

# The Experience of Emergency Preparedness at Waterford Nuclear Power Station

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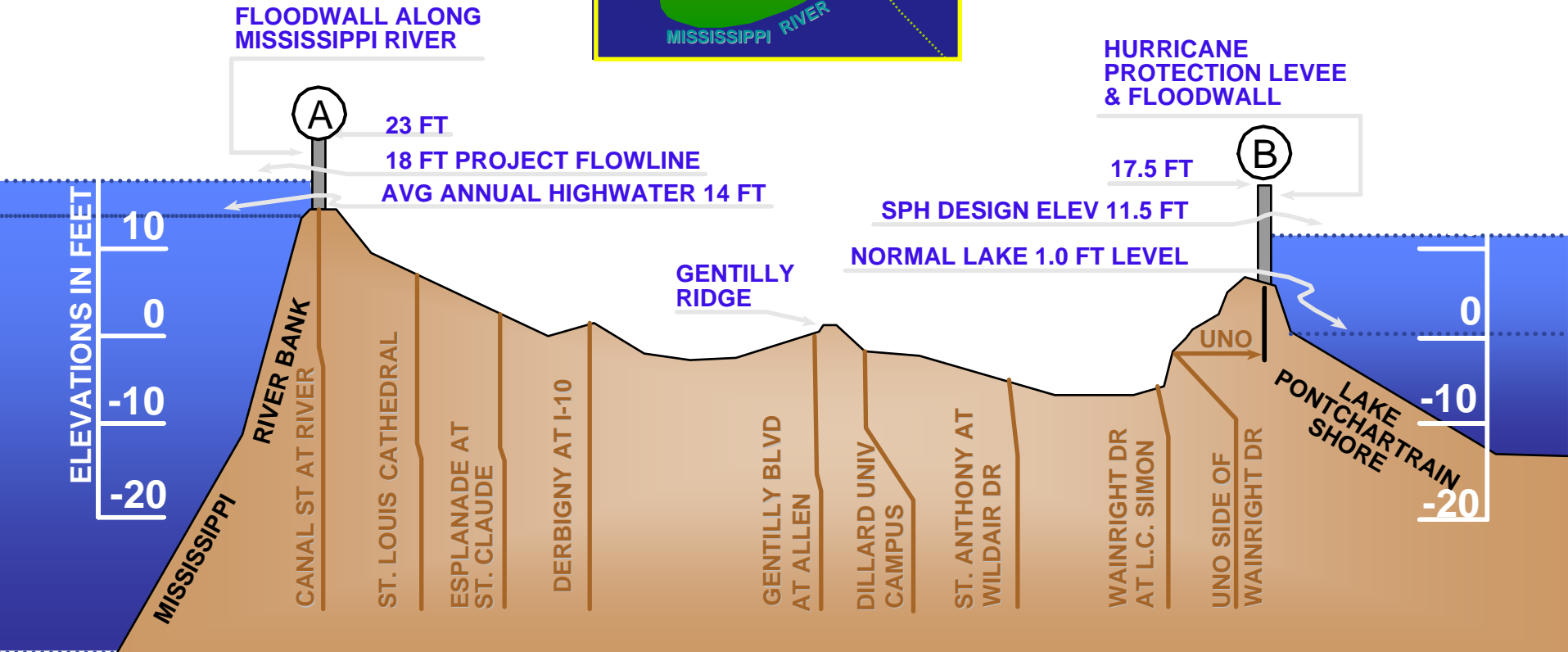
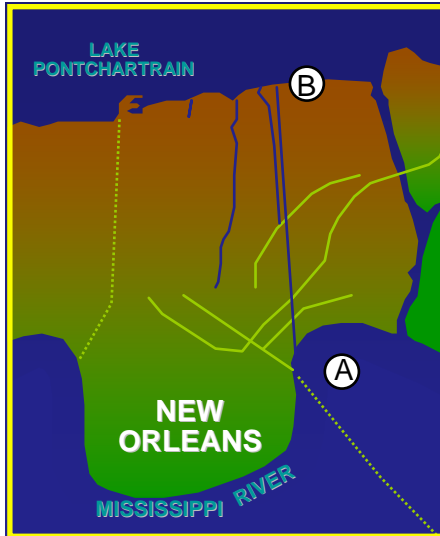


# Waterford Nuclear Station Historical Emergency Response

- Hurricane Betsy – 1965 (pre-construction)\*
- Hurricane Gilbert - 1988
- Hurricane Andrew – 1992 NOUE
- Ammonia Release – 1997 Alert
- Hurricane Georges – 1998 NOUE
- Hurricanes Isidore and Lili – 2002 NOUE
- **HURRICANE KATRINA – 2005 NOUE**

