Rush Creek Task Force (CCPG)

April 27, 2017

Meeting Notes

1. Introduction

- See Attendance list

2. Anti-trust Reminder

- Patrick reviewed the anti-trust guidelines with the group. The guidelines are attached to the meeting agenda.

3. Approve Meeting Notes

a. March 29, 2017 Meeting

- Patrick sent the draft notes on April 12, 2017
- Some clarifications were received from Lisa Hickey
- No further corrections were provided at this meeting.
- Motion:
  - PSCo (Tom Green) moved to approve the March 29, 2017 meeting notes, with the clarifications provided by Ms. Hickey.
  - Tri-State (Ryan Hubbard) seconded the motion.
- Discussion:
  - None
- Vote:
  - No objections were noted.
  - March 29, 2107 meeting notes were approved.

4. Action Item Review

- Reviewed the action items from the February 22, 2017 meeting:

Item	Action	Status
1	Draft Benefits Language	Ongoing
2	Light load powerflow studies	Discuss Today
3	Transient Stability studies	Ongoing
4	Modify Results Spreadsheet	Complete – Discuss Today
5	Cost Estimates	Ongoing

- Related to costs, PSCo evaluated line mileages between Rush Creek I and Daniels Park, and a potential substation on the Comanche – Daniels Park lines.
  - The line estimation showed approximately 46 miles from Rush Creek I to a new switching station on the Comanche – Daniels Park 345 kV lines. The new switching station is approximately 21 miles south of Daniels Park
  - See photo in Attachment A

5. Review of Study Results

a. Heavy Summer

- PSCo reviewed the updated study results
- The focus was on alternatives that were limited by the Leetsdale – Monroe 115 kV underground line loading, but also on Pawnee - Daniels
- Noted that upgrades to the limited lines were not specifically modeled when moved to the next limiting element.

b. Light Spring

- PSCo reviewed the light spring study results
- The results showed similar injection results as the heavy summer except for the Benchmark case where Pawnee-Story 230 kV line was as a limiter.
- It appeared there was too much generation on PSCo's system necessary to meet PSCo's load obligations.
- Attachment B summarizes the Heavy Summer and Light Spring results.

6. Stakeholder Comments

- Mark Detsky advocated for more alternatives for the task force to analyze which would increase injection capabilities in eastern Colorado. Mark suggested expanding some alternatives with by adding a 345 kV line from Big Sandy to Story.
- The RCTF agreed to study two additional alternatives:
  - Alt 5a: RCI to Big Sandy to Story, RCII to Burlington
  - Alt 5b: RCI to Big Sandy to Story, RCII to Burlington, RCI to Daniels Park
  - Per Chris Neil's request, the RCTF agreed to run one sensitivity analysis with a 345 kV connection from Pawnee to Story to ensure the connection does not overload any other lines in the area.

7. Action Items

Item	Action	Resp
1	Draft Benefits Language	PSCo
2	Update power flow results with new alternatives	PSCo
3	Transient stability analysis	PSCo
4	Cost estimates	PSCo
5	Summarize results with narrative	PSCo

