PHMSA Valve Workshop

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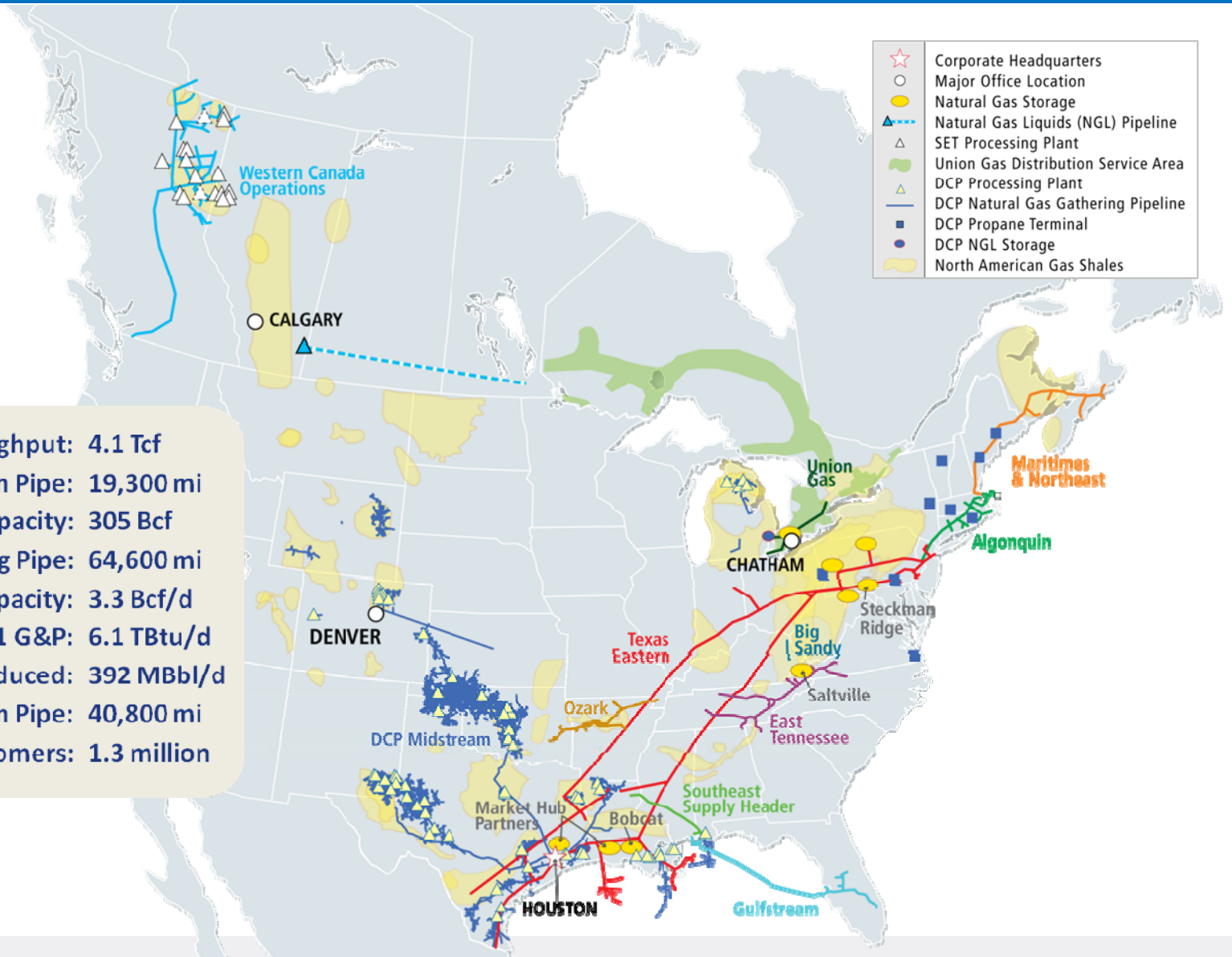
Our Diverse Portfolio of Assets

