



# Combined License Application Mandatory Hearing Florida Power & Light Company Turkey Point Units 6 and 7

- Safety Panel
- December 12, 2017



# Panelists

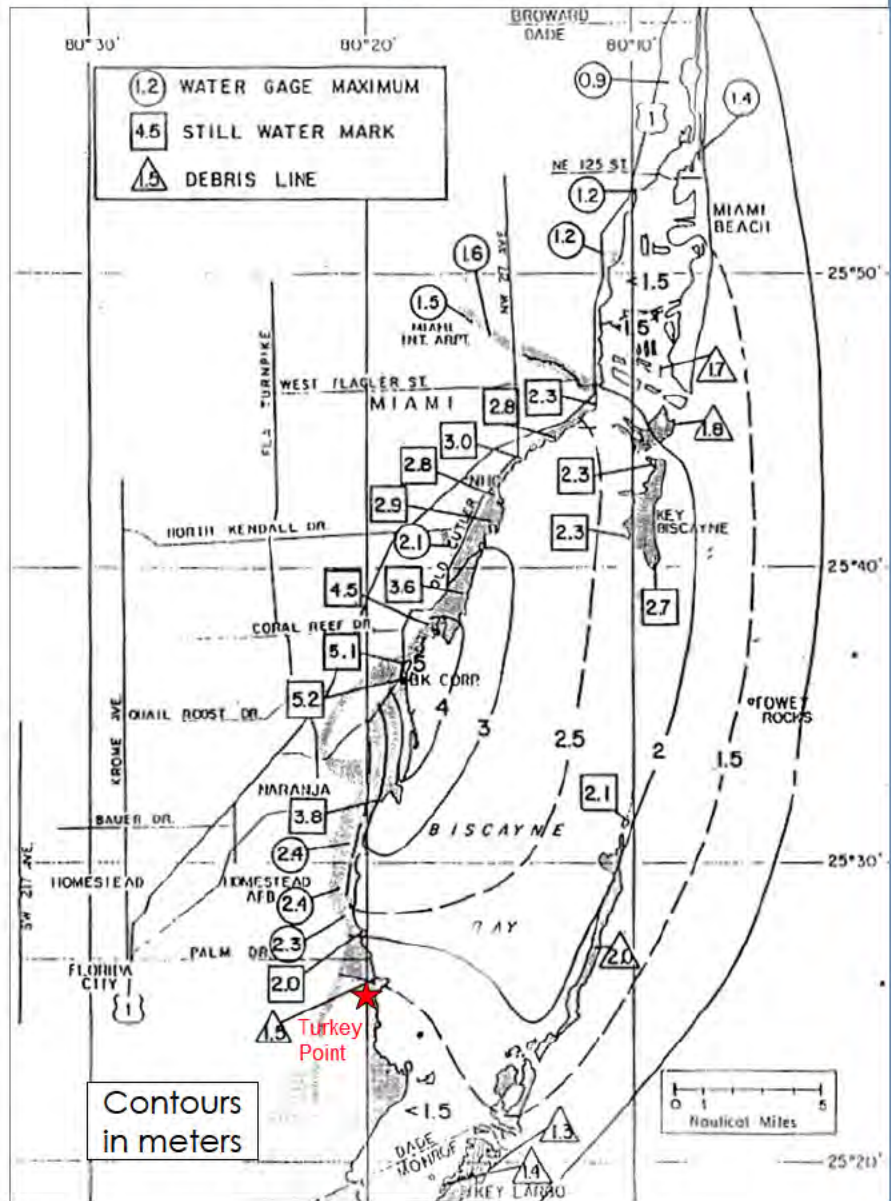
- Manny Comar – Senior Project Manager, NRC
- Joseph Giacinto – Lead Hydrologist, NRC
- Zachary Gran – Health Physicist, NRC
- Ellen Smith – Hydrologist, ORNL

