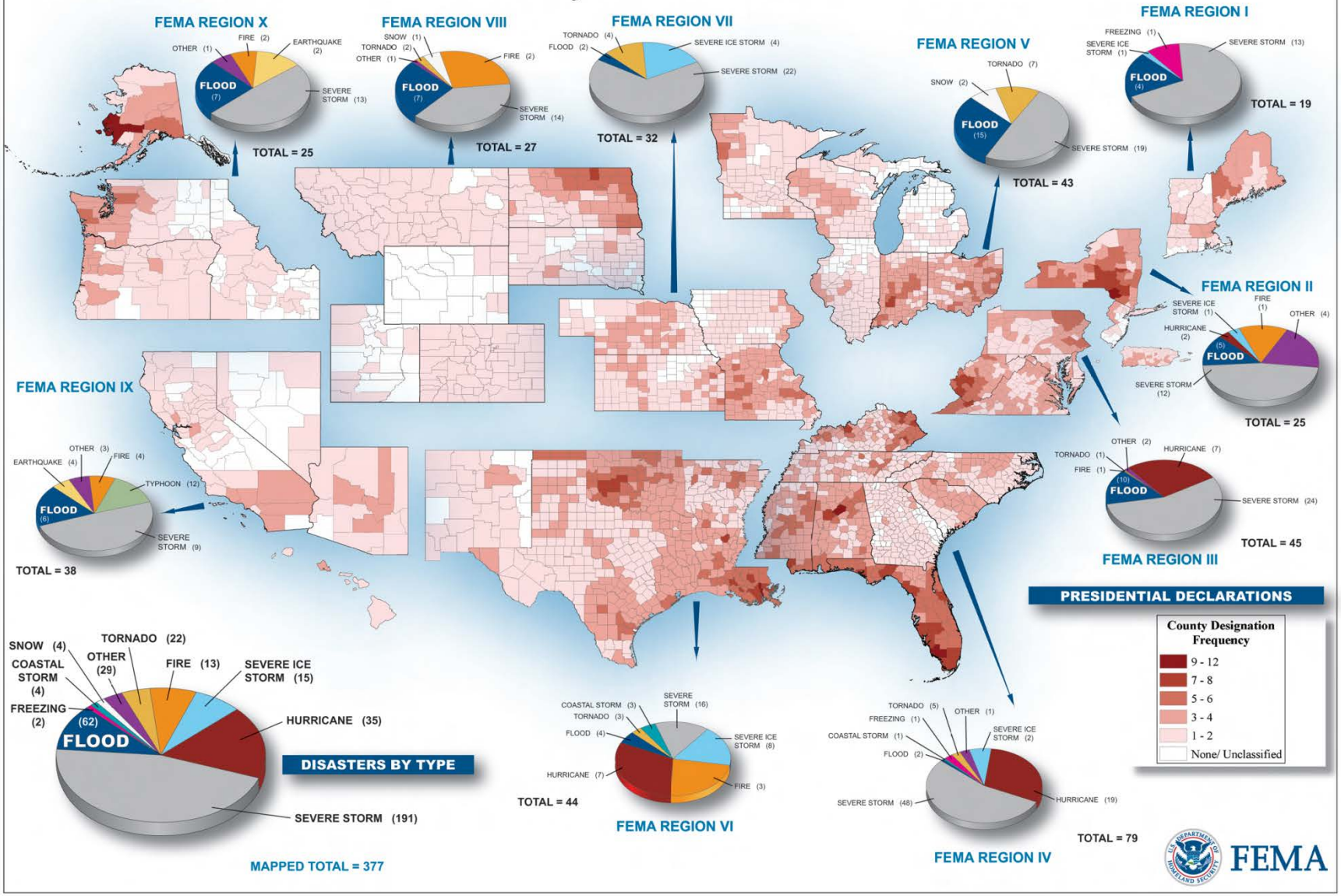
Presentation Outline

- Common Disaster Impacts – Flood/Power Loss
- Hurricane Isaac – Tale of Two Municipalities
- Plant/Pumping Recommendations
- The Plant Replacement Question
- Reinforcement of Good Practices
- Procurement of Emergency Services Pre-Disaster
- Knowledge of Funding Constraints
- Questions