2010 Pipeline Throughput:	4.1 Tcf
Transmission Pipe:	19,300 mi
Storage Capacity:	305 Bcf
Gathering Pipe:	64,600 mi
SE Gas Processing Capacity:	3.3 Bcf/d
DCP 3Q11 G&P:	6.1 TBtu/d
DCP 3Q11 NGLs produced:	392 MBbl/d
Distribution Pipe:	40,800 mi
Retail Customers:	1.3 million



SET U.S. Pipeline Assets

- 97 compressor stations
- ~2.1 million installed horsepower
- 12,850 miles of pipe
- 7 storage assets, partnership in 3 fields
- ~1,600 meter stations
- 2 offshore platforms

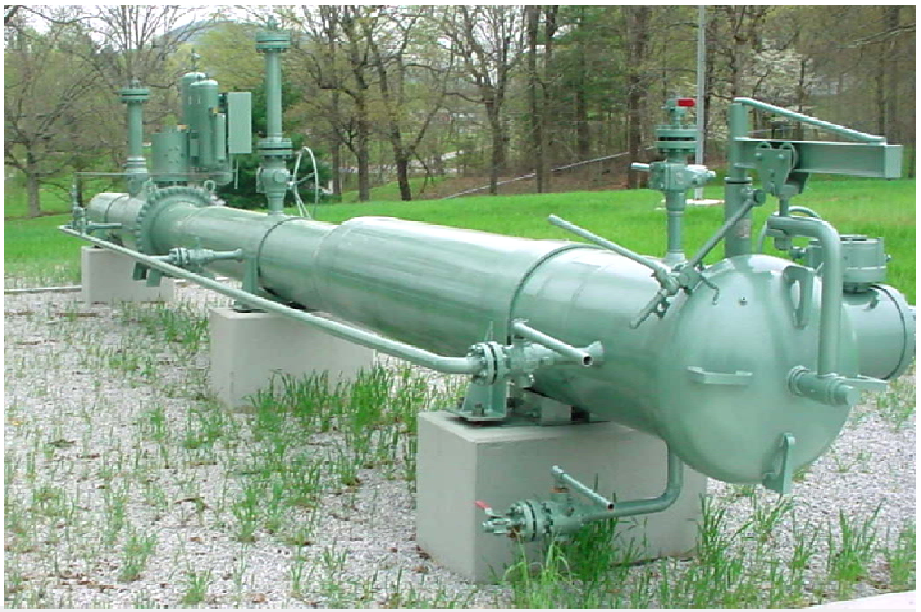
Valve Installation Considerations

- ASME B31.8
  - Original criteria to support operations & emergency response
  - Valve spacing based on road spacing to facilitate access/response
- Spectra Energy - *spacing per DOT & closer to meet above for easier access*
  - Parallel lines have crossover valves – added complexity
- Main line valves need to accommodate in-line tools
  - Full opening
  - Typically ball or gate design

Multiple Lines with Crossovers

Actuators

- **Fully Manual:** Geared to close against line pressure & accommodate human strength
- **Gas Driven – manual:** Gas pressure used to drive actuator to close, actuated on site by personnel (typically close within 2-3 minutes)
- **Gas Driven – automated:**
  - Automatic (ACV) – rate of change or low pressure sensor
  - Remote controlled (RCV) – pressure sensors, telemetry tied to SCADA/ human interface to initiate
- *Each have pros & cons/limits*



Design Considerations - Environmental

- For actuator, gas primarily clean
- Dew point considerations
  - Use mist extractors to minimize freeze-up & discharge
- Don’t install in flood plains
- Temperature is a consideration for solenoid ratings, etc.