8. Next Meeting

- May 25, 2017; 1:00 PM

9. Attendees List

Rush Creek Task Force				
LastName	FirstName	Company/Org	Email	4/27/2017
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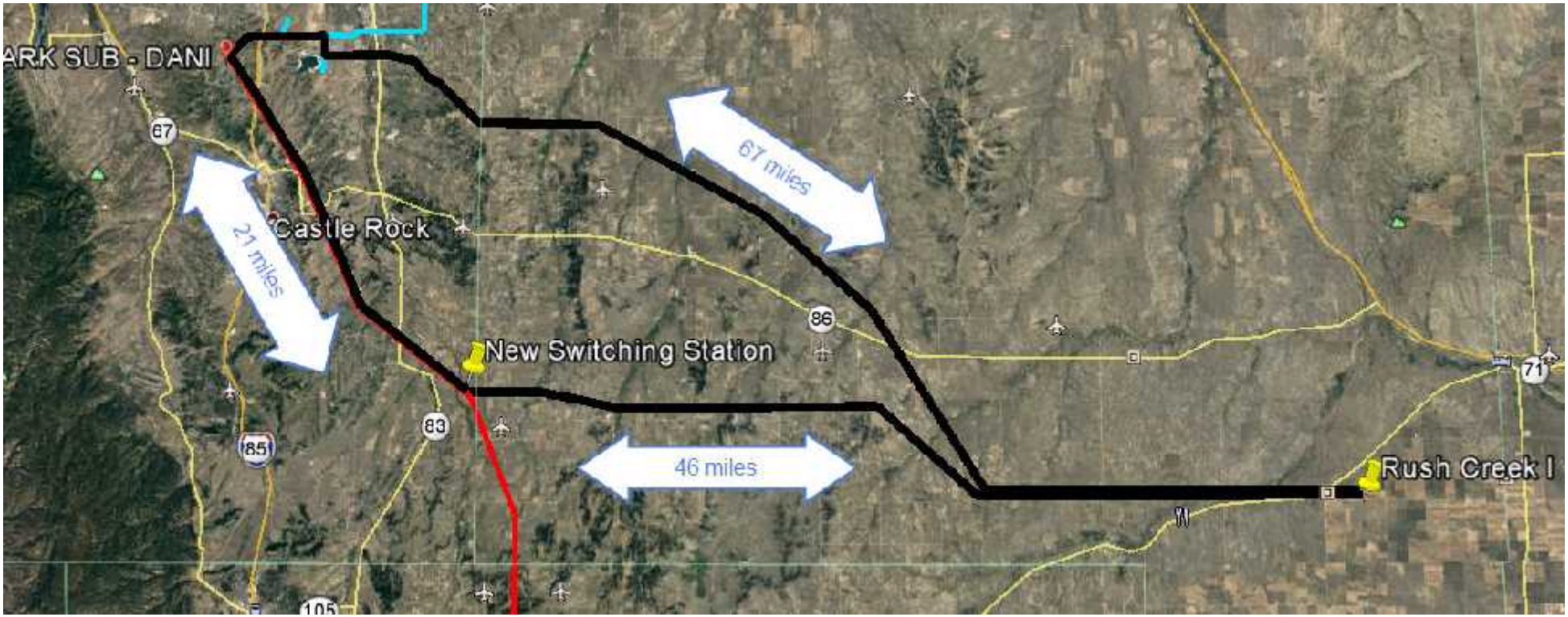
10. Attachment A – Line length estimations for alternatives into Daniels Park



11. Attachment B – Alternative Analysis Summary

Rush Creek Task Force

Alternative Analysis 4/27/2017

Power Flow Results - Heavy Summer 2026

Alternative	Alternative Description	Incremental Injection Capability (MW)	Total Injection Capability (MW)	Limiting Element	Owner	Limiting Rating	Limiting Contingency
Alt 0	Benchmark	550	1150	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
		850	1450	Pawnee-Story 230 kV	PSCo	576 MVA	Missile Site-Smoky Hill 345 kV
Alt 1	RCII - Burlington	100	700	Burlington-Bonny Creek 115 kV	TSGT	145 MVA	Missile Site-RCI 345 kV
		200	800	Burlington-Big Sandy 230 kV	TSGT	274 MVA	
		250	850	Wray-N Yuma 230 kV	TSGT	287 MVA	
Alt 2	RCI - Big Sandy	100	700	Big Sandy-Last Chance 115 kV	WAPA	109 MVA	Missile Site-RCI 345 kV
		250	850	Last Chance-Beaver Creek 115 kV	WAPA	109 MVA	
		250	850	Burlington-Big Sandy 230 kV	TSGT	274 MVA	
Alt 3	RCII - Limon gen	-250	350	Missile Site-Limon I 345 kV	Other	810 MVA	Missile Site-RCI 345 kV
Alt 4	Missile - RCI - RCII #2	550	1150	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
		850	1450	Pawnee-Story 230 kV	PSCo	576 MVA	Missile Site-Smoky Hill 345 kV
Alt 5	RCII - Burlington, RCI-Big Sandy	350	950	Big Sandy-Last Chance 115 kV	WAPA	109 MVA	Missile Site-RCI 345 kV
		500	1100	Burlington-Bonny Creek 115 kV	TSGT	145 MVA	

