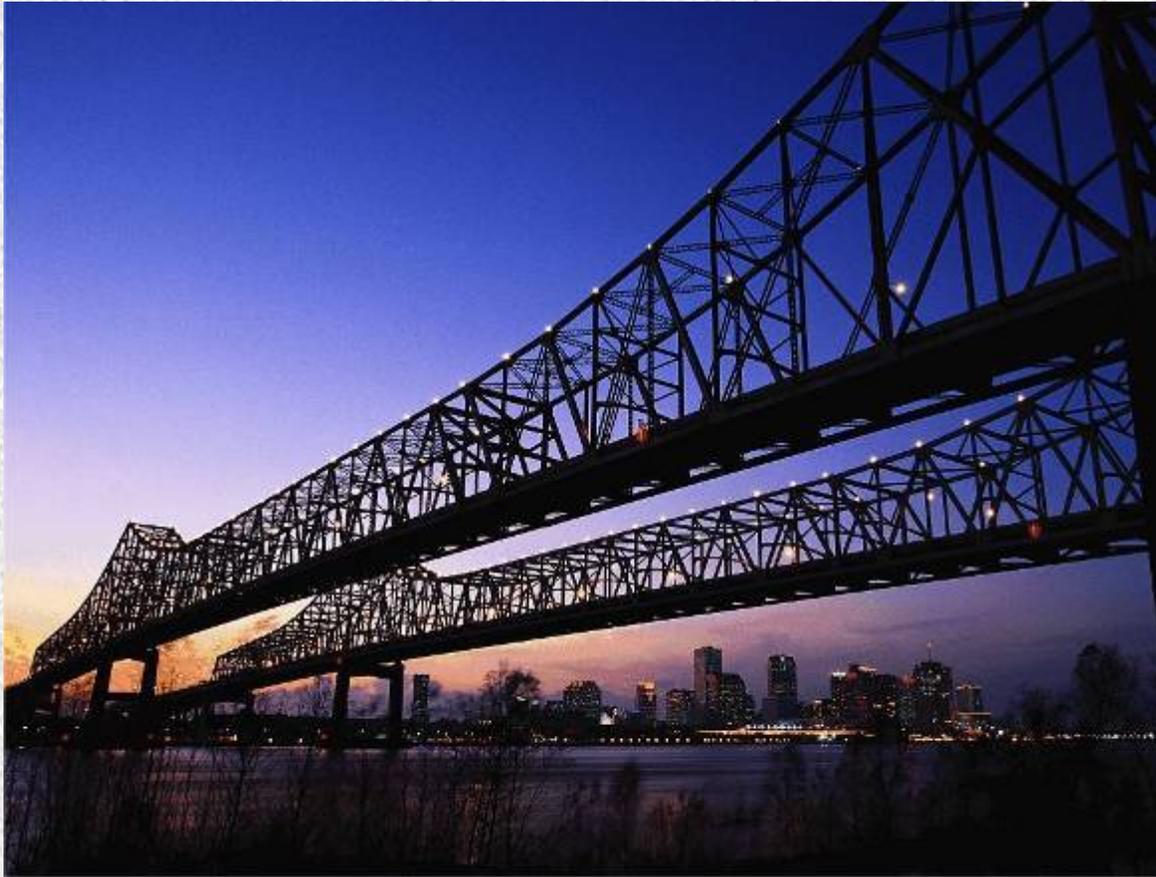


CONTINUED BUILDING OPERATION AFTER A CATASTROPHIC EVENT



Presented by:

Phil Boogaerts

Engineer,
Facilities Management
Southeast Louisiana Veterans
Healthcare System
New Orleans, LA

August 8, 2007

VA Medical Center New Orleans, LA

Utilities & Systems Management during and after Hurricane Katrina



Energy Projects and Planning

Opportunities to resolve design
issues in existing systems and
implement disaster hardening

Often little or no additional cost
involved

Appropriate time for related projects

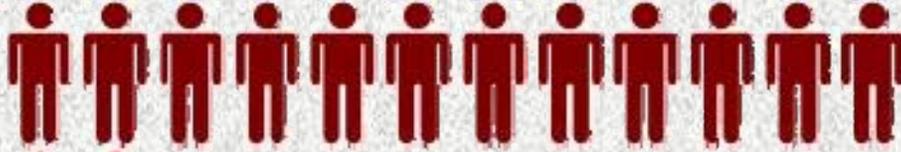
Overview

- Hurricane Katrina Strike Monday, 8-29-05
- 855 People at VAMC New Orleans, LA for 4-5 days
- Flooding Occurs 8-30-05
- Utility Failures:
 - Electricity (normal power)
 - Electricity (emergency power)
 - Water/Sewer
 - Telephone/data
 - HVAC
- Coping with utility loss
- Facility management with and without patients
- Evacuation
- Rebuilding and recovery
- Hurricane hardening for utility systems
- Questions, comments and discussion