- Lightning monitoring considerations for automated valves – continuity checks for remote transmitters
- Fences to protect from damage & limit access – locked to prevent unintended operation

Spectra Energy Automation Criteria

- **ACVs:** restrict use to mainline applications in areas where pipe load is more stable (i.e. away from high demand customers)
- **RCVs** – use in:
  - HCAs where response times are above one hour
  - Sites with limited accessibility (even seasonably, traffic, etc)
  - Dense urban environments on pipes >20”

Edison, NJ Incident

Incident Background

- Valve closure ~ 90 minutes
- Personnel on site <30 minutes
- Valve site very close to incident ~1500’
- Line pressure fell below drive pressure for actuator
- Pressure differential across valve too high to actuate to complete closure

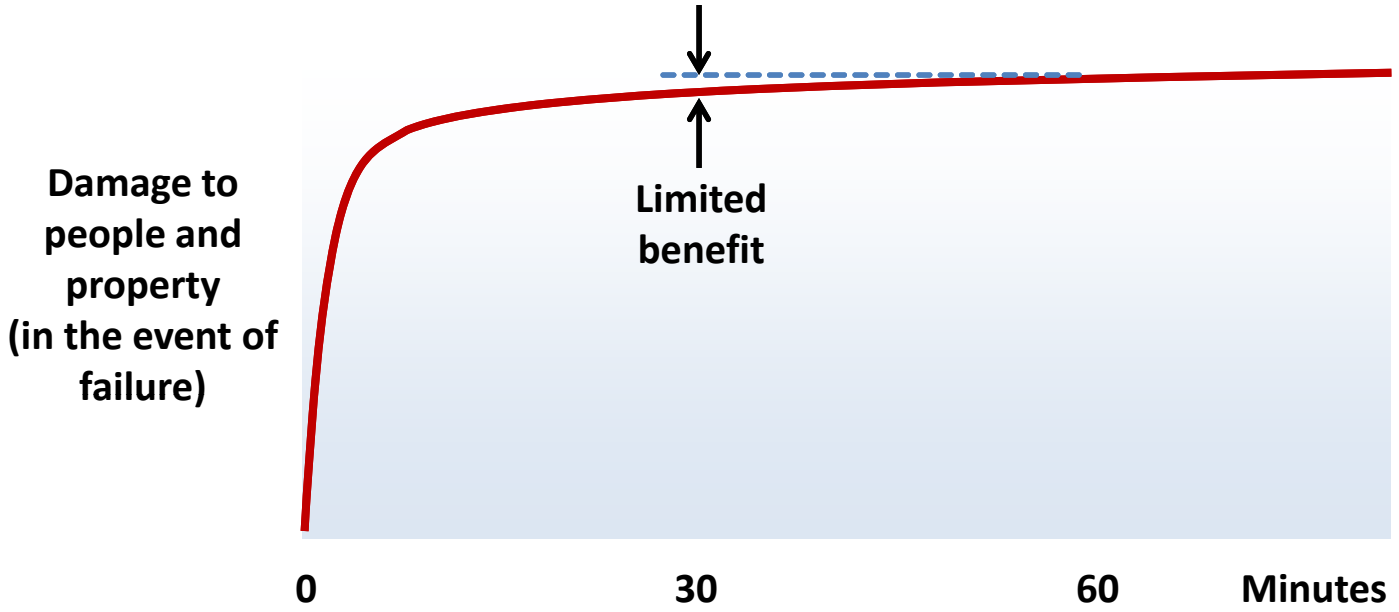
Lessons Learned on Valves

- Pressure storage tanks/volume bottles added to actuators (not driven by line gas pressure)
- Multiple crews dispatched to secondary up and down stream valve locations at incident notification (in addition to incident site and primary valve locations)
- Response criteria & equipment selections revised – application of RCV technology became more widely applied – tied to SCADA system for use by Gas Controllers

Spectra Energy U.S. Valve Statistics

System mainline & crossover valves	**2,800**
Mainline & crossover valves adjacent to Class 3, 4 & HCAs	**1,700**
Valves w/ RCV or ACV equipment	**200**
Valves requiring automation to meet INGAA commitments	**250**
Valves requiring automation to meet 30 minute response in HCAs	**1,200**