# Safety Panel Topics

- Storm Surge and Sea Level Rise
- Deep Well Injection for Liquid Radioactive Waste Disposal

# Historical Storm Surge

- Hurricane Andrew made landfall 8 miles north of site in 1992.
- Category 5 storm
- Remains highest Florida storm surge on record:
  - 15.4 ft 8 miles north of site
  - 3-4 ft at the site



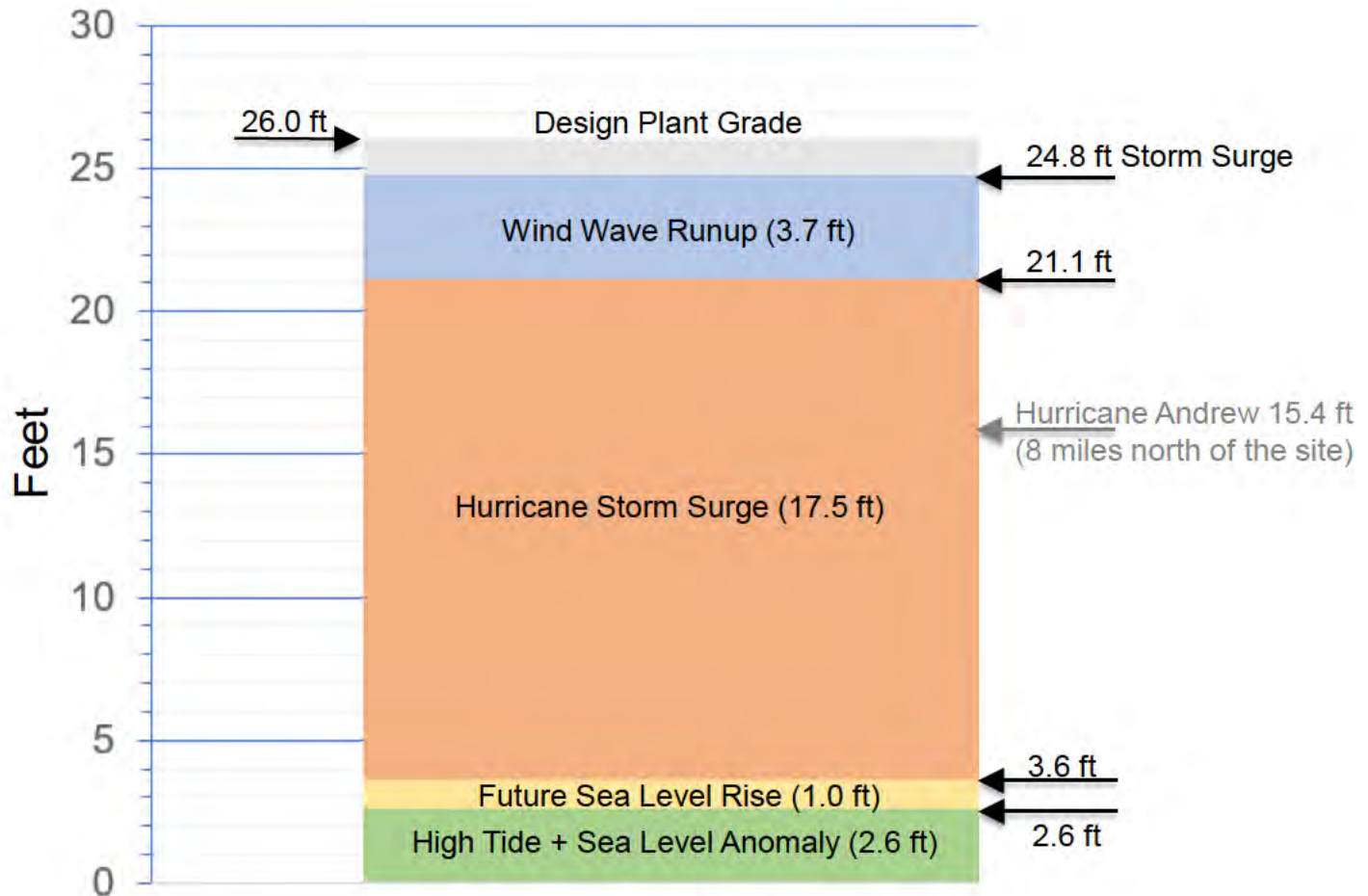
# Storm Surge Components

- Used combination of Probable Maximum Hurricane parameters that results in highest storm surge
- Added 20 percent to predicted surge
- Additional conservative assumptions
  - Extreme high tide, sea level rise, wind and waves
- Estimated storm surge of 24.8 ft
- Design plant grade of 26.0 ft

# Sea Level Rise in the Storm Surge Analysis

- NRC guidance was followed.
- NOAA-derived linear trend for Miami Beach data: 0.78 ft rise in 100 years
- Miami Beach gauge taken out of service in 1981—Key West gauge data from 1913 until 2016 show a consistent trend
- Analysis includes 1.0 ft rise to year 2100
- Sea level rise is observable and gradual.

# Storm Surge Components



# Staff Storm Surge Conclusions

- Estimated storm surge is beyond historical extremes.
- Multiple conservatisms appropriately account for uncertainty.
- The design basis flood level from storm surge is appropriately conservative.
- The design-basis flood level does not reach the design plant grade.



# Deep Well Injection

- FPL is proposing to use Deep Well Injection to dispose of liquid effluent releases.
- First use of such disposal by a nuclear power plant in the USA
- 10 CFR 20.2002 describes the methods for obtaining approval of proposed disposal procedures.

# Background – Deep Well Injection

- Injection into the Boulder Zone of the Lower Floridan aquifer (approximately 3000 feet deep)
- The Boulder Zone of the Lower Floridan aquifer is separated from the Upper Floridan Aquifer by the approximately 1500 ft thick Middle Confining Unit (MCU) which will prevent upward migration.

# Background – Deep Well Injection

- Approximately 180 FDEP Class I Underground Injection Control (UIC) wells from various industries permitted in Florida
- FPL proposes 12 Class I UIC wells and 6 dual-zone monitoring wells for Turkey Point Units 6 and 7.