Facility Occupants During Hurricane



- 241 Patients-10 ventilator



- 272 Employees
(15 Engineering Employees)



- 342 Family Members



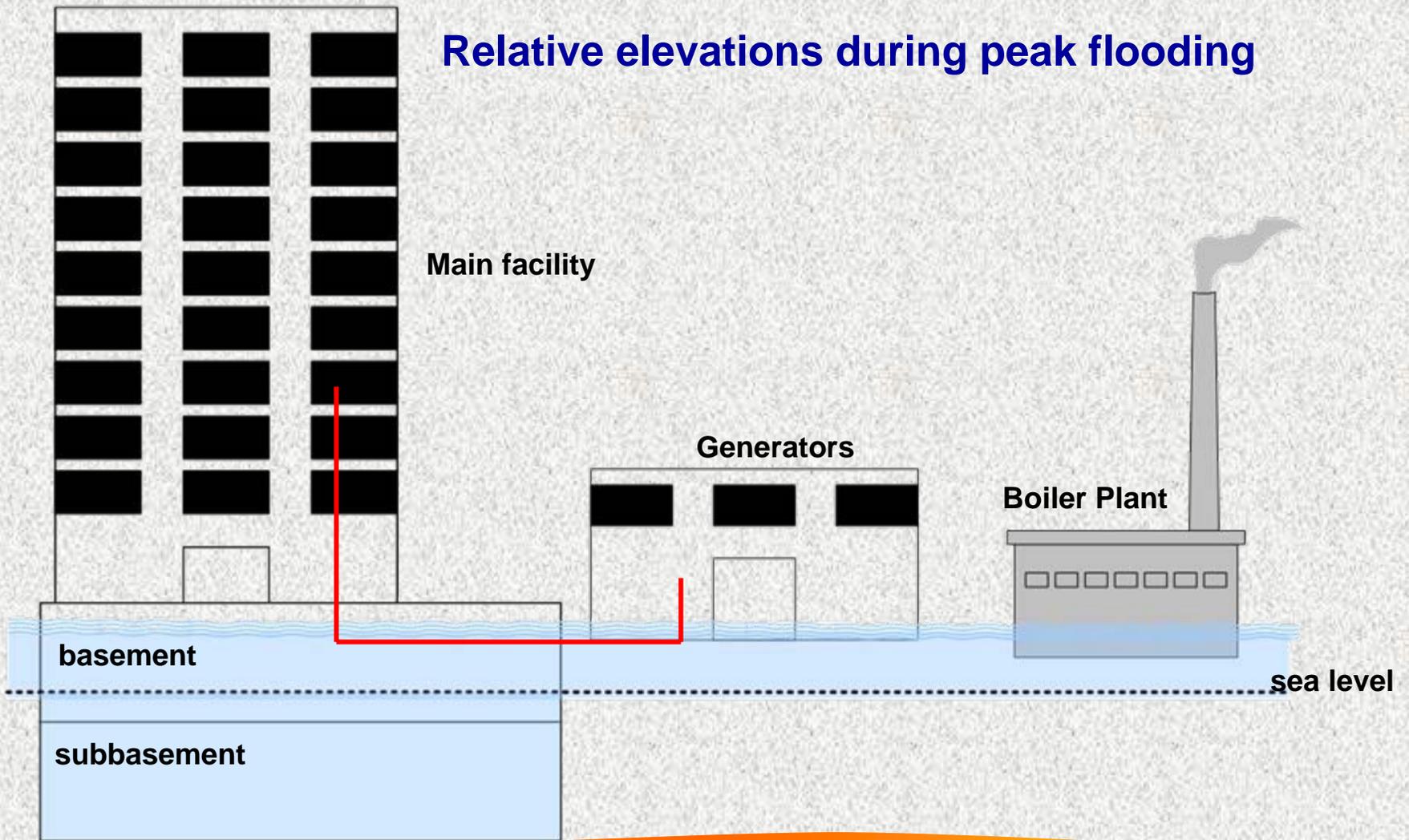
 = 20 persons

- 855 Total People

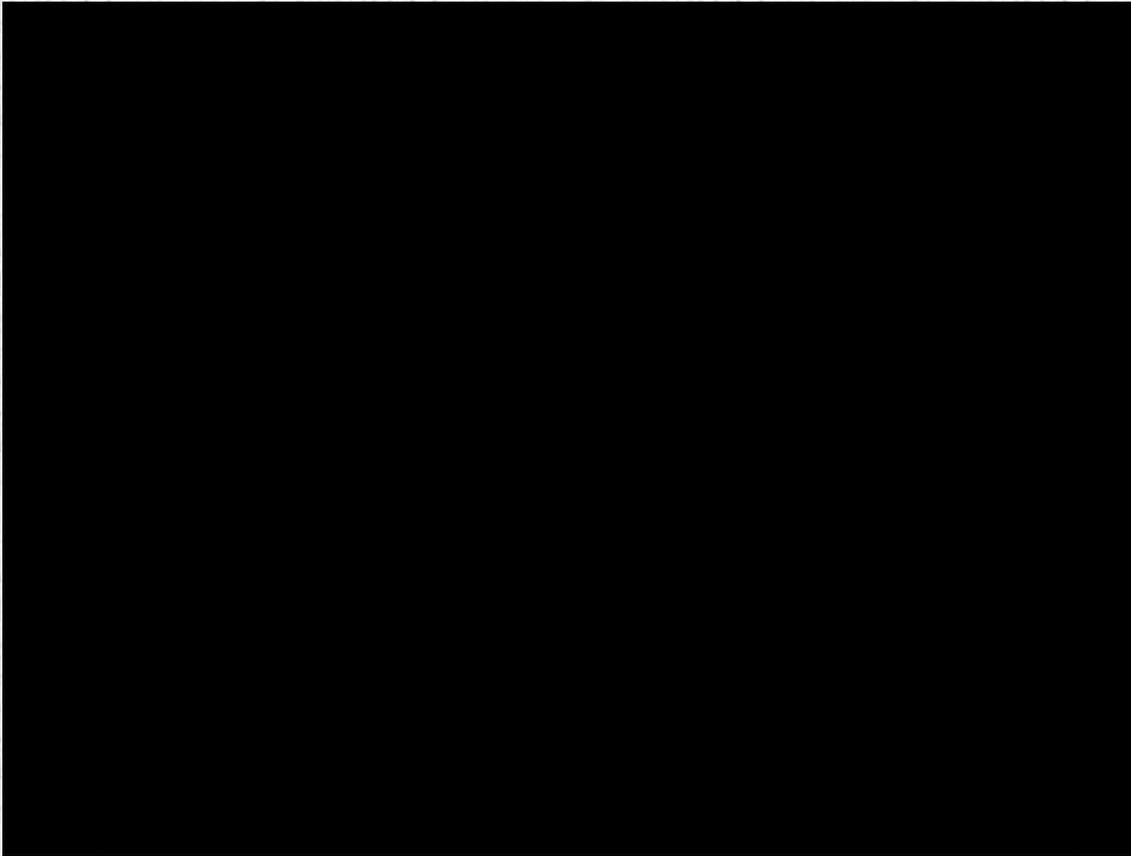
Disaster Impact - Utility Systems



Flooding Impact