Damage Mitigation



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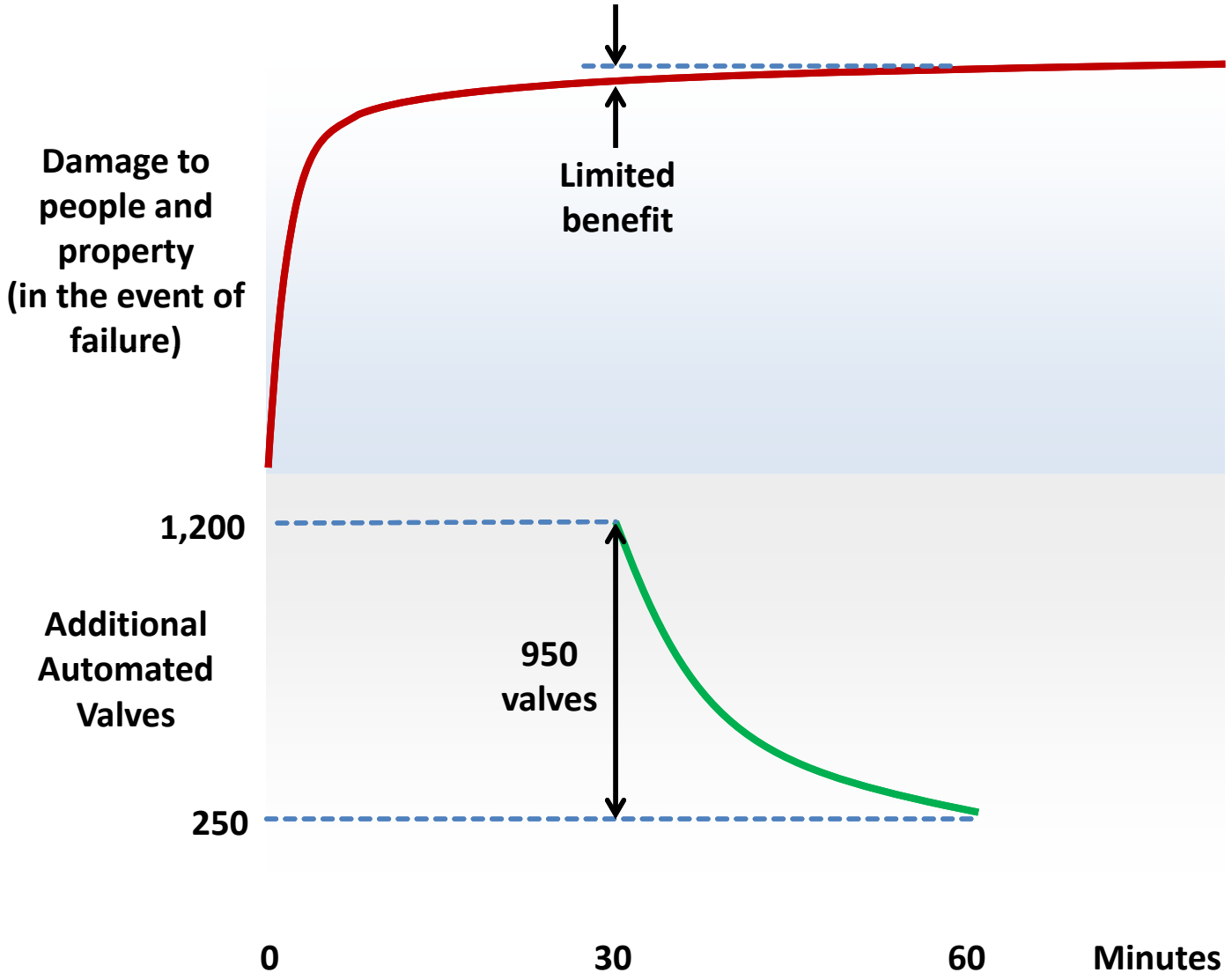

Conclusion

- Most physical damage and injuries occur very quickly
- Valve spacing and closure will not significantly alter physical impact in most situations – more issues to consider though
- An order of magnitude increase in impact will occur to shift from INGAA criteria to 30 minutes or “all” valves
- Response time coordination with emergency responders access seems logical for most situations
- Operating people in close proximity to valving are an important element in incident response (automation isn’t only issue or answer)
- **There are issues beyond physical impact which are difficult to quantify that need to be considered and addressed**
- **It is important to improve, create consistency and provide certainty of incident response in high consequence areas**
- **Need to continue to vet out/characterize secondary impact for inclusion in accelerated response criteria**