Projects FY 21-22
Federal Helium Operations

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Engineering & Tech Support
Overview

Pipeline Projects FY 21-22

• Cathodic Protection (CP)
  • Inspections
  • Pipeline Description
  • Rectifier locations
  • Current Requirements

• Highway Expansion US 50
  • Kansas Department of Transportation (KDOT) Hwy 50 Pipeline Project – KDOT 50-35 KA-2383-01
CP - Inspection

- S&B Services
  - Annual and Bi-monthly Inspections
  - Reports by J.D. Engineering
# Pipeline Description

<table>
<thead>
<tr>
<th>Segment</th>
<th>Mile Post</th>
<th>Length (mi)</th>
<th>Diameter (in)</th>
<th>Wall Thickness (in)</th>
<th>Material Grade (psi)</th>
<th>%SMYS (1,500 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Amarillo CHEU to Satanta</td>
<td>0.0 to 187.5</td>
<td>187.5</td>
<td>8.625</td>
<td>0.250</td>
<td>46000</td>
<td>56.3%</td>
</tr>
<tr>
<td>2. Satanta to Bushton</td>
<td>187.5 to 354.8</td>
<td>169.1</td>
<td>4.5</td>
<td>0.219</td>
<td>35000</td>
<td>44.0%</td>
</tr>
<tr>
<td>3. Sher-Han Lateral</td>
<td>S0.0 to S37.7</td>
<td>37.7</td>
<td>4.5</td>
<td>0.219</td>
<td>35000</td>
<td>44.0%</td>
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<tr>
<td>4. National Lateral</td>
<td>N0.0 to N23.1</td>
<td>23.1</td>
<td>4.5</td>
<td>0.219</td>
<td>35000</td>
<td>44.0%</td>
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<tr>
<td>5. Jayhawk Lateral</td>
<td>J0.0 to J12.2</td>
<td>12.2</td>
<td>3.5</td>
<td>0.188</td>
<td>35000</td>
<td>39.9%</td>
</tr>
</tbody>
</table>
CP – Rectifier Locations

- 8 existing rectifiers
  - Cliffside and privately owned Otis rectifiers providing current as well (not shown)
- 4 Rectifiers added in 2021
  - Weak points from 2012 CIS
  - Working to establish account with energy supplier
## CP – Current Requirements

### Pipeline Segments

<table>
<thead>
<tr>
<th>Seg</th>
<th>99.5</th>
<th>98.0</th>
<th>90.0</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coating Effectiveness (%)</td>
<td>Current Required (Amps)</td>
<td>Current Before New Rectifiers</td>
<td>Current After New Rectifiers</td>
</tr>
<tr>
<td></td>
<td>99.5 Total</td>
<td>37</td>
<td>79</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>98.0 Total</td>
<td>148</td>
<td>79</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>90.0 Total</td>
<td>741</td>
<td>79</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>926</td>
<td>236</td>
<td>362</td>
<td></td>
</tr>
</tbody>
</table>

- **CP – Current Requirements**
- **Coating Effectiveness (%)**: 99.5, 98.0, 90.0
- **Current Required (Amps)**:
  - Seg 1: 22, 89, 443
  - Seg 2: 11, 42, 210
  - Seg 3: 2, 9, 47
  - Seg 4: 1, 6, 29
  - Seg 5: 1, 2, 12
- **Current Before New Rectifiers**:
  - Seg 1: 55
  - Seg 2: 23
  - Seg 3: 0
  - Seg 4: 0
  - Seg 5: 0
- **Current After New Rectifiers**:
  - Seg 1: 97
  - Seg 2: 23
  - Seg 3: 0
  - Seg 4: 0
  - Seg 5: 0

**Grand Total**:
- **Current Required (Amps)**: 926
- **Current Before New Rectifiers**: 236
- **Current After New Rectifiers**: 362
US Hwy 50 Expansion Project
KDOT 50-35 KA-2383-01

• Expansion of U.S. 50 Cimmaron/Dodge City, Kansas
  • Upgrade to controlled access, four-lane divided expressway
• Utility Conflict KDOT / Federal Helium Pipeline
  • Need for pipeline reinforcement
  • Following slides used to showcase the condition of pipeline
• US 50 / Federal Helium Pipeline Crossing
• MLV - 27
KDOT 50-35 KA-2383-01

1. Bare casing; good seal
2. Calcareous deposit
3. Corrosion on casing
4. WT carrier pipe (0.208”)

(U.S. Department of the Interior
Bureau of Land Management)
KDOT 50-35 KA-2383-01

1. Pipe damage
2. After coating removal
3. After sandblasting
4. Grind repair
KDOT 50-35 KA-2383-01
KDOT 50-35 KA-2383-01

Surface irregularities

Grind test
KDOT 50-35 KA-2383-01

Denso Protal 7200 two-part epoxy

Worst case pit (carrier pipe)
KDOT 50-35 KA-2383-01

Welding on new split casing

Continued toward MLV 27
KDOT 50-35 KA-2383-01

Spit casing weld seams

Casing and spacers
KDOT 50-35 KA-2383-01

South of US 50
• End sealing system
• Test station
• Air-to-soil interface
KDOT 50-35 KA-2383-01

- North casing end
- Contrast new/old
KDOT 50-35 KA-2383-01

- Casing pressure test
  - 1 psi/20 min (good results)
  - Leak on casing vent (shown)
KDOT 50-35 KA-2383-01

Bull guard and ditch tape by MLV 27

New test station with coupon
KDOT 50-35 KA-2383-01

Soil resistivity test  
MLV 27, relocated AM 229 signpost
KDOT 50-35 KA-2383-01

- Backfill
Questions/Comments