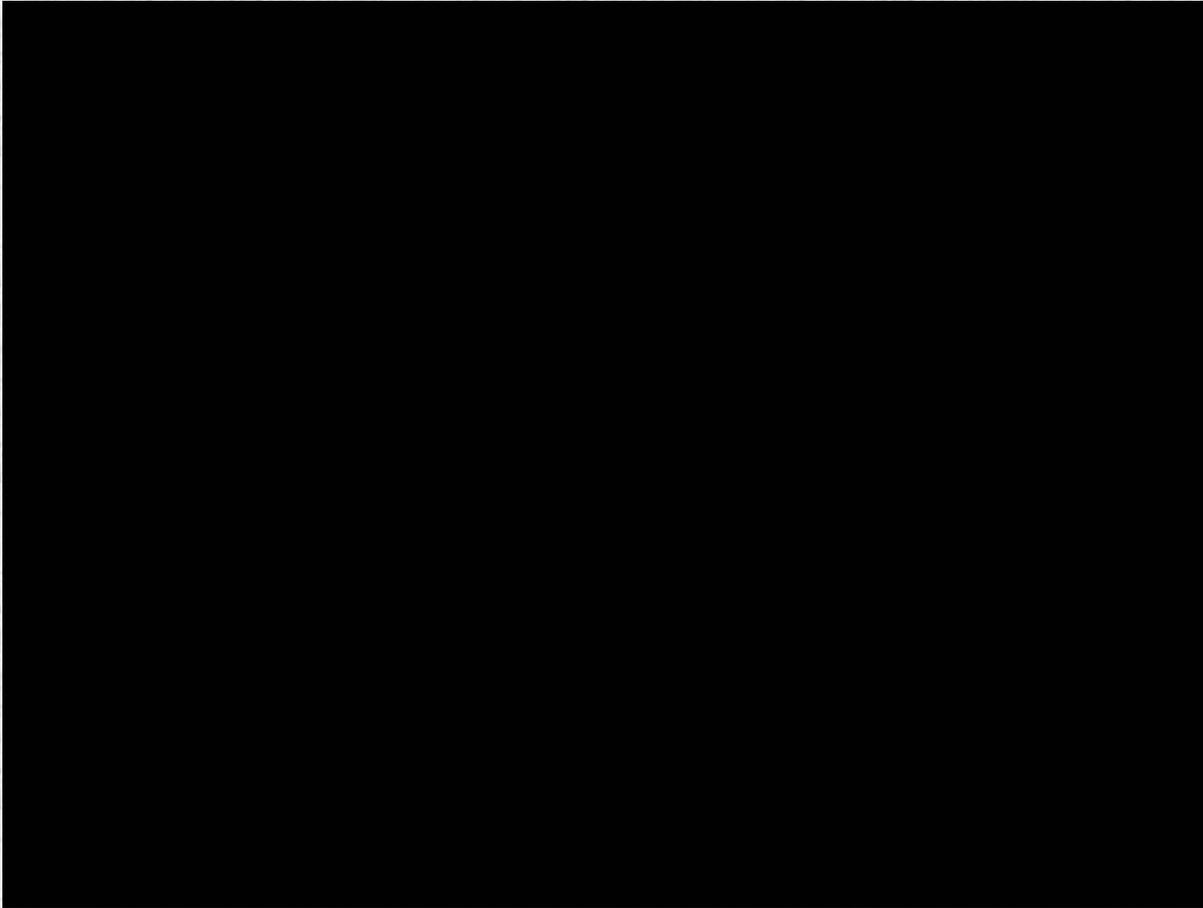


Katrina Impact on Facility



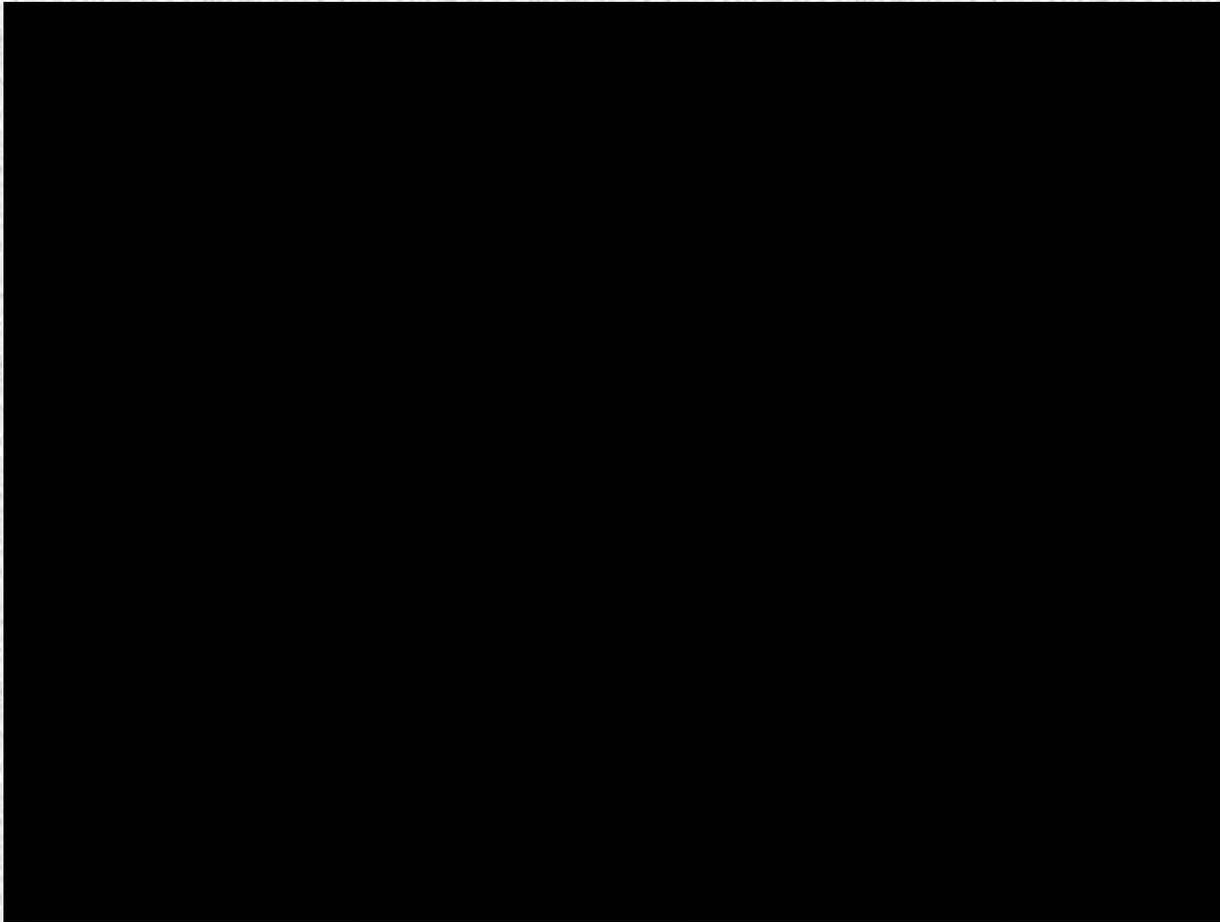
- 18 feet of water in basement and subbasement

