Keyhole Technology

Uses – Construction and Maintenance – Internal and Contractor Crews

November 13, 2012

Tracy Townsend, Division Head
Safety, Compliance, Construction & Operations
Support and Technology
Why the move to keyhole technology construction?

- **Primary**
  - Spend dollars remediating couplings/replacing pipe vs. paving (M&O) roadway.
  - Move to mass service replacement with rehabilitation project and then accelerated pipe replacement programs.
  - Improved customer experience because permanent restoration performed at time of service replacement.

- **Secondary**
  - Increased project productivity.
  - Eliminated 2nd trip for restoration efforts.
How did WG move from the use of keyhole primarily by internal forces to contractor forces?

• **Leveraged existing Alliance relationship.**
  – Experienced with technology.
  – Ability to invest in equipment and talent.

• **Competitively bid blankets with others.**
Keyhole Technology Timeline at Washington Gas

2003:
• WG O&M crews.
• CP and spotting/day lighting.
• Tracked at hourly rate.

2006 - 2008:
• WG Contractor Crews.
• Main encapsulation work.
• T&M rates; establishing unit rates.

2010:
• WG Contractor Crews.
• Main encapsulation work and service replacements.
• Moved to unit rates; updated WMIS.
Companion Technologies

Camera launch capability for coupling encapsulation.

- **Pre 2008** typically required cutting out a 5’ section of main using a combination of stoppers and gate valves to launch camera.

- **Post 2008** creation/use of a camera launch fitting to allow direct live camera insertions.
Companion Technologies Cont.

Shortened EFVs.

- **November 2010** development and use of a Perfection Tee.
Evolution/change in Design Considerations

- Initial planned replacement design of coupled main for encapsulation of the couplings – planned camera launches.

- Eventual planned replacement design of coupled main for encapsulation of the couplings and service replacements – planned camera launches & keyhole service replacements.

- Now mass service replacement in accelerated pipe replacement programs
  - Construction prejobs projects to access existing roadway condition.
    - Core Farm constructed.

- Permitting jurisdictions require identification of construction methodology.
Challenges in Permitting of Work

- Turnover in personnel.
- No specifications in jurisdictions’ standards.
- Need to pave roadways.
Keyhole Permitting NOT New

The keyhole method had previously been approved by numerous jurisdictions in our operating area:

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>State</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rockville</td>
<td>MD</td>
<td>7/8/2003</td>
</tr>
<tr>
<td>Chevy Chase</td>
<td>MD</td>
<td>8/12/2003</td>
</tr>
<tr>
<td>VDOT</td>
<td>VA</td>
<td>12/29/2003</td>
</tr>
<tr>
<td>Prince George’s Co</td>
<td>MD</td>
<td>3/16/2004</td>
</tr>
<tr>
<td>Charles Co</td>
<td>MD</td>
<td>4/27/2004</td>
</tr>
<tr>
<td>Arlington Co</td>
<td>VA</td>
<td>5/25/2004</td>
</tr>
<tr>
<td>City of Fairfax</td>
<td>VA</td>
<td>7/29/2004</td>
</tr>
<tr>
<td>City of Vienna</td>
<td>VA</td>
<td>9/22/2004</td>
</tr>
<tr>
<td>Maryland State Hwy</td>
<td>MD</td>
<td>11/10/2004</td>
</tr>
<tr>
<td>Montgomery Co</td>
<td>MD</td>
<td>8/11/2009</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>DC</td>
<td>8/21/2009</td>
</tr>
</tbody>
</table>