



NGTL System and Foothills Pipe Lines Ltd.

Customer Operations Meeting

August 27, 2019



Welcome and thank you for joining us

Safety:

- In case of emergency or evacuation statement, please proceed immediately to the ground-level exit
- Nearest stairs to ground-level exit are outside this room and directly to the right
- Muster point – Milestones on Stephen Avenue

Participating via WebEx:

- Please sign-in through WebEx application including your full name and company
- To reduce background noise and improve audio quality, all WebEx participants will be placed on mute
- Please submit your questions via the chat function and the moderator will ask your question

Forward Looking Information

This presentation includes certain forward looking information. Statements that are forward-looking are based on certain assumptions and on what we know and expect today and generally include words like anticipate, expect, believe, may, will, should, estimate or other similar words.

The information provided is for informational purposes only and is not to be relied upon for any other purpose whatsoever. The information is based upon certain assumptions that may or may not be accurate, and therefore is subject to various risks and uncertainties. TransCanada shall not be liable for damages sustained as a result of any use or reliance on such information.

The outages listed in this presentation are not an exhaustive list. Outage date, duration, and impact may be subject to change. Refer to the Daily Operating Plan (DOP) for all planned outages with potential service impact.

Safety moment – Get prepared for back to school

- **Observe school zone speeds**
 - Always obey speed limits; especially important during school year
 - Children are out throughout the day (recess, lunch, certain classes)
- **Obey the crossing guard**
 - Even if light turns green but crossing guard says stop, follow their direction
- **Watch for darting children**
 - Kids are easily distracted which can create dangerous situations
- **School buses**
 - Most mishaps take place outside the bus
 - Make sure children wait away from the road and stay back until the bus makes a full stop and doors open
 - Do not pass a school bus when the signal lights are flashing

Agenda

1. Saddle Expansion Update

2. Temporary Service Protocol

a) Background and overview

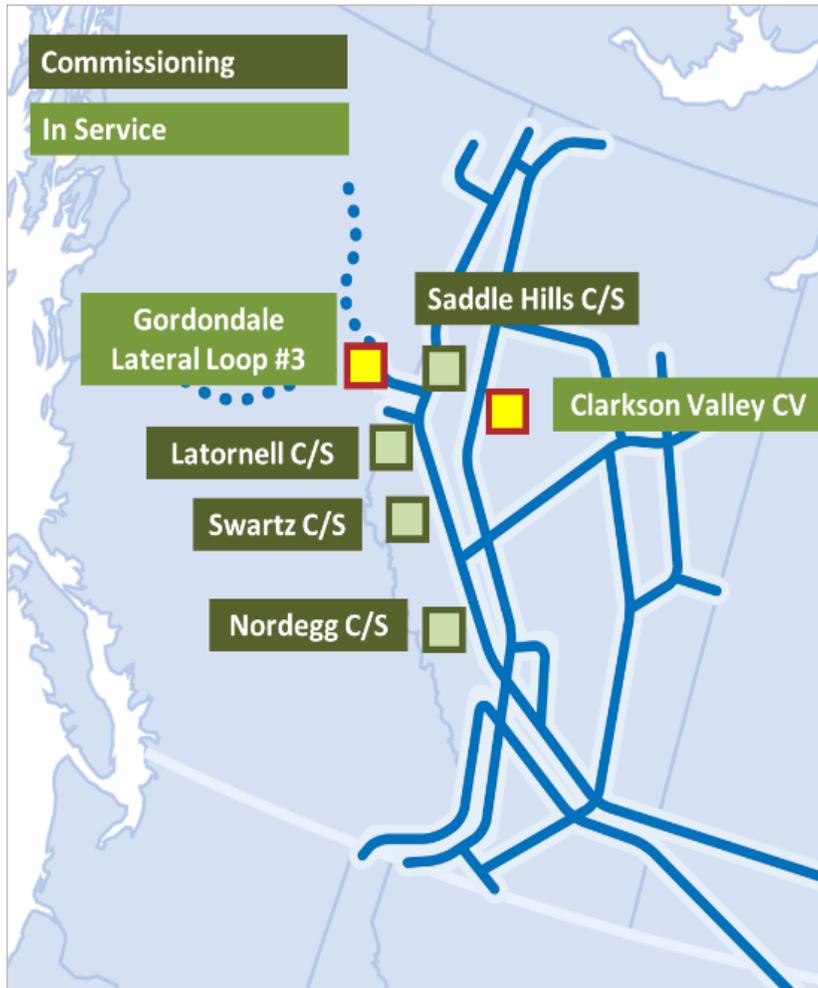
b) System operations management overview and potential changes

c) Outages subject to potential change



SADDLE WEST EXPANSION UPDATE

Project Overview



- **Purpose:** required to meet design flow requirements in the Peace River Project Area including 362 mmcf/d of new incremental FT-R contracts, target in-service date June 1, 2019
- **Scope:** four 30 MW compressor unit additions at Saddle Hills, Latornell, Swartz Creek, and Nordegg; control valve installation at Clarkson Valley (in-service May 30); and 25 kms NPS 36 loop of the Gordondale Lateral (in-service January 12)