Katrina Impact on Facility



- 18 feet of water in basement and subbasement
- 21 days without municipal utilities

Katrina Impact on Facility



- 18 feet of water in basement and subbasement
- 21 days without municipal utilities
- Facility mostly unusable for months/years

Flooding Impact



Massive flooding through windows

Flooding Impact



Flooding of elevator pits

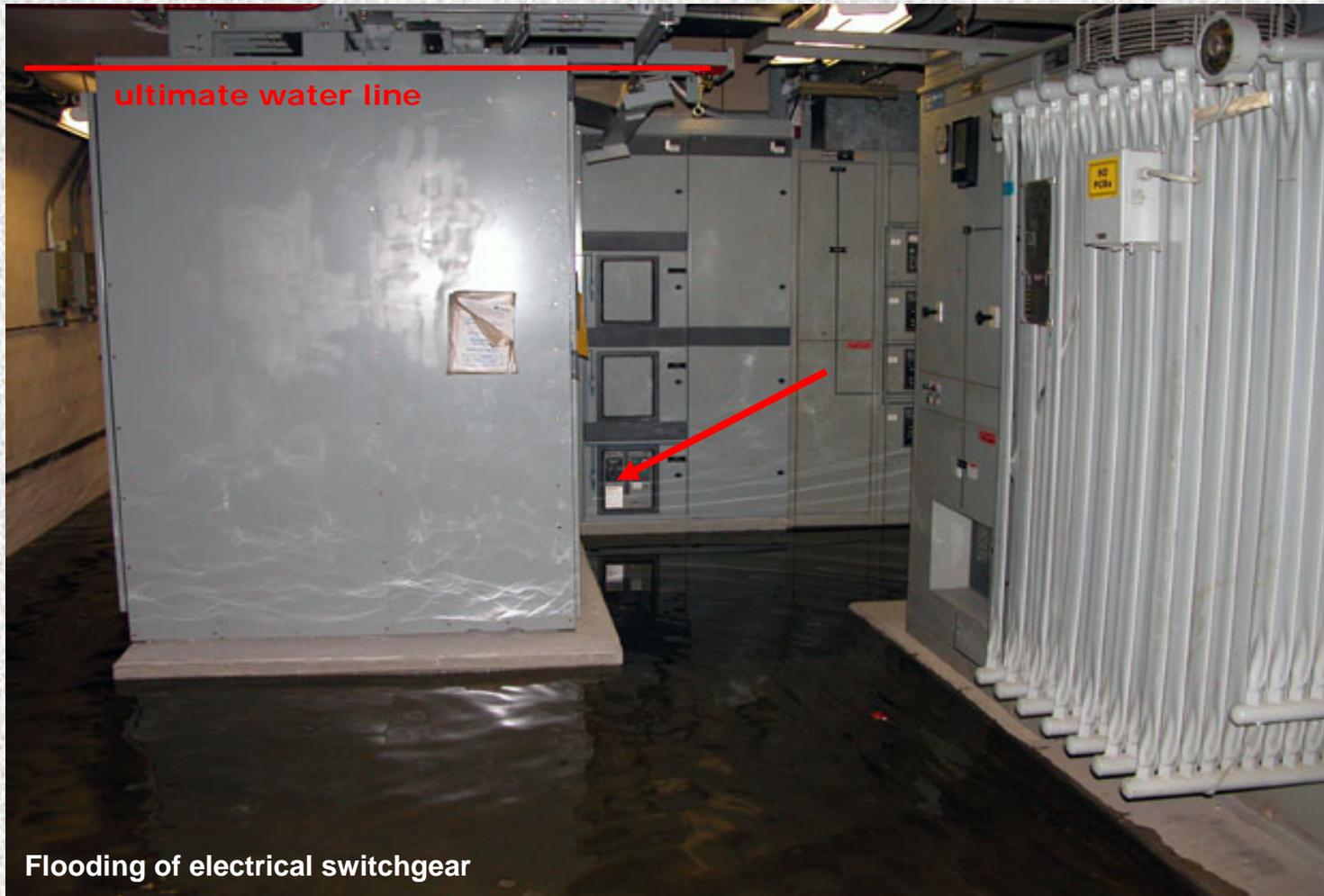
Flooding Impact



Basement elevator lobby – after dewatering

Flooding of elevator pits

Flooding Impact



Flooding of electrical switchgear

Flooding Impact



Flooding of boiler plant

Coping with Utility Loss



Extended generator run time (3 weeks)