		550	1150	Lincoln-Midway 230 kV	TSGT	637 MVA	
Alt 6	RCII - Burlington, RCI-Limon gen	-100	500	Missile Site-Limon I 345 kV	Other	810 MVA	Missile Site-RCI 345 kV
Alt 7	RCII - Burlington, RCII-Limon gen	-100	500	Missile Site-Limon I 345 kV	Other	810 MVA	Missile Site-RCI 345 kV
Alt 8	RCI - Daniels Park, RCII-Burlington	550	1150	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
		750	1350	N Yuma-Red Willow 115 kV	TSGT	79 MVA	Wray-Sandhill 115 kV
Alt 9	RCI - Daniels Park, RCI-RCII	550	1150	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
		750	1350	Daniels Park-Santa Fe 230 kV	PSCo	319 MVA	Greenwood-Monaco 230 kV
Alt 9a	RCI - Daniels Park, RCI-RCII, Waterton Loop	600	1200	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
		850	1450	Daniels Park-Santa Fe 230 kV	PSCo	319 MVA	Greenwood-Monaco 230 kV

Power Flow Results - Light Spring 2026

Alternative	Alternative Description	Incremental Injection Capability (MW)	Total Injection Capability (MW)	Limiting Element	Owner	Limiting Rating	Limiting Contingency
Alt 0	Benchmark	250	850	Pawnee-Story 230 kV	PSCo	576 MVA	Missile Site-Smoky Hill 345 kV
		750	1350	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
Alt 1	RCII - Burlington	150	750	Burlington-Bonny Creek 115 kV	TSGT	145 MVA	Missile Site-RCI 345 kV
		200	800	Burlington-Big Sandy 230 kV	TSGT	274 MVA	
		200	800	Bonny Creek-South Fork 115 kV	TSGT	147 MVA	
Alt 2	RCI - Big Sandy	100	700	Big Sandy-Last Chance 115 kV	WAPA	109 MVA	Missile Site-RCI 345 kV
		150	750	Last Chance-Beaver Creek 115 kV	WAPA	109 MVA	
		300	900	Burlington-Big Sandy 230 kV	TSGT	274 MVA	
Alt 3	RCII - Limon gen	-250	350	Missile Site-Limon I 345 kV	Other	810 MVA	Missile Site-RCI 345 kV
Alt 4	Missile - RCI - RCII #2	250	850	Pawnee-Story	PSCo	576 MVA	Missile Site-Smoky Hill 345 kV
		750	1350	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV

Alt 5	RCII - Burlington, RCI-Big Sandy	250	850	Last Chance-Beaver Creek 115 kV	WAPA	109 MVA	Missile Site-RCI 345 kV
		300	900	Big Sandy-Last Chance 115 kV	WAPA	109 MVA	
		550	1150	Lincoln-Midway 230 kV	TSGT	637 MVA	
Alt 6	RCII - Burlington, RCI-Limon gen	-100	500	Missile Site-Limon I 345 kV	Other	810 MVA	Missile Site-RCI 345 kV
Alt 7	RCII - Burlington, RCII-Limon gen	-100	500	Missile Site-Limon I 345 kV	Other	810 MVA	Missile Site-RCI 345 kV
Alt 8	RCI - Daniels Park, RCII-Burlington	650	1250	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
		850	1450	Pawnee-Story 230 kV	PSCo	576 MVA	Missile Site-Smoky Hill 345 kV
Alt 9	RCI - Daniels Park, RCI-RCII	600	1200	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV
		600	1200	Pawnee-Story 230 kV	PSCo	576 MVA	Missile Site-Smoky Hill 345 kV
Alt 9a	RCI - Daniels Park, RCI-RCII, Waterton Loop	650	1250	Pawnee-Story 230 kV	PSCo	576 MVA	Missile Site-Smoky Hill 345 kV
		700	1300	Leetsdale-Monroe 230 kV UG	PSCo	398 MVA	Daniels Park-Arapahoe 230 kV