Project Delay

- Delay a result of unexpected piping vibration with the four unit additions
- Some amount of piping vibrations is normal and expected, however the level of vibrations are outside acceptable limits
- All efforts are being made to investigate root cause and address the vibration asap, working with internal and industry subject matter experts to develop solutions

Actions Taken and Planned

Mitigation implemented:

- Structural steel piping support reinforcement
- Surge valve trim testing and replacement
- A number of piping mods completed

Outcome:

- Observed improvement but not within acceptable limits, data analysis ongoing

Next Steps:

- Further surge valve testing and analysis
- Administrative/operational controls during unit start-up and shut-downs
- Additional piping mods including surge control line
- Additional support stiffening and pipe supports

Estimated in-service:

- November 1, 2019 (or earlier if possible)
- Still some uncertainty associated with the mitigations measures which could result in further delays



Temporary Service Protocol
BACKGROUND & OVERVIEW

Background

- NGTL applied to the NEB for a temporary tariff amendment pursuant to Section 60(1)(b) of the *National Energy Board Act*
- Filing was submitted on August 26, 2019, and is proposed to be effective September 3, 2019 or as soon as possible thereafter
- NGTL requested the Board consider an expedited comment process to enable timely decision making
- NGTL's implementation of the temporary service protocol is subject to NEB approval

NGTL respectfully requests that any party that would like to comment on the Application file a letter of comment with the Board and serve a copy to NGTL on or before 12:00 pm (MST) Friday, August 30, 2019.

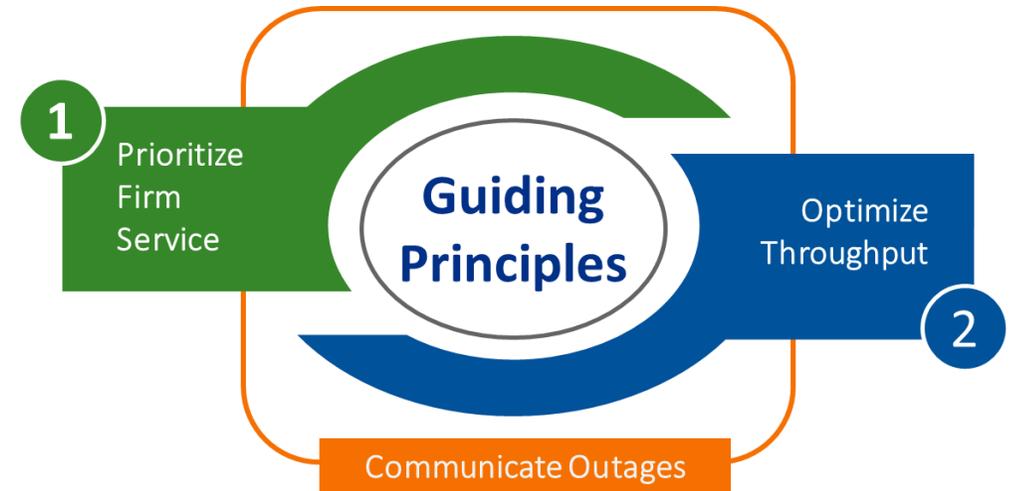
Current state

System managed in accordance with NGTL tariff and guiding principles:

- Maximize availability of firm service
- Optimize throughput

System constraints managed by:

- Firstly, reducing IT availability
- Secondly, reducing FT availability if IT reductions are not sufficient



Implementation of Temporary Service Protocol is subject to NEB approval

Temporary Service Protocol

Protocol condition

- Prioritize access to interruptible delivery and storage to EGAT during upstream planned outages through summer periods via restriction of receipt service upstream of bottleneck

Effective time period

- Official start date is subject to NEB approval
- 2019: September 3 (or as soon as possible thereafter) through October 31
- 2020: April 1 through October 31