Coping with Utility Loss



Coping with Utility Loss



Nursing Home/Parking Garage Generator Room

Coping with Utility Loss



Boiler plant generator

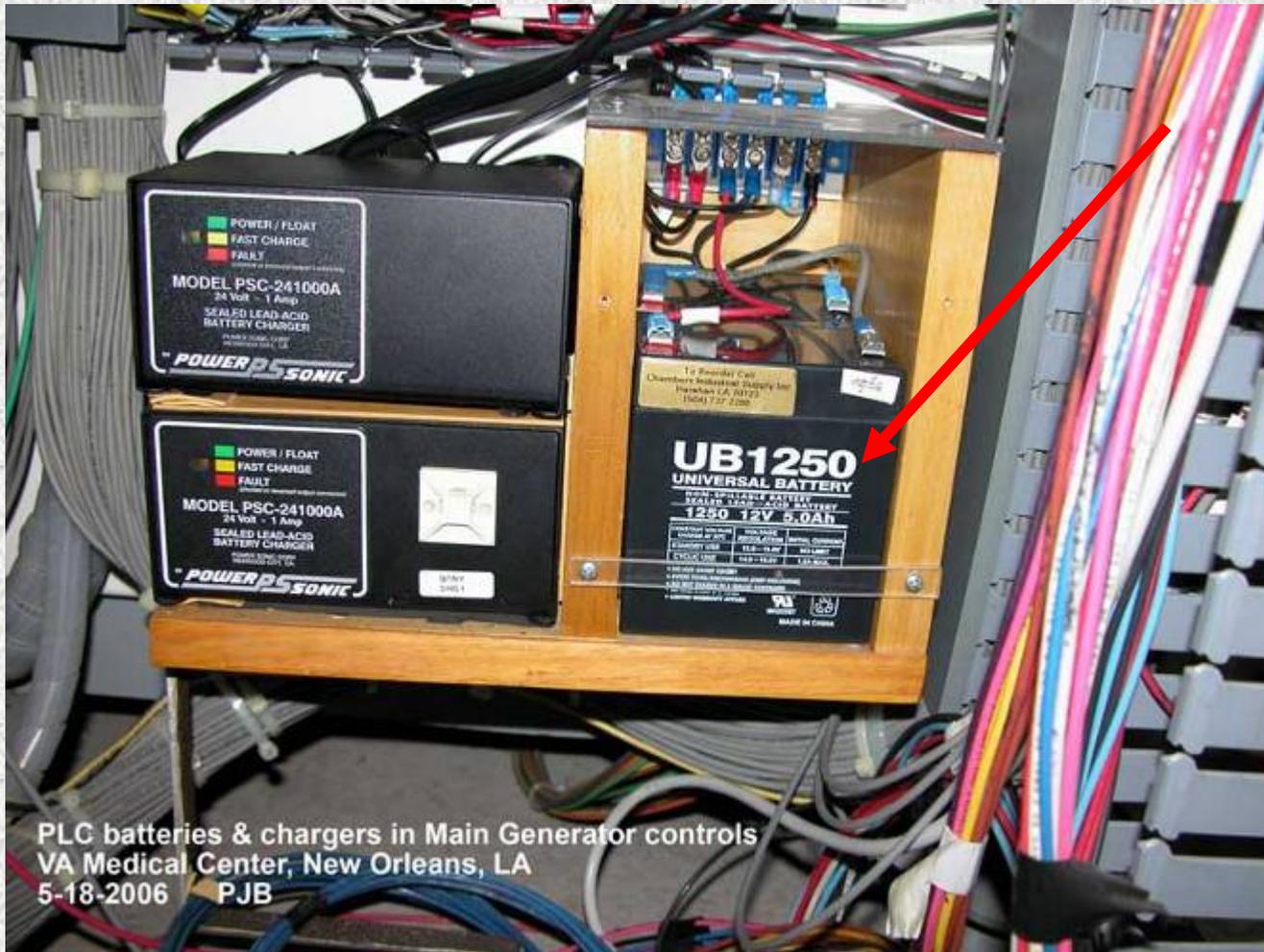
Coping with Utility Loss



Coping with Utility Loss



Coping with Utility Loss



Portable generators (diesel)

Coping with Utility Loss



Evacuate most critical patients

Photo: Rex Oxner

Coping with Utility Loss



Vertical transport w/o elevators

Photo: Rex Oxner

Coping with Utility Loss



Transport from 8th floor garage

Photo: Rex Oxner

Vertical transport w/o elevators

Photo: Rex Oxner

Coping with Utility Loss



Coping with Utility Loss



Last truck out! 3pm 9-2-2005

Photo: Rex Oxner

Evacuate most critically ill patients

Post evacuation

- Staffing: 30 Police Officers, 1 Engineer
- Activities:
 - Security – internal & external
 - Protect patient records
 - Run generators
 - Pump water
 - Set up sleeping & living quarters
 - Deal with government agencies
 - Deal with contractors & the public
 - Begin decontamination & recovery

