DVP Alternatives for Consideration to Resolve 2015 RTEP Issues
Presented at June 9, 2010
TEAC
Based on PJM’s latest analysis presented at the June 9, 2010 TEAC

- THERMAL Deficiencies begin to occur in 2017
  - Earliest Dominion line to overload is Mt Storm – Doubs 551 line in 2017
    - PJM sensitivity analysis advanced overload to 2016 when considering RPS

- REACTIVE Deficiencies occur in 2015
  - Multiple contingencies will not solve
  - Results in significant impact to Dominion system
All 2015 reactive deficiencies can be resolved with reactive reinforcements

- See PJM Alternatives 5 and 6 from June 09, 2010 TEAC presentation
  - Realize this is short term fix with additional transmission infrastructure needed
- 2010 RPM Auction results likely to reduce amount of reactive reinforcements required.
  - 9282 MW of demand response cleared 2010 RPM (32% increase over 2009 RPM)
  - The impact of the additional demand response has not been evaluated
DVP Recommended alternatives to consider

- Based on latest PJM analysis DVP has 4 alternatives to consider
  - DVP has done a high level analysis which shows alternatives provide benefits to resolving PJM identified deficiencies
  - Alternatives provide flexibility in allowing for staged construction over multi-year timeframe
  - Elements of proposals include the following
    - By 2015
      - Reactive reinforcements to resolve 2015 reactive deficiencies.
      - Rebuild Mt Storm – Doubs 500 kV Line (65% increase in lines current thermal capability)
    - Beyond 2015
      - Additional transmission infrastructure beyond 2015 to resolve longer term EHV issues
DVP Alternative Number 1

By 2015

- Install reactive reinforcements to resolve 2015 reactive deficiencies. ($110 M)
  - 900 MVAR SVC at Loudoun 230 kV
  - 900 MVAR SVC at T157 Tap 500 kV
  - 300 MVAR static caps @ Meadow Brook 500 kV
  - 300 MVAR static caps @ Loudoun 500 kV
  - 300 MVAR static caps @ Doubs 500 kV
- Rebuild Mt Storm – Doubs 500 kV Line to 4330 MVA (65% increase in lines current thermal capability) ($300 M)
  - Can be completed by 2015
  - Can be built for DC compatibility with little additional expense
  - Limited CPCN requirement
  - With Trail in service, longer outage windows available to minimize construction period
- Install 50% series compensation at Meadow Brook end of Trail ($10 M)
  - Flexible option with short lead time for construction or can be deferred based on final assessment

By 2017

- Rebuild Mt Storm – Pruntytown line ($200 M) cost only for Pruntytown line
  - Double circuit line may be required
  - Extend rebuild back to Harrison

Estimated Cost – $ 620 M
DVP Alternative Number 2

By 2015
- Install reactive reinforcements to resolve 2015 reactive deficiencies. ($110 M)
  - 900 MVAR SVC at Loudoun 230 kV
  - 900 MVAR SVC at T157 Tap 500 kV
  - 300 MVAR static caps @ Meadow Brook 500 kV
  - 300 MVAR static caps @ Loudoun 500 kV
  - 300 MVAR static caps @ Doubs 500 kV
- Rebuild Mt Storm – Doubs 500 kV Line to 4330 MVA (65% increase in lines current thermal capability) ($300 M)
  - Can be completed by 2015
  - Can be built for DC compatibility with little additional expense
  - Limited CPCN requirement
  - With Trail in service, longer outage windows available to minimize construction period
- Install 50% series compensation at Meadow Brook end of Trail ($10 M)
  - Flexible option with short lead time for construction or can be deferred based on final assessment

By 2017
- Build a portion of PATH stopping at Mt Storm ($900 M)
  - Requires installation of 765 – 500 kV auto
  - Install 900 MVAR SVC on 500 kV at Mt Storm

Estimated Cost – $1.32 B
DVP Alternative Number 3

By 2015
- Install reactive reinforcements to resolve 2015 reactive deficiencies. ($110 M)
  - 900 MVAR SVC at Loudoun 230 kV
  - 900 MVAR SVC at T157 Tap 500 kV
  - 300 MVAR static caps @ Meadow Brook 500 kV
  - 300 MVAR static caps @ Loudoun 500 kV
  - 300 MVAR static caps @ Doubs 500 kV
- Rebuild Mt Storm – Doubs 500 kV Line to 4330 MVA (65% increase in its thermal capability) ($300 M)
  - Can be completed by 2015
  - Can be built for DC compatibility with little additional expense
  - Limited CPCN requirement
  - With Trail in service, longer outage windows available to minimize construction period
- Install 50% series compensation at Meadow Brook end of Trail ($10 M)
  - Flexible option with short lead time for construction or can be deferred based on final assessment

By 2017
- Build a portion of PATH stopping at Welton Spring ($900 M)
  - Requires installation of 765 – 500 kV auto
  - Install 900 MVAR SVC on 500 kV

Estimated Cost – $1.32 B
DVP Alternative Number 4

By 2015
- Install reactive reinforcements to resolve 2015 reactive deficiencies. ($110 M)
  - 900 MVAR SVC at Loudoun 230 kV
  - 900 MVAR SVC at T157 Tap 500 kV
  - 300 MVAR static caps @ Meadow Brook 500 kV
  - 300 MVAR static caps @ Loudoun 500 kV
  - 300 MVAR static caps @ Doubs 500 kV
- Rebuild Mt Storm – Doubs 500 kV Line to 4330 MVA (65% increase in its thermal capability) ($300 M)
  - Can be completed by 2015
  - Can be built for DC compatibility with little additional expense
  - Limited CPCN requirement
  - With Trail in service, longer outage windows available to minimize construction period

By 2017
- Build PATH proposal ($1.8 B)
  - Rebuilding of Mt Storm – Doubs and Reactive support portion of proposal by 2015 provides flexibility of extending construction period for PATH

Estimated Cost – $2.22 B
Key Facts of Mt Storm – Doubs

- 551 Line – Mt. Storm to Doubs was constructed in 1964 as part of the original 500 kV loop.
- Total line length is 99.26 miles located:
  - 65.7 miles in WVA (Dom Owned)
  - 30.7 miles in VA (Dom Owned)
  - 2.86 miles in MD (APS Owned)
- 150 ft ROW
- Average tower height of 102 ft
Conclusion

- DVP alternatives provide flexibility for staged multi-year construction to meet requirements of PJM RTEP 15 year Planning analysis
- Reactive reinforcements and rebuild of Mt Storm – Doubs can be implemented by 2015
  - Can be completed by 2015
  - Can be built for DC compatibility with little additional expense
  - Limited CPCN requirement
  - With Trail in service, longer outage windows available to minimize construction period
- For Alternatives 2 and 3, DVP review was limited due to our inability to emulate PJM load deliverability analysis