Central Division

Major operating areas:
- Barnett (12 rigs)
- Northridge (0 rigs)
- Cana (23 rigs)
- Granite Wash (5 rigs)
### Anadarko Basin Stratigraphy

#### Systems/Series

<table>
<thead>
<tr>
<th>System</th>
<th>Layers/Groups</th>
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<tbody>
<tr>
<td><strong>MISS</strong></td>
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<tr>
<td>Chesterian</td>
<td>Chester Group</td>
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<tr>
<td><strong>PENNSYLVANIAN</strong></td>
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<tr>
<td>Atokan</td>
<td>Atoka Group</td>
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<tr>
<td>Morrowan</td>
<td>Morrow Group</td>
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<tr>
<td>Desmoinesian</td>
<td>Marmaton Group, Cherokee Group</td>
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<tr>
<td>Missourian</td>
<td>Ochelata Group, Skiatook Group</td>
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<td>Virgilian</td>
<td>Wabaunsee Group, Shawnee Group, Douglas Group</td>
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<td><strong>PERMIAN</strong></td>
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<tr>
<td>Leonarian</td>
<td>Hennesey Shale, Garber Sandstone, Wellington Formation</td>
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<tr>
<td>Wolfcampian</td>
<td>Chase Group, Council Grove Group, Admire Group</td>
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<td>Guadalupian</td>
<td>Cloud Chief Formation, Whitehorse Group, El Reno Group</td>
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<td>Ochoan</td>
<td>Elk City Sandstone, Doxey Shale</td>
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#### Diagram

- **Type Log**
- **Arkosic Sandstone**
- **Shale**
- **Carbonate-Rich Sandstone**
- **3,000'**
DEPOSITIONAL MODEL FOR GRANITE WASH

- Deepwater Submarine Fan Lobe
- Fan Delta
- Distal Fan Lobe

The diagram illustrates the processes and elements involved in the deposition of sediment in a granite wash environment, including the influence of climate, tectonics, and rock types.
TexPan Granite Wash
Drilling Performance Improvement

1st Devon Granite Wash horizontal. Spud 12/16/2006. 66 days Spud - RR. Drilled 797' of lateral.

Most recent Devon Granite Wash horizontal. Spud 3/20/2011. 29.5 days Spud - RR. Drilled 4,250' of lateral.
TexPan Granite Wash
Continuous Improvements

• Revised casing program (2nd revision) - 9-5/8” across Brown Dolomite; 5-1/2” to TD.
• Pre-treating Brown Dolomite w/ 30-40 ppb LCM during drilling has virtually eliminated downtime due to mud losses
• Oil based mud below intermediate casing point prevents shale sloughing in the curve, eliminates need for 7” casing through the curve, and reduces friction coefficient
• Continuous drill bit performance analysis and enhancements from our vendors
• Introduction of rotary steerable systems in the curve and lateral reduce slow ROP due to sliding
• Replaced pendulum BHA’s in the vertical hole with Packed-Hole BHA’s and eliminated slow ROP necessary to drop angle
TexPan Granite Wash

Issues/Risks

- Take away capacity (midstream) due to increased activity.
  - January 2010 (approx. 19 rigs drilling)
  - May 2011 (approx. 63 rigs drilling)
- Increasing costs - must be offset with operational efficiencies.
- Continuous improvement.....how do you get better?
- Tight labor, equipment, and service market.
- Cuttings disposal (specifically oil base cuttings).
- Water.
Thank You.