Session 1 Presentation - Use of Offshore Energy Facilities as Deepwater Ocean Observing Platforms

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Use Of Offshore Energy Installations As Deepwater Ocean Observing Platforms

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Presenter: Jeffery Morin, PhD
RPS Ocean Science
Current Ocean Data Collection in the Gulf of Mexico

- Dept. of Interior Notice to Lessees (NTL) 2009 Mandates 1000 m water column speed and direction profile for floating Oil and Gas Platforms
- 10 min. interval data has been reported from active rigs to the NDBC for 12 years (NTL 2005)
- Profiles are intended for use in:
  - Construction and ROV Operations
  - Riser operations
  - Physical Oceanographic studies
  - Long term structural analysis
  - HSE operational thresholds
  - Search and Rescue, etc.

- The accumulated data base is publically accessible and has been utilized in a number of investigations and reports
Objectives

- Alert personnel of adverse weather when conducting weather sensitive activities
  - Help prevent weather related incidents
- Advise personnel of actual conditions
  - Weather sensitive activities can be adapted to improve safety
  - Reduce exposure of personnel to hazardous conditions
- Optimize efficiency of operations
  - Take advantage of weather windows
  - Assist with operational planning
  - Minimize delays by enabling the adaption of operations to rising or falling conditions
- Provide input for modelling oil spill and man overboard events
  - Improve rapid response
- Provide input to commercial and national forecast agencies as validation for nowcast and forecast products
- Store both raw and processed data
  - Used for post-incident investigations
  - Input to long term metocean data bases, used for future projects
Wave Radar – Miros SM 050 Wave Radar
(Miros Wavex, Wave Extractor, Ocean Waves WAMOS II)

The SM 050 emits energy from 6 horns.

Reflected energy from ocean waves carries a characteristic shift in returned frequency (Bragg Scattering) related to wave motion. Requires capillary waves.

The SM 050 transmits in 6 directions (over 180 degrees) and determines speed and direction for each of the 6 sectors.
Lidar Wind Measurements (ZephIR)

Lidar instruments use a rotating mirror with laser transmission. Wind speed and direction are derived from doppler shift in returned signal.

11 elevations
Shell Installations – Platform Distribution

Tendon Leg Platform
Olympus
Hurricane Nate

- **October 4**, identified as a tropical depression (#16) in South Caribbean Sea.
- **October 5**, upgraded to tropical Storm, Nate. Moving north northwest from Yucatan Peninsula.
- **October 7 (AM)**, upgraded to Hurricane Nate (position 27.3 N, 88.3 W), 128 kilometers southeast of Mississippi Canyon.
- **October 7 (PM)**, maximum sustained winds reached 80 kts.
- **October 8**, Land fall 5 miles west of Biloxi, Mississippi.

*Very rapid development and intensification. Northward movement at 15 to 20 kts.*
Hurricane Nate

Mississippi Canyon, TLP Ursa, TLP Olympus, etc.
Wind Variables – TLP Ursa Lidar

Observations
Wave Variables – Significant Wave Height and Maximum

Observations
Wave Radar – Wave Direction
Wave Variables – Wave Period

- Wind Speed (m/s)
- Wave Max Period
- Primary Wave Period

Observations
Wave Variables – Steepness and Skew
Surface Currents

Observations
Wave Radar – Wave height with Wave Watch III (NOAA) Hindcast Results
Conclusions

• Shell Exploration and Production is expanding and upgrading platform installation real-time ocean measurement systems
  – Through mid-life upgrades
  – Through new installations (semi-submersibles Appomattox and Vito)
• These systems are currently coming on line and delivering to on-shore through FTP
• Real-time data is subsequently being utilized for platform operations and on-shore decision making
• Initial comparisons and analysis indicate data collection systems are reliable and accurate

• Future
  – Develop front end products for onshore decision makers which incorporate real time data
  – Incorporate incoming data with hindcast and forecast model products to assist in contingency plans (i.e. man overboard, spill tracking, operational forecasting)