Valve Considerations for Natural Gas Transmission Pipelines

PHMSA Valve Workshop – March 28, 2012

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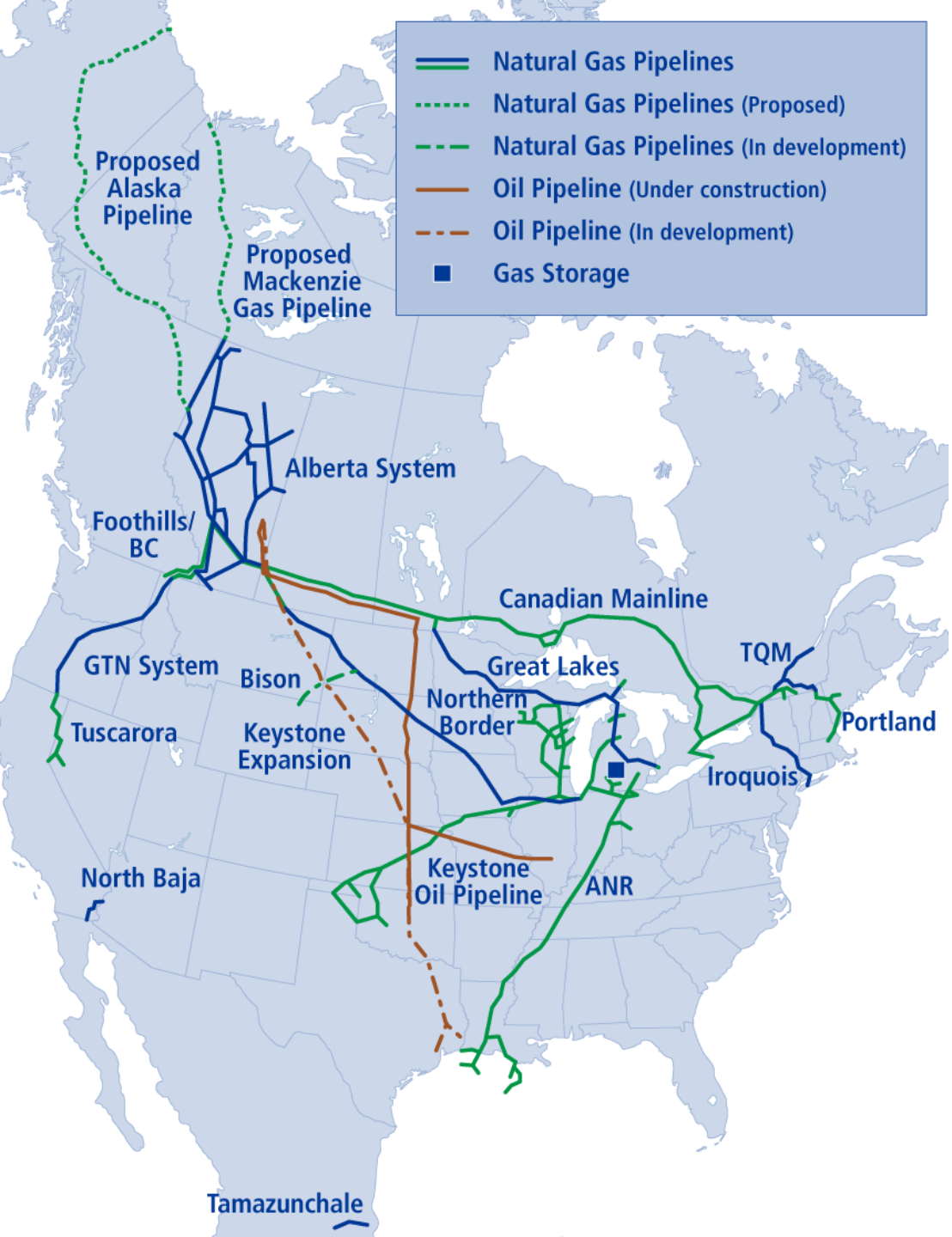
In business to deliver



Pipeline Assets

One of North America's Largest Natural Gas Pipeline Networks

- 35,500 miles wholly-owned
- 7,000 miles partially-owned
- Average volume of 14 Bcf/d