Recovery



Police

Photo: Rex Oxner

Recovery



Police

Photo: Rex Oxner

Police

Coping with Utility Loss



Window & portable air conditioners

Coping with Utility Loss



Decon tent used for showers

Photo: Rex Oxner

Coping with Utility Loss



Refueling "under water"

Coping with Utility Loss



UST fuel fill cofferdam

Coping with Utility Loss



Chiller plant – submerged for 3 weeks

Coping with Utility Loss

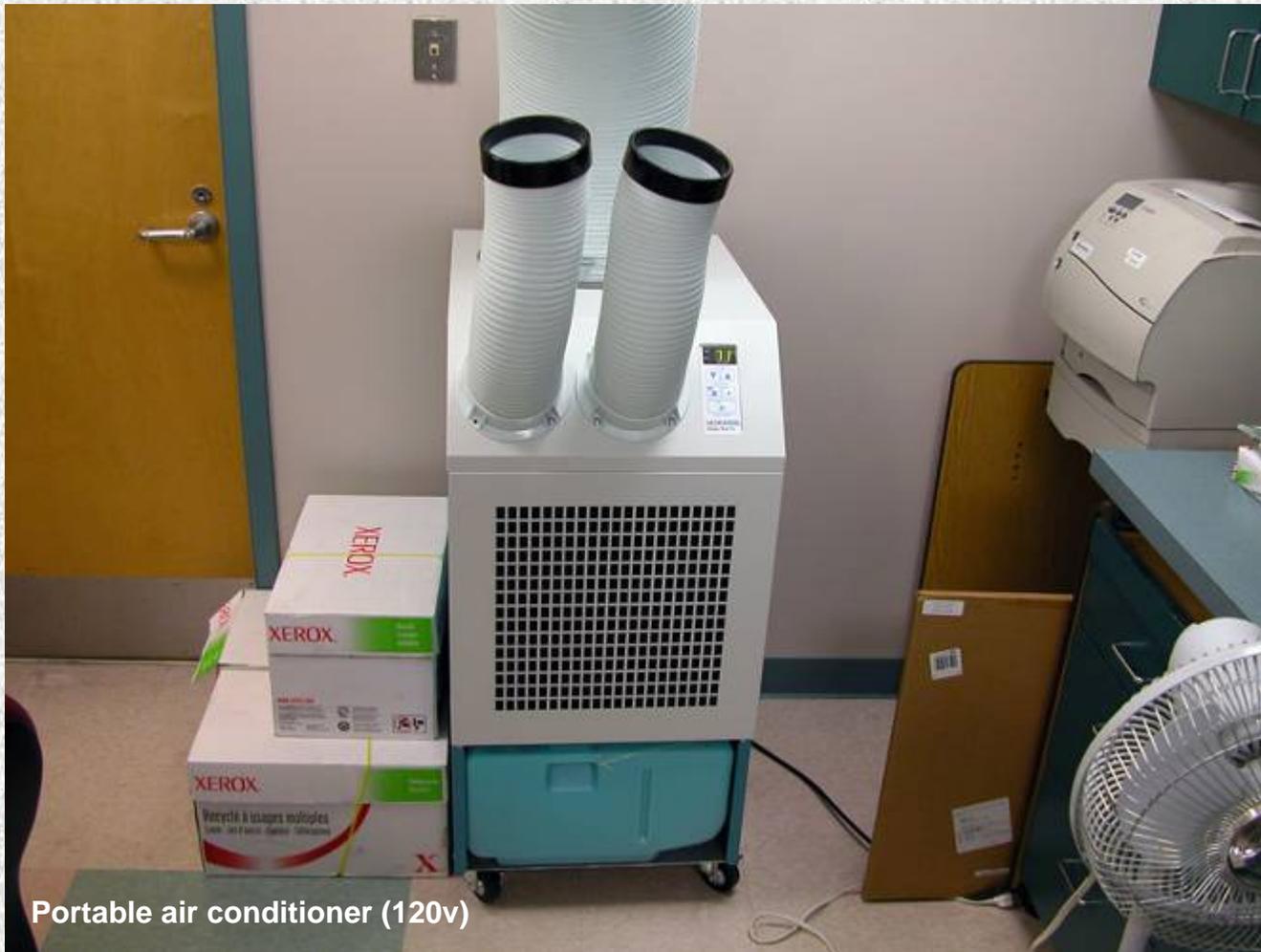


Rental chiller

Coping with Utility Loss



Coping with Utility Loss



Portable air conditioner (120v)

Coping with Utility Loss



Chilled water piping from district cooling plant

Coping with Utility Loss



New VA energy transfer station (ETS) & pump
in Entergy Thermal Plant
June 28, 2007 PJB