PRESIDENTIAL DISASTER DECLARATIONS

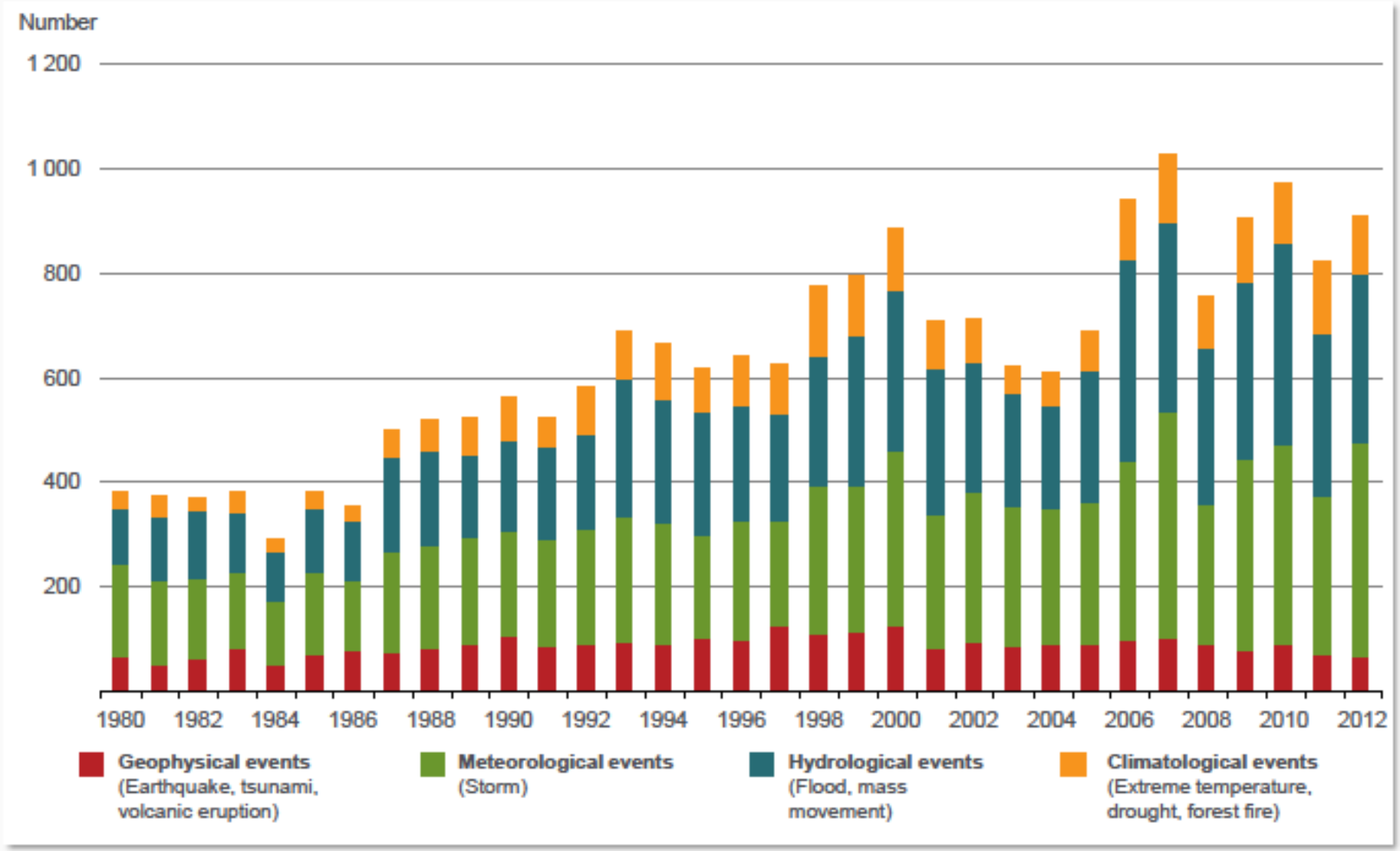
January 3, 2000 to March 3, 2007



NatCatSERVICE

Natural catastrophes worldwide 1980 – 2012

Number of events



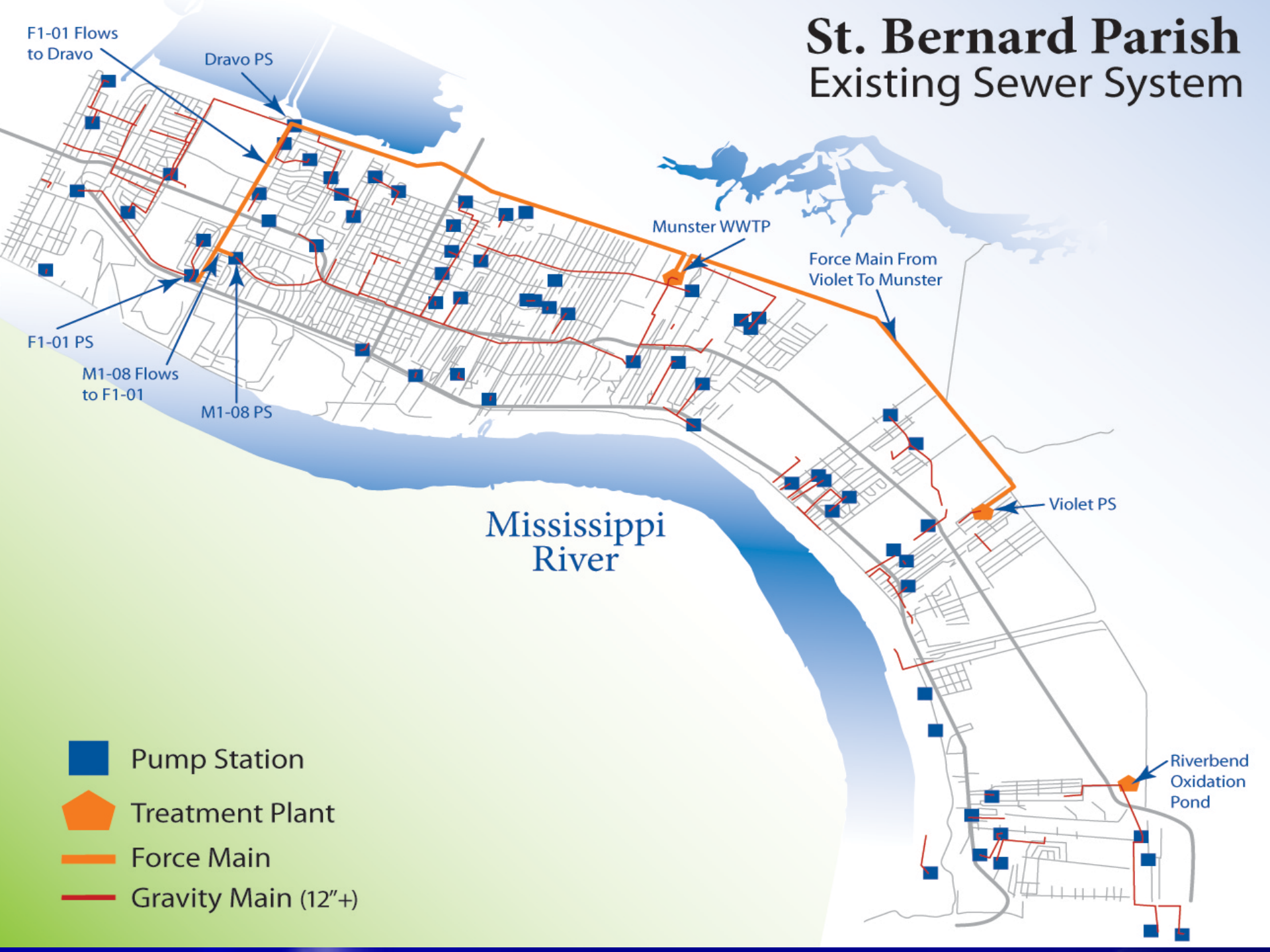
Common Storm Impacts – Flood/Power Loss

- Flood/Storm Surge Impacts
  - Treatment Impacts
    - Solids Removal
    - Disinfection
    - Pumping
  - Pump Station/Transmission Impacts
- 100 year Design Flood Levels Exceeded
- Power Loss Impacts
  - Loss of Pumping Capabilities
  - Loss of Treatment

Hurricane Isaac – Tale of Two Municipalities

- Slow Moving Category 1
- Limited Evacuation for 1.1 million
- Wide-spread Extended Power Loss for Region

St. Bernard Parish
Existing Sewer System



Hurricane Isaac – St. Bernard Parish

- All major pump stations – emergency power and minimum 3 days of fuel
- Major WWTP – emergency power and 7 days of fuel
- 75% power loss throughout the Parish for 3 days

Hurricane Isaac – St. Bernard Parish

- WWTP continued operation flows during peak of storm
- Treating peak flows 3 times average daily
- Reduced system overflows and home backups
- Reduced emergency expenses
- Facilitated a positive response to LDEQ