# City of New Orleans Ground Elevations

# From Canal St. at Mississippi River to the Lakefront at U.N.O.



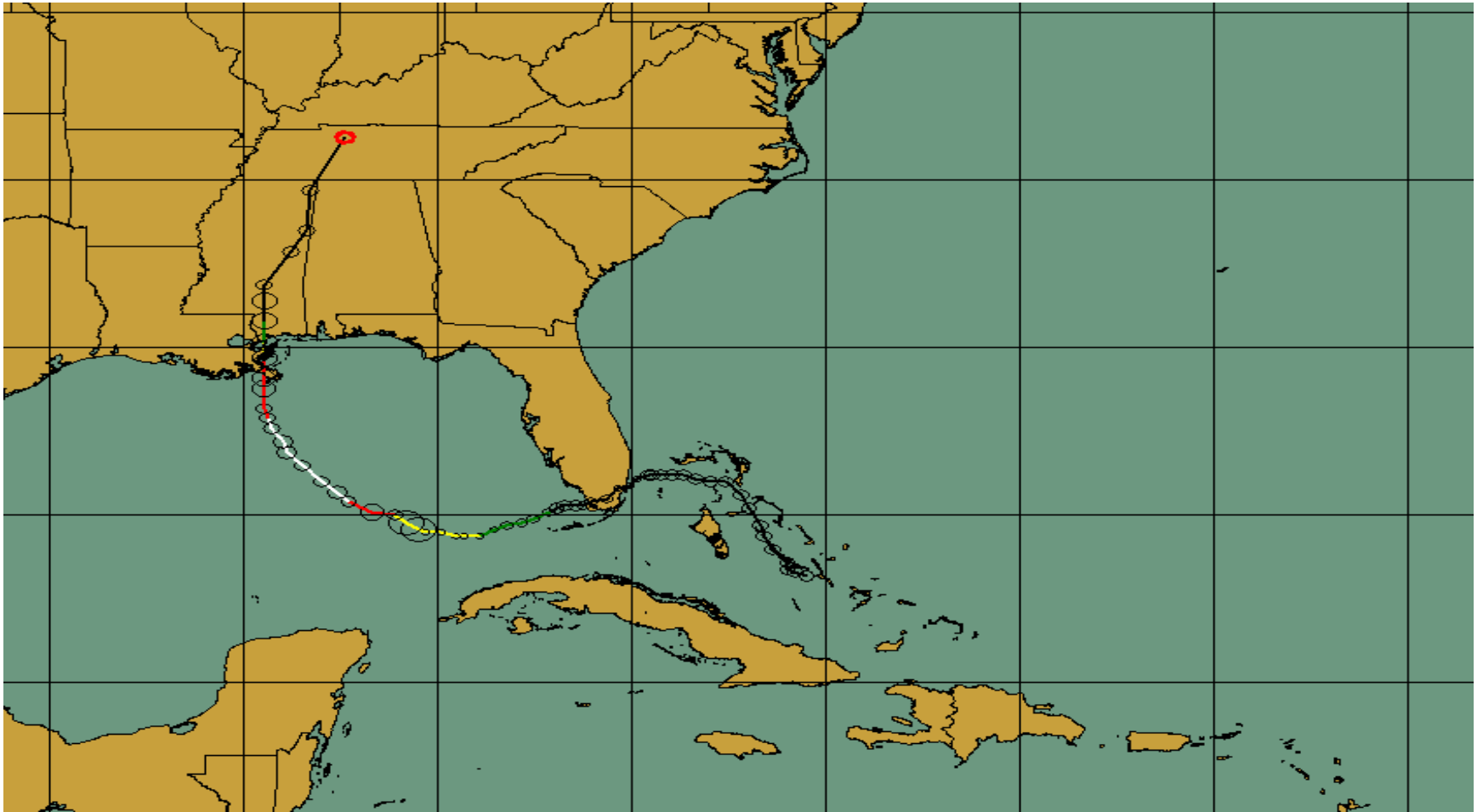
# Katrina Statistics

## August 29, 2005

- Over 1,500 Louisiana deaths
- 107 transmission lines and 126 substations lost
- 233,000 square kilometers affected
- 16,000 federal government employees responded
- Damages over \$100 billion
  - 1992 Hurricane Andrew – \$21 billion in 2005 dollars



# KATRINA TRACK





# Preparations for Katrina

## August 26-28, 2005

- Hurricane duty roster
  - 138 personnel on site (including 2 NRC)
- Employee hotline messaging
- Site walkdowns/preparations
- Communications equipment testing
- Rooms for Core Team families
- Just in time training on shutdown/loss of offsite power
- Plant shutdown initiated 10:59 AM 08/28/05
  - Reactor and turbine offline 1:16 PM
  - Turbine online at 12:16 PM 09/13/05

# Katrina Impact

## August 29 and 30, 2005

- Maximum winds 08/29/05
  - Gusts – 126 km/h at 10 m 9:17 AM  
138 km/h at 60 m 7:20 AM  
60 m sensor lost ~ 8:00 AM
  - 100 km/h at 10 m 1 minute averaged
- Loss of Offsite Power at 7:59 AM on 08/29/05
  - Diesels supplying safety busses
  - Offsite power restored on 09/02/05
- Loss of telephone and radio communications on 08/30/05 with New Orleans flooding

# Katrina Post Event

- Damage assessment
- Diesel fuel deliveries
- Power restoration
  - Safety systems
  - Local government emergency operations centers
  - Siren public alerting system
- Communications restoration
  - Satellite telephones
  - “Foreign” area code
  - VOIP telephones
- All employees accounted for

# Katrina Post Event

- Waterford shutdown 08/28/05
- NRC/FEMA restart assessments begin 09/06/05
- Restart approval granted 09/09/05
- Turbine online 09/13/05

# Katrina Post Event

- 10 emergency response issues identified
  - Updated evacuation time estimate needed due to displaced New Orleans population moving INTO Waterford area
  - Lack of sufficient transportation resources for public evacuation
  - Failure of AC power to public alerting sirens
  - Need for station emergency response organization call-in capability
  - Station backup Emergency Operations Facility not available (New Orleans location)
  - Emergency News Center not available (New Orleans location)
  - Emergency News Center rumor control operators not available (evacuated)
  - One public evacuation reception center not available for use (housing New Orleans evacuees)
  - NRC Emergency Notification System (ENS) line not operable
  - National Weather Center radio alert toning system not operable

# Waterford Nuclear Power Station

## Katrina Experience Conclusion

- Plant safety systems and emergency plans functioned as designed
- Strong offsite relationships paved way for restart
- Waterford 3 workforce rebounded quickly
- Performance of Entergy's four southern nuclear plants provided much needed generation
- Entergy orchestrated outage repair and restoration at a record pace
- Information shared by industry helped Waterford 3 prepare