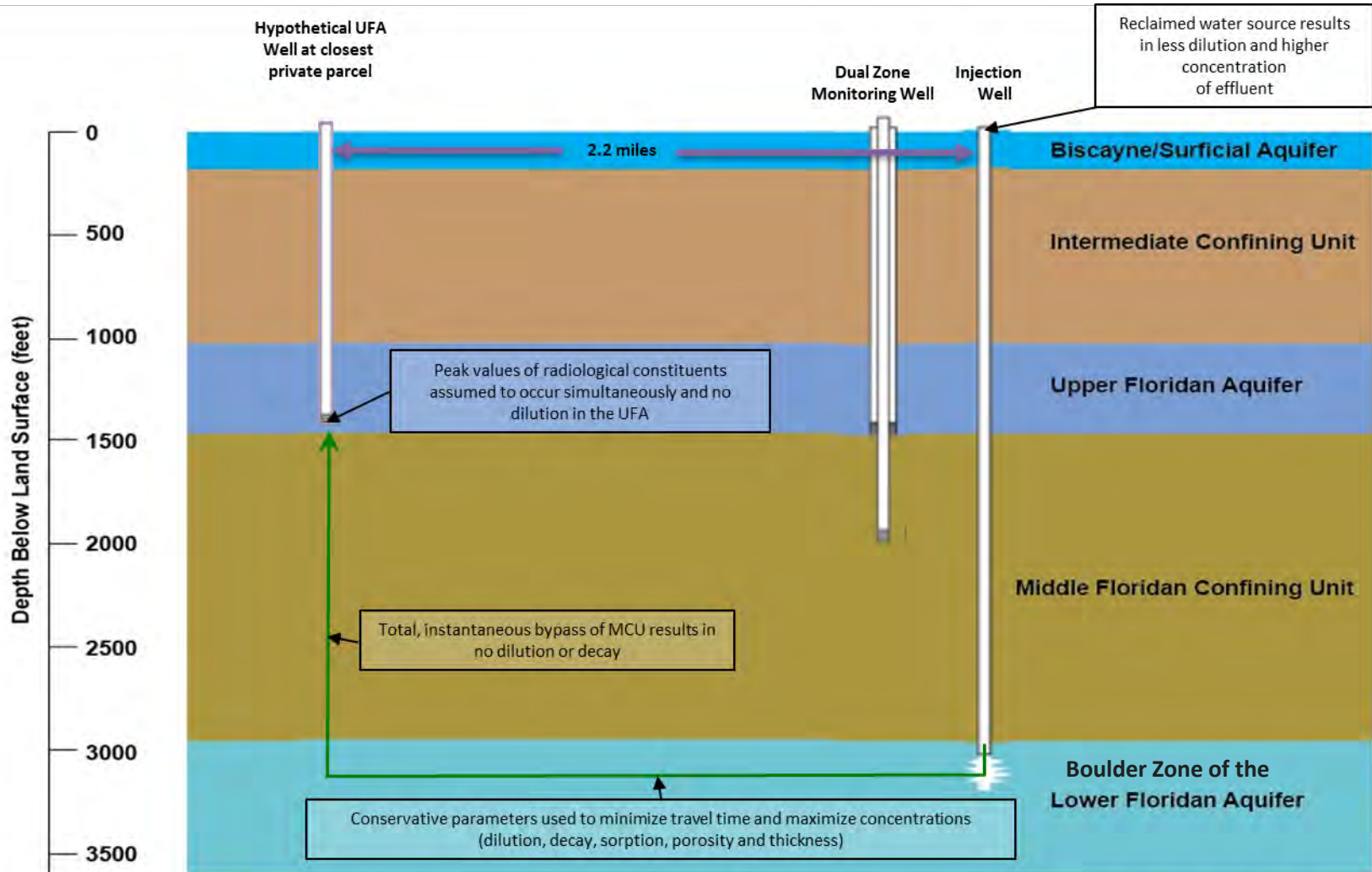
# Staff Analysis

- Staff typically approves 10 CFR 20.2002 requests that will result in a dose to a member of the public (including all exposure groups) that is no more than "a few millirem/year".
  - SECY-07-0060 and NUREG-1757, "Decommissioning Process for Materials Licensees"
  - Criteria in 10 CFR Part 50, App. I, used for suitable criteria for evaluating dose

# Staff Analysis

- Independent dose analysis using the concentrations described by FPL. Staff Analysis considered:
  - H-3, Cs-134, Cs-137, and Sr-90
  - Nearest hypothetical receptor at 2.2 miles NW
  - Irrigated food pathways of vegetables, milk, meat, and drinking water as potential pathways for dose
  - Assumed full breach of the MCU

# Injection Scenario



horizontal axis not to scale

# Staff's Conclusions

- Based on the conservative assumptions stated by staff, the releases were determined to be in compliance with:
  - 10 CFR Part 20 Appendix B
  - 10 CFR Part 50 Appendix I
  - 10 CFR 20.2002

# Acronyms

- CFR – Code of Federal Regulations
- Cs – Cesium
- FDEP – Florida Department of Environmental Protection
- FPL – Florida Power & Light Company
- GDC – General Design Criterion
- H-3 – Tritium
- MCU – Middle Confining Unit



# Acronyms

- NOAA – National Oceanographic and Atmospheric Administration
- ORNL – Oak Ridge National Laboratory
- PMH – Probable Maximum Hurricane
- Sr – Strontium
- UFA – Upper Floridan Aquifer
- UIC – Underground Injection Control