Applicability

- During periods of planned upstream outages on the NGTL system

Upstream

- Receipt system constraint – at or upstream of Clearwater C/S, Woodenhouse C/S

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Definitions

Planned

- Work communicated in DOP > 48 hours from start date (per tariff)
- Majority of planned work is communicated 3-6 months from start date

Unplanned

- Unknowable events, work communicated in DOP < 48 hours from start date

Upstream

- At or upstream of Clearwater Compressor Station, Woodenhouse Compressor Station

Applicable outages

- Planned outages that start between April 1 – October 31

Implementation of Temporary Service Protocol is subject to NEB approval

When temporary service protocol is not applicable

- Unplanned outages
- Downstream outages
- Day-to-day supply/demand management outside of planned upstream maintenance windows
- Winter season
 - Nov 1, 2019 – Mar 31, 2020
 - Nov 1, 2020 onwards

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Additional considerations

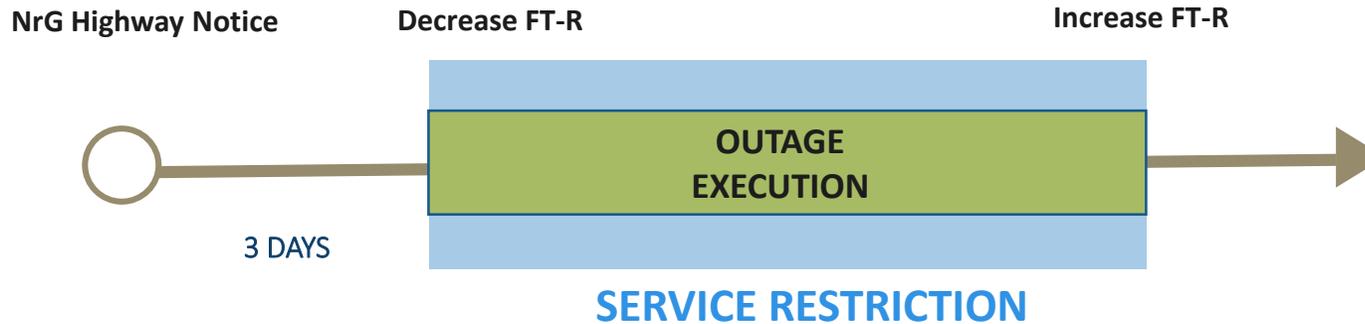
Implications of the variance to service prioritization include:

- Increased number of FT-R restriction days
- Current Daily Operating Plan (DOP) will be updated to reflect impacts of the variance to service protocol, subject to NEB decision on tariff amendment
- Outside of the planned outage / maintenance windows during summer operating months, EGAT/WGAT interruptible service availability will continue to be driven by daily system conditions and is subject to uncertainty
- Protocol will have no detrimental impacts on FT-D availability throughout the system

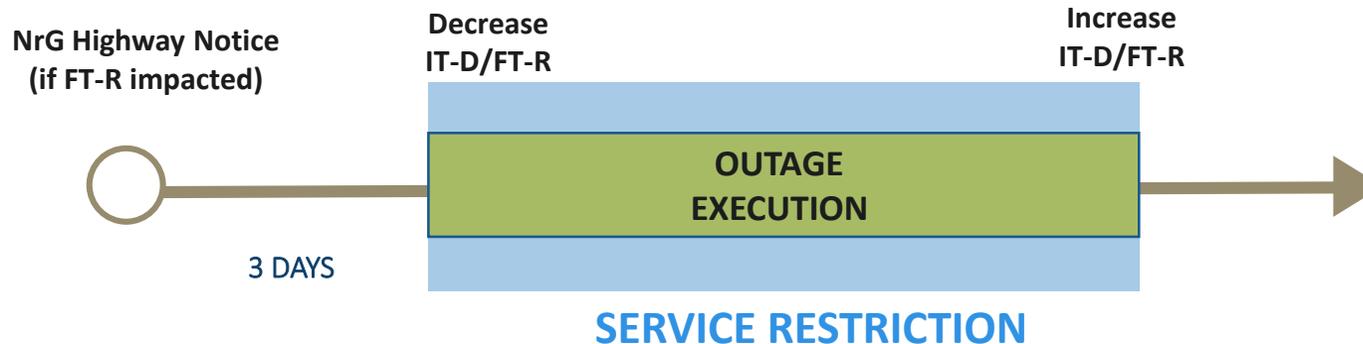
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Expected Outage Execution Timing (During/Outside Temporary Protocol)