Coping with Utility Loss



Sawing off electrical bus at first floor

Recovery



Portable pumps dewatering basement & subbasement

Recovery



Recovery



Emergency repair to flooded fire pump

Photo: Rex Oxner

Recovery



Emergency repair to flooded water booster pumps

Recovery



Electric boiler – 30 hp

Recovery



Negative air flow machines

Emergency repair to flooded fire pump

Photo: Rex Oxner

Recovery



Portable low grain refrigerant dehumidifiers

negative air flow machines

Photo: Rex Oxner

Recovery



Generator preventive maintenance and repairs

Recovery

VA Temporary Clinic, Hammond, LA



Recovery



Recovery



Recovery



Hurricane hardening (utilities)

\$40 million

Main Facility

**Proposed
Utility Systems
Tower**

Cooling Tower

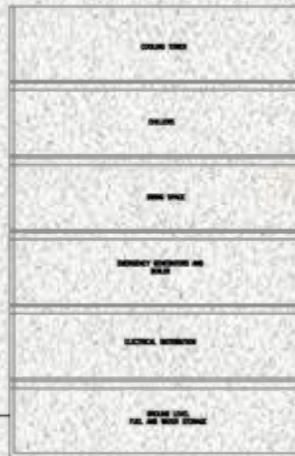
Chillers/Boilers

Swing space

Emergency Power Sys

Normal Power Swgr

Fuel & Water Storage



GENERAL ARRANGEMENT
SECTION
1 OF 12

RFP DOCUMENT - NOT FOR CONSTRUCTION
FULLY SPRINKLERED

CONSULTANTS:		ARCHITECT/ENGINEERS:		GENERAL ARRANGEMENT DIAGRAM		NEW ORLEANS HEALTH CARE SYSTEM		Office of Facilities Management	
		 GLHN ARCHITECTS & ENGINEERS, INC. <small>1000 P. O. BOX 1000, SUITE 1000, NEW ORLEANS, LA 70116</small>		GENERAL ARRANGEMENT DIAGRAM ENERGY CENTER		NEW ORLEANS, LOUISIANA GA-7 Page 12 of 12			

Recovery



Hurricane humor

Coping with Utility Loss

EPSS Considerations:

- Watertight integrity of underground storage tanks (USTs)
- Filters in fuel lines
- Extra oil & coolant for engines; VAMC NOLA used 150gal oil
- Extra oil & fuel filters for engines
- Genset watch standing protocol
- Long term functioning of day tank pump cycling
- Access to UST fuel filler caps in event of flooding
- Cable and connectors for emergency EPSS feeds
- Shut off non-useful or non-functioning EPSS loads
- Check critical EPSS loads for functioning and reset (e.g., refrigerators & freezers Lab & Research)
- Checking oil while engine running
- Engine runtime between scheduled maintenance

Recovery

Contractors & A/Es:

- They *will* be there for you!
- Have cell phone numbers
- Get contracts set up ASAP with trustworthy people
- Make contact with fuel suppliers
- Involve contractors in recovery decision making process and solicit their expertise and ideas
- Good specialty contractors can function as general contractors if necessary
- Service contractors can provide watch standers
- Require usual paperwork but allow extra time
- Review construction projects in progress before disaster and decide whether to continue, modify or cancel
- Treat them well; certify their invoices promptly!

Recovery

Contracting Assistance:

- Arrange for contracting help ASAP after disaster, from other VAMCs if necessary
- Make time to respond to Contracting Officer's requests for information and follow protocol
- Maintain some sense of overall priority of orders and contracting needs
- Make effort to ensure normal submission and flow of paperwork for contracts, including proposals, service reports and invoices

Recovery

Disaster items worth special note:

- Portable diesel generators (6500 +/- watts)
- Front end loader
- Extra dumpsters
- Portable toilets & hand washing stations
- Extension cords – 12/14 gauge, 25', 50' & 100' lengths
- Decontamination tent for showers with oil-fired HW heater
- Large portable water tanks (water buffalo)
- Fuel delivery system for portable generators
- Portable air conditioning units (120-volt)
- Vehicle capable of driving though 4-ft water
- Tools if Engineering shops subject to flooding
- Portable pumps, large & small
- Tarps & plastic sheeting

Recovery

Disaster items worth special note:

- Evacusleds or other means to move patients vertically
- Flexible SO cord to run large motors (up to 60hp)
- Fans and blowers of all types, large & small
- Portable lights of all types, especially stand mounted
- Absorbent (“kitty litter”) and pillows (“Pigs”) for spills
- Portable power panels
- Chemicals to treat feces filled toilets (Clorox will do)
- Insect spray
- Lumber & plywood

People



 **Comments**

 **Questions**

 **Discussion**

Contact me!

Phil Boogaerts

**Engineer, Facilities Management (629/AD2)
Southeast Louisiana Veterans Healthcare System**

1601 Perdido Street

New Orleans, LA 70112

phil.boogaerts@med.va.gov

504-382-6858