North America's 3rd Largest Natural Gas Storage Operator

- 380 Bcf of capacity

Premier North American Oil Pipeline System

- 2,124 miles
- 1.4 million Bbl/d ultimate capacity

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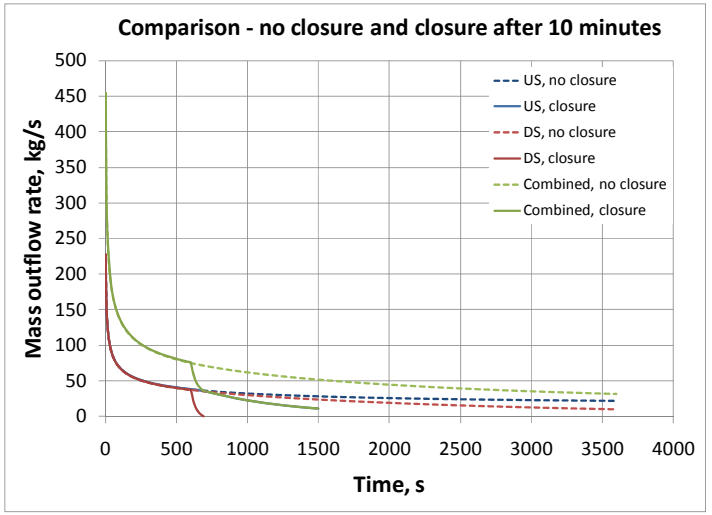
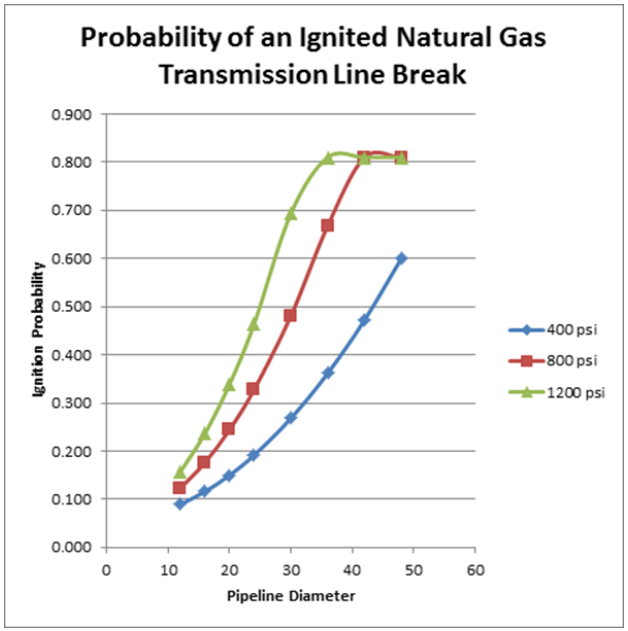
Risk 101

Risk = Probability x Consequence

- **Consequence is thermal effects**
  - Gas Outflow
  - Ignition Probability
  - Thermal Radiation
  - People, structures





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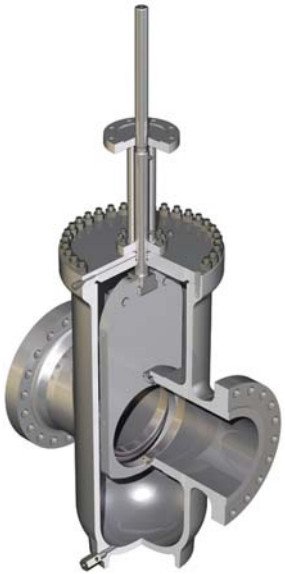
Isolation Plans

- **Isolation Options**
  - Local Control
    - Automatic (LPSD, ROPD)
    - Manual
  - Remote
  - Combination
- **Detection**
  - SCADA
  - Emergency Calls

Ball Valve

Gas Hydraulic Actuator



Gate Valve

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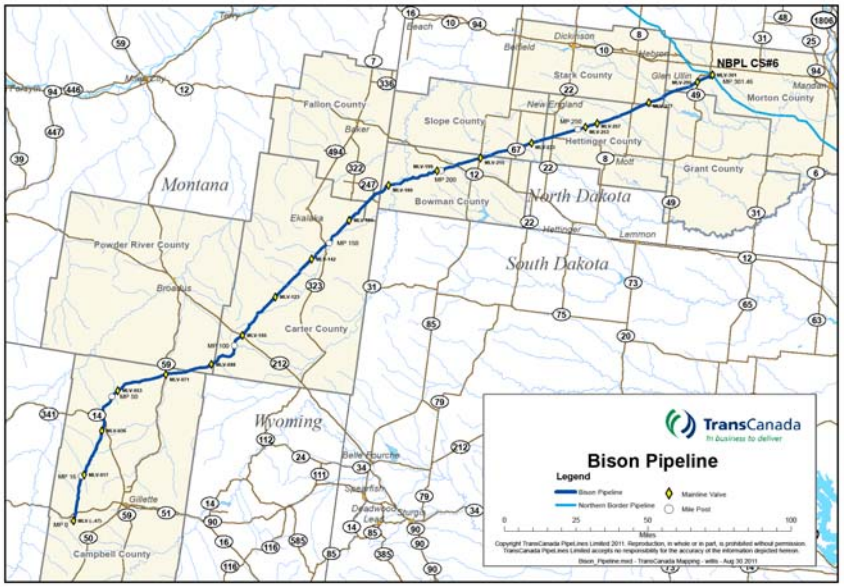
Bison Facilities