UPSTREAM JAMES RIVER (USJR) – During Temporary Protocol



UPSTREAM JAMES RIVER (USJR) – Outside of Temporary Protocol

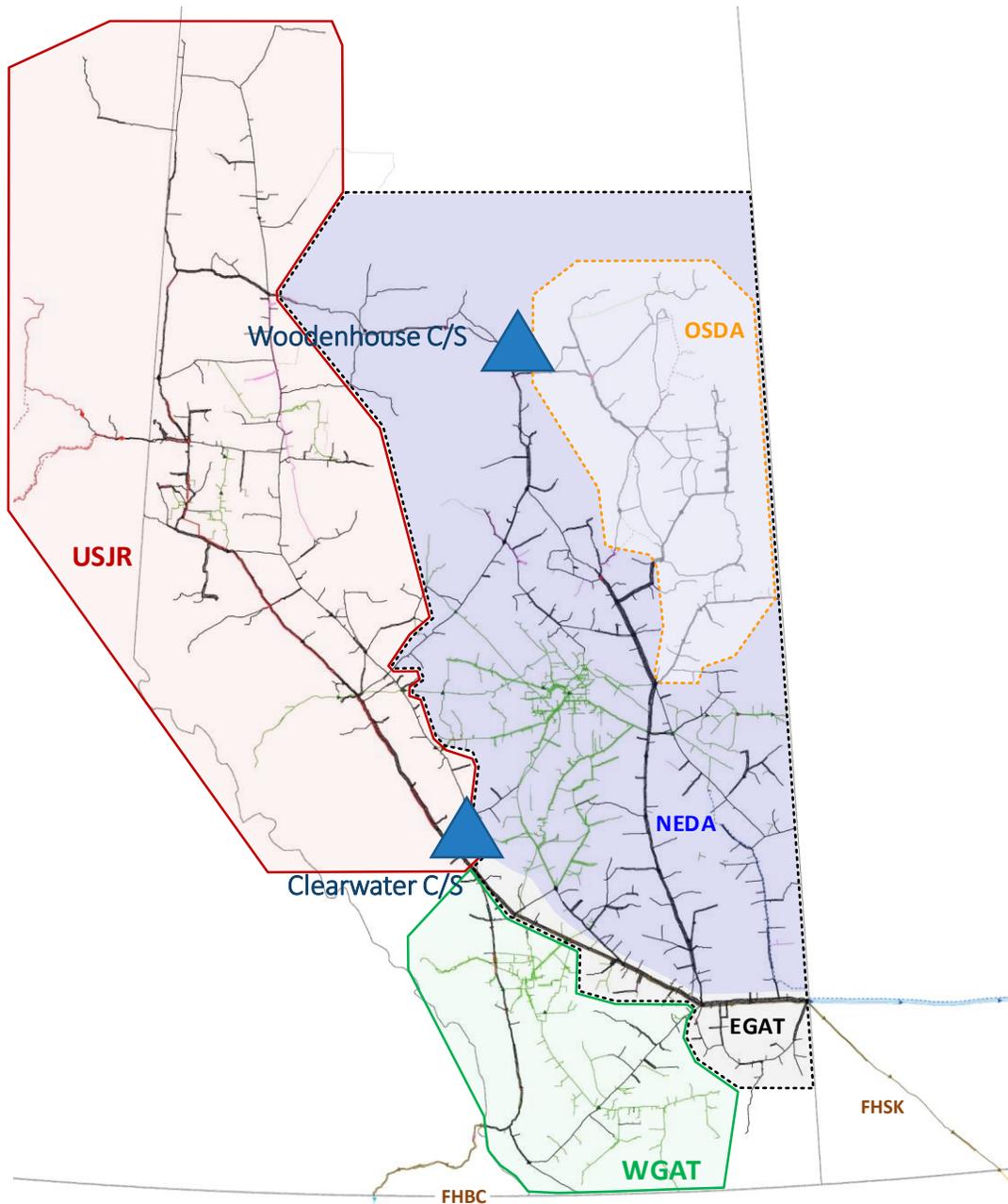


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**SYSTEM OPERATIONS MANAGEMENT OVERVIEW
& POTENTIAL CHANGES**

Area definitions



USJR, Upstream James River receipt area

WGAT, Western Gate delivery area

EGAT, Eastern Gate delivery area

- NEDA, Northeast delivery area
- OSDA, Oil Sands delivery area

FHBC, Foothill B.C. System

FHSK, Foothills Sask. System

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How do I know which areas and services will be affected under various circumstances?

For Temporary Service Protocol to be enacted, all three criteria must be met:

