Sharyland Utilities, L.P.

- Newest Investor Owned Utility in Texas
- A “greenfield” utility focusing on power reliability
- Our Service Territory is encompassed by the Master Planned Development of Sharyland Plantation
South Texas Location

• Located in the Cities of Mission and McAllen, TX
• Directly across the border from Reynosa, Tamaulipas, MX
• 150 miles from Financial and Industrial Center of Monterrey, Nuevo Leon, MX
The Master Plan

- South Texas Metro Area
  - Young Work Force
  - Economy
- Reynosa, Tamaulipas, MX
  - Large Industrial Parks
  - Fortune 500 Companies
- Monterrey, Nuevo Leon, MX
  - Industrial Center
What is an HVDC Tie?

- Power transfer between grids (states/countries)
- Provides “firewall” protection for each side
- Neglects the system characteristics to allow them to be matched. (Asynchronous Tie)
South Texas Infrastructure

< SAN ANTONIO

< CORPUS CHRISTI

LOWER RIO >
GRANDE VALLEY

Sharyland Utilities
Sharyland HVDC Project

- 150 MW Back-to-Back HVDC tie expandable to 300 MW
- Classic Technology
- Operating at:
  - 138 kV AC
  - +/- 21 kV DC
- In-Service October 2007
Basic Criteria

• The Interconnection must be “open-access”.
  – By Tariff design, the unit is open to all users.

• The technology must block disturbances from spreading into either system.
  – The inherent nature of DC technology acts as a firewall to prevent disturbances from spreading system to system.

• It must provide for all of its own Reactive Power support.
  – Additional filter capacity (Var support) provides for rapid injections of power from CFE into ERCOT and vice-versa during periods when peak loads or disturbances require additional support.
Basic Criteria

- It must provide for frequency regulation and maintain voltage at appropriate levels.
  - The control system can control or follow the frequency.
- Load pick-up and/or the ability for BlackStart in the range of 25 MW to full rated capacity was required.
  - Not inherent to conventional HVDC. However, BlackStart capability was achieved with the addition of a bypass circuit.
  - "Make-Before-Break" capability during restoration of power
Load Flow and Contingency Stability Studies

- Determine power flow levels and system response in various contingency situations
  - Loss of lines
  - Loss of generation
- Dynamic system response
  - Reactive support
  - Voltage and current disturbance
Design Issues

Subsynchronous Torsional Interaction - SSTI

Determine the effects of vibration due to oscillation on the turbine-generator shafts on the AC Network in the vicinity of the unit.
Design Issues

Additional Issues

– Short Circuit Ratio
– Determine Harmonic effects
– Protection Coordination
– BlackStart Sequence Coordination
– Over and under voltage Coordination
Regulatory and Permitting

Presidental Permit from the United States Department of Energy
  • Justification of need
  • Environmental
  • Operational Requirements

Certificate of Convenience and Necessity (CCN) from the Public Utility Commission of Texas
  • Stakeholder discussions
  • Commercial Policy implications
Regulatory and Permitting

Physical Permits
- US Army Corps of Engineer
- International Boundary and Water Commission
  - Clearance over navigable waters
  - Hydrology issues
  - Levee considerations
- Mexican Counterparts
  - CILA
Regulatory and Permitting

**Interconnection Agreement** - Sharyland Utilities and Comisión Federal de Electricidad (CFE)

**System Support Agreement** - Electric Reliability Council of Texas and Comisión Federal de Electricidad (CFE)

**ERCOT Requirements** - Protocols Revisions and changes to the Operating Guides

**FERC Jurisdictional Issues** - Declaratory Order
Mutual Benefits

- Enhances system reliability
- Provides access to additional generation resources
- Provides access to new wholesale markets
- Reduces environmental impact through avoidance or deferral of new generating facilities
- Reduced electric rates to consumers in both Countries.
Why a DC Tie now?

• Studies emphasize need for interconnections along the Texas and Mexican Border - specifically pointing out availability in Brownsville, Laredo and McAllen Areas.

• Infrastructure needed to support growth in the Rio Grande Valley
  – Joint Planning
  – More efficient use of existing infrastructure

• A DC Tie will remain useful even as economic conditions change. It is not a stranded investment.
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