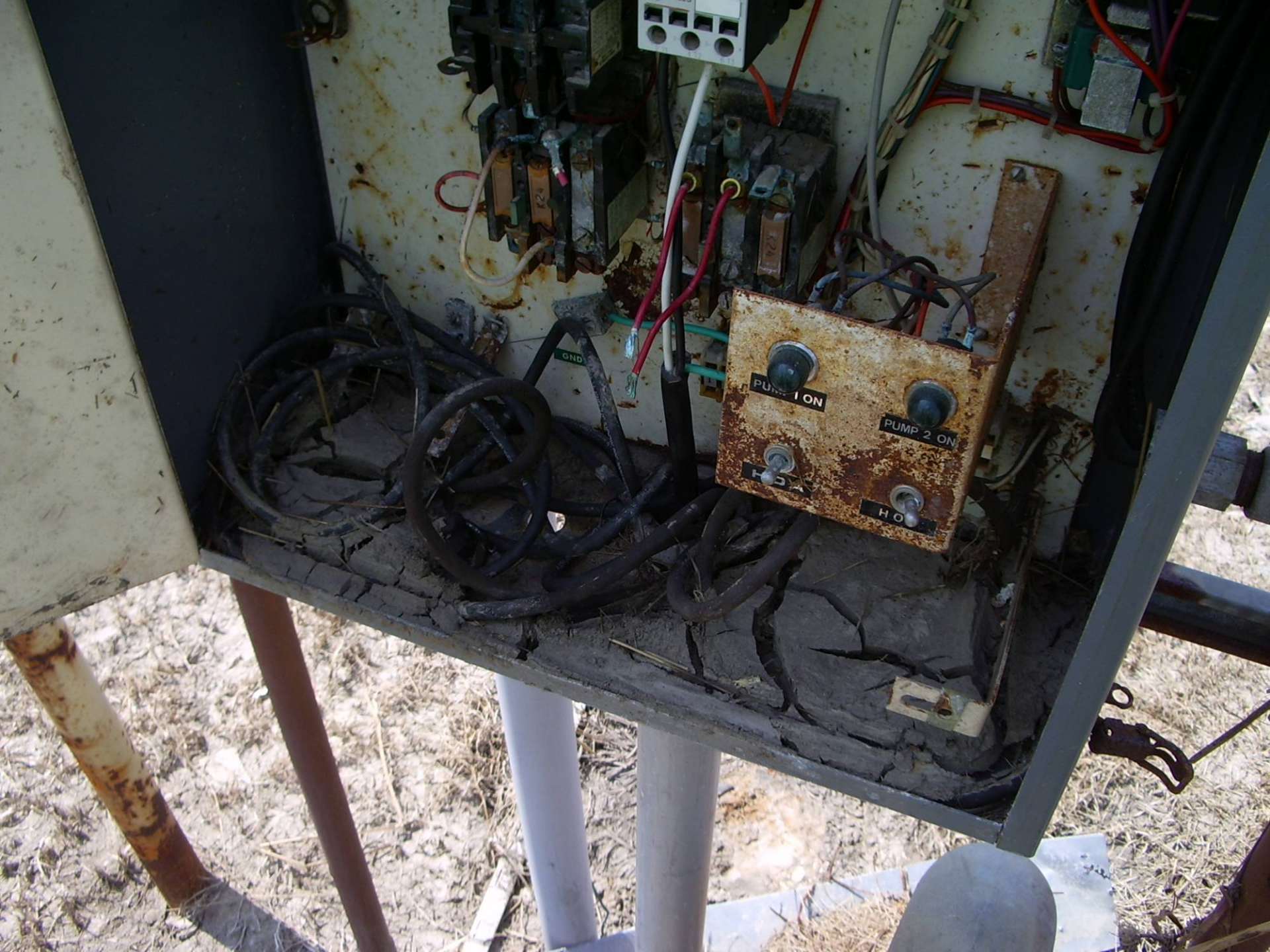
Hurricane Isaac – Another Municipality

- Limited plant generator and primary pump station capabilities
- Extensive power loss for over 3 days
- Difficulties with overflows and sewer backups
- Approximately $6 million in emergency expenses for generators and pumps
- Potential Impact to Department Image

Plant/Pump Recommendations:

Pumping/Lift Station Impacts –

- All electrical service lost
- Portable emergency generators not available due to high demand
- Limited provisions for portable pumping
- Control panels and MCCs damaged
- Motors and bearings impacted (including submersible pumps)
- Emergency generators flooded
- 100 year flood levels exceeded


PUMP 2 ON

Lift Station Improvements

- Purchase and secure storage of key emergency equipment (generators, portable pumps, etc)
- Installation of emergency pump outs
- On-site emergency generators
- Raise control panels if practical
- Extend gravity sewers and eliminate pump stations
- Conversion to dry pit or wet pit submersible pumps
- Seal wet wells
- Consider design to 500 year flood levels
- Focus on primary lift stations


09/26/2005

Treatment/Transmission System Impacts –

Treatment Plants

- Complete loss of effluent pumping
- Complete loss of emergency power generation
- All power feeds lost
- Control panels and MCCs damaged
- Essential process basins filled with mud and debris
- Impacts to Solids Handling Processes
- Flooding beyond 100 year levels
- Biological processes eliminated
- Disinfection processes impacted


DIESEL FUEL

Treatment Plant Improvements

- Provide adequate emergency power generation
- Contingency disposal plans for liquid/solid biosolids disposal
- Raise Electrical Components
- Consider Dry and Wet Pit Submersible Pumps
- Consider coarse bubble diffusion for aeration
- Consider bypass alternatives

Treatment Plant Improvements

- Protect chemical storage facilities
  - Restrain storage tanks
  - Store redundant equipment
  - Consider liquid chlorination systems

The Plant Replacement Question

- Reality of Justifying Funding
  - + >30% of Plant Structural Components
  - + Many Elevated Process, Headworks, Solids Handling, etc., Often Not Impacted
  - + Many Components of Plants often undamaged by floods, Clarifier Mechanisms, Diffusers, Piping, etc.

= Damage Less Than 50%

The Plant Replacement Question

Case Histories

- Munster WWTP Consolidation – 65% paid by FEMA funded damages from 4 WWTPs
- Galveston 5% from FEMA remainder from CDBG Funds
- Mississippi Gulf Coast – Kiln/Picayune Expansions 100% CDBG Funds
- Diamondhead, Mississippi – 100% FEMA Funded

Reinforcement of Good Practices

- Drawing Conversion
- Asset Management
- Conversion from Gaseous Chlorine
- Implementation of CMOM Activities

Reinforcement of Good Practices

- Drawing Conversion
  - Sole Hard Copies Damaged in Multiple Events
  - Stored at Site of Vulnerable Facility
  - Delayed emergency and permanent recovery efforts
- Response
  - Convert all drawings to electronic format (pdf or Autocad)
  - Store electronic files at off-site location

Reinforcement of Good Practices

- Asset Management/CMOM Activities
  - Provides ready documentation of existing equipment status
  - Quick identification of repair needs
  - Documents a fully functional collection system – regular cleaning/CCTV
- Response
  - Expedites funding eligibility and degree of funding
  - CCTV records facilitate permanent repairs
  - Non-flowing system eligible for FEMA funded cleaning

Reinforcement of Common Activities

- Conversion from Gaseous Chlorine

Procurement of Emergency Services – Pre-Disaster – Why

- Assist with Availability of Equipment and Supplies
- Aid with Timeliness of Recovery
- Enable maximum FEMA reimbursement (if applicable)

Procurement of Emergency Services – Pre-Disaster – Types

- Debris Removal and Monitoring – Utility vs. County
- Emergency Management - staff augmentation
- Chemical Supply – include emergency supply with annual contracts (i.e. soduim hypochlorate)
- Annual Maintenance Contracts – add emergency provisions (i.e temporary pumps, prices for changes in quantities)
- Generator/Fuel Provisions – needs to be evaluated against immediate needs
- Contingency Plans for Solids Processing/ Disposal – Contracts – Co-operative Agreements

Knowledge of Funding Constraints

FEMA

- Emergency items & permanent repairs of actual damages
- Meant primarily for replacement of damaged items
- Opportunity for Improved/Alternate Projects

406 Hazard Mitigation

- Mitigation of damaged items only
- Included with other FEMA funds

Knowledge of Funding Constraints

404 HMPG

- Funds not tied directly to damaged elements
- Separate timing and program constraints

CDBG Funds

- Typically follow major disasters
- Not guaranteed
- Often a lag awaiting program requirements
- Often primarily dedicated to housing

Questions

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