- **303 miles**
- **NPS 30**
- **No HCA's**
- **20 Mainline valves (ball valves)**
  - All Automatic Controls (ASV) (LPSD)
  - 3 with remote control (RCV)

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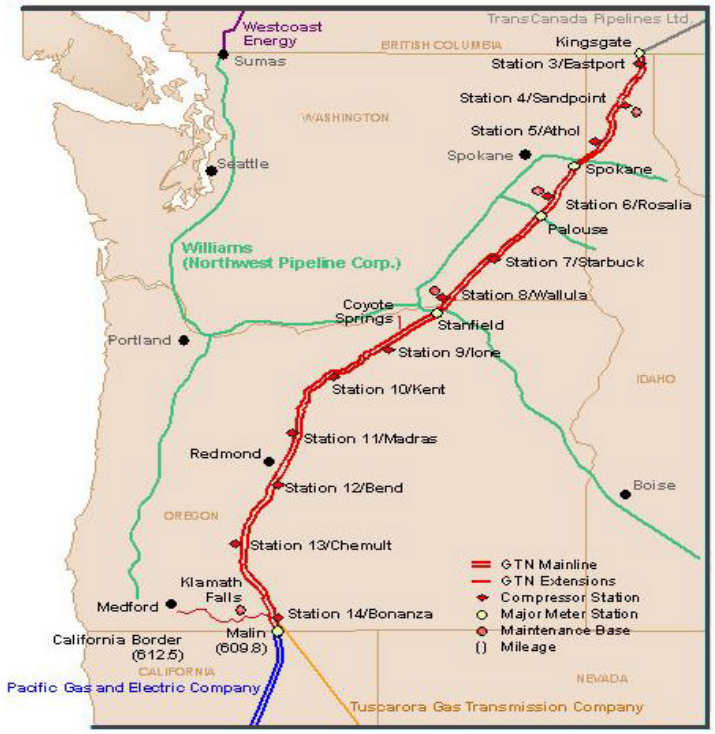
GTN Facilities



- **1351 miles, NPS 36 / 42 / 12**
- **93 HCA's**
- **90 Mainline Block Valves**
  - A Line (1961, gate valves)
    - 50 % Automatic Controls (LPSD)
    - 50 % Manual Control (non HCA)
  - B Line (1994, ball valves)
    - 100 % Automatic Controls (LPSD)

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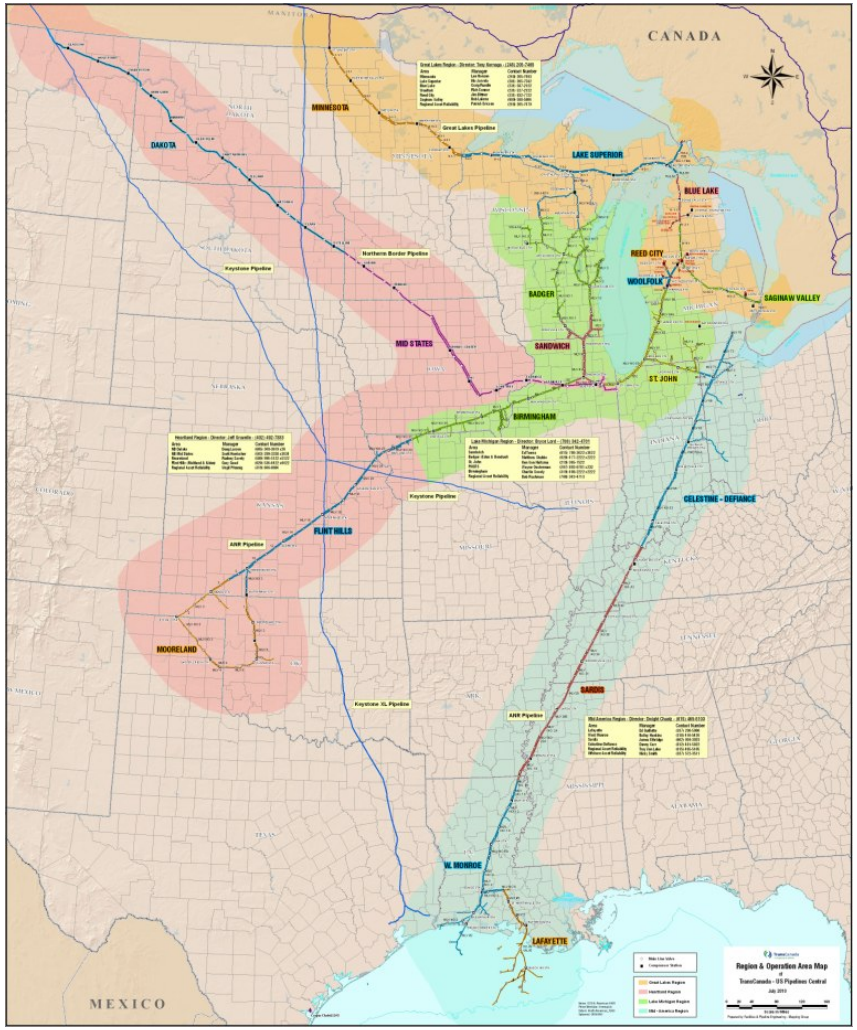
ANR Facilities



- **10,563 miles**
- **NPS 2 – 42**
- **765 HCA's**
- **900 block valves**
  - ball & gate valves
  - > NPS 12 Automatic Controls (ROPD) (90%)
  - < NPS 12 Manual Controls

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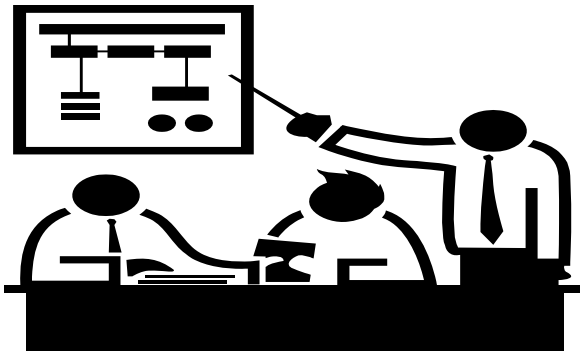
Past Studies & Conclusions

Installation of automated valves does not reduce initial impact.

The time of valve closure may have an effect on property damage, risk to emergency responders.

Gas Research Institute
US Department of Transportation
Pipeline Research Council International



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Gas HCA IMP

§192.935 Additional Preventive & Mitigative Measures

(a) An operator must take additional measures…..

(c) If an operator determines, … that an ASV or RCV would be an efficient means of adding protection to a HCA…

TEP-RCV-TIP-US Threat Identification Procedure

TransCanada risk analysis;

- the application of automated valves will not minimize initial impact,
- it would minimize secondary effects

Plan

- Develop and implement isolation plan for each HCA
- Prioritized to Identified Sites with Limited Mobility (ISLM)

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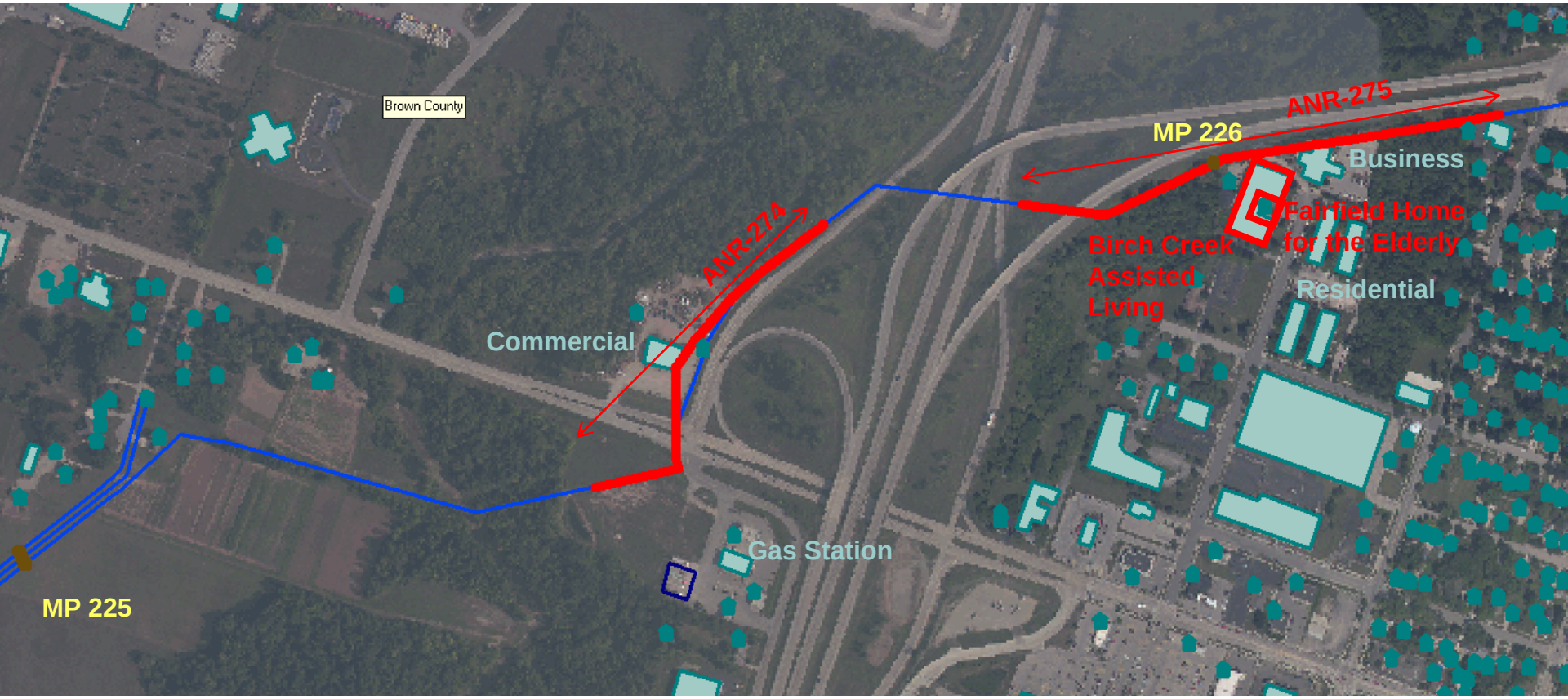
ISLM HCA Isolation – ANR-275 Line 350



US Valve: MLV 22 (Denmark Tap)

DS Valve: Green Bay MS (Line End)

Other HCA's in area:

High Risk ISLM: None

Other ISLM: None

No ISLM: ANR 118, 272, 273, 274, 276, 312, 313

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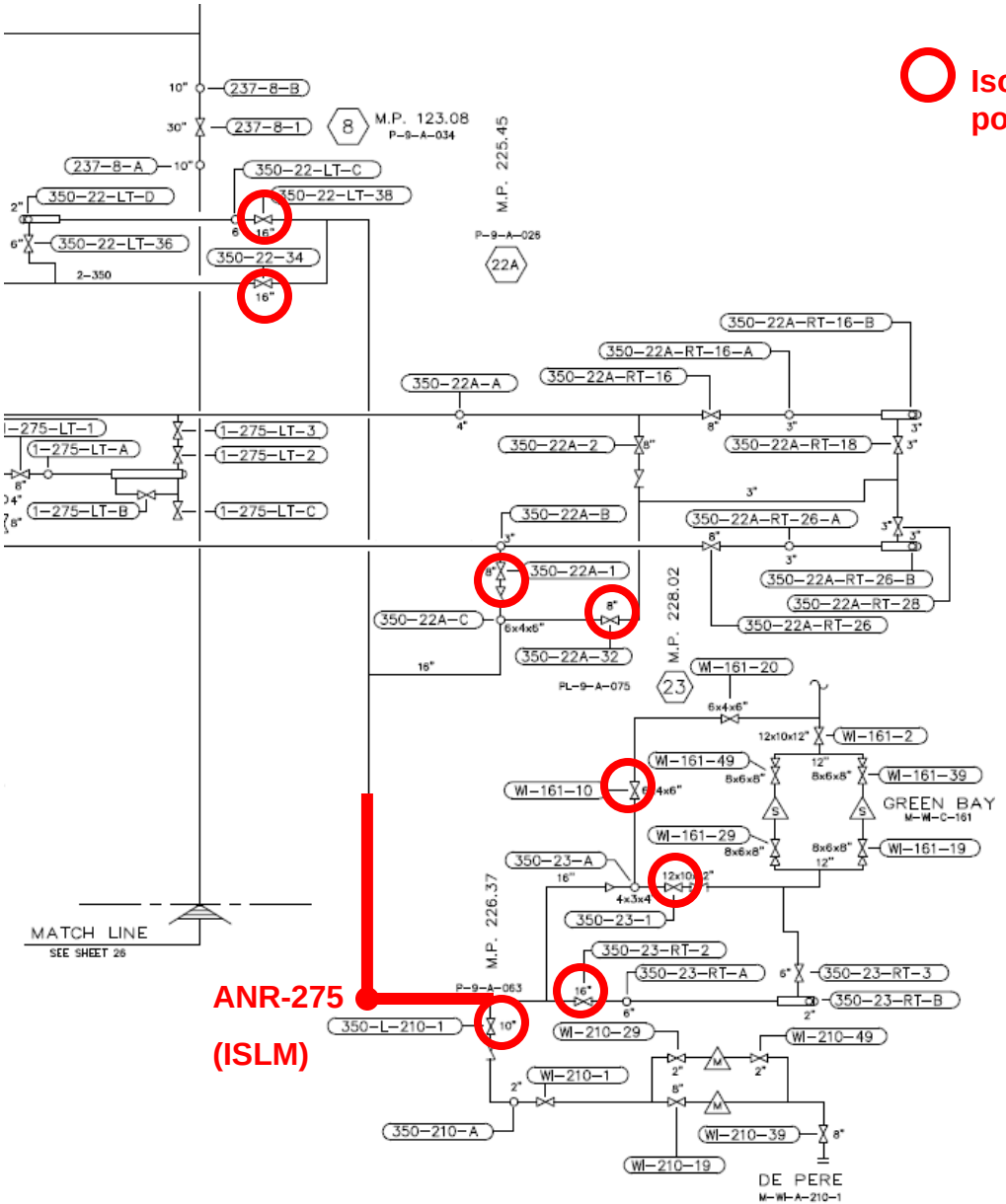
ISLM HCA Isolation – ANR-275
Valve Chart

Isolation valve surveyed for potential upgrade



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Valve Automation

Automation

- Actuators installed on all new valves > NPS 12
- Low Pressure Shut Down (LPSD) – standard due to high reliability
- Remote Control functionality for operations, hydraulic control points, limited access, and higher level reliability
- Actuator travel time ~ 1 inch/second

Cost

- Valve; $500 K for new pipeline, $1000 K for existing pipeline
- ACV; $50 - $100 K for new actuator
- RCV; $150 - $250 K for new actuator & telemetry package
- OPEX; $5K/year

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Conclusion

TransCanada History (US 15,133 miles)
No failures in HCA in > 60 years

Committed to a Reduction in Probability of Release

- Relentless pursuit of zero incidents
- Integrity Management Programs
- Technology Developments (processes, tools)
- Public Awareness and Damage Prevention Program

Committed to a Reduction in Consequences of Release

- 60 minute isolation for HCA, Class 3 & 4 (INGAA)
- Achieved through combination ACV, RCV and operations personnel
- Program in place prioritized to Identified Sites with Limited Mobility (ISLM)

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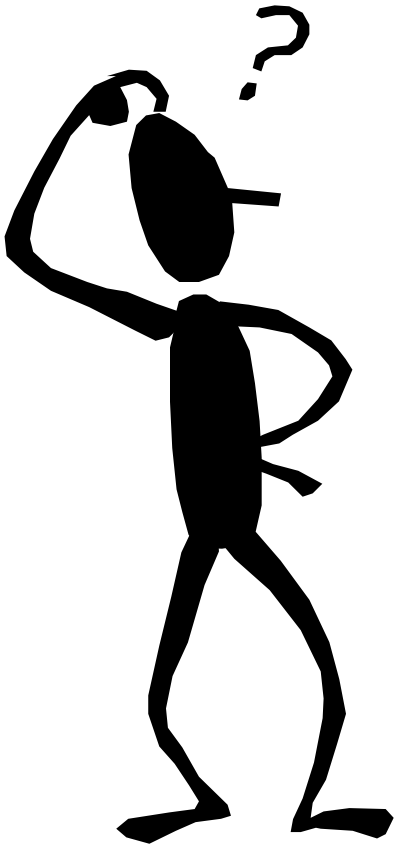
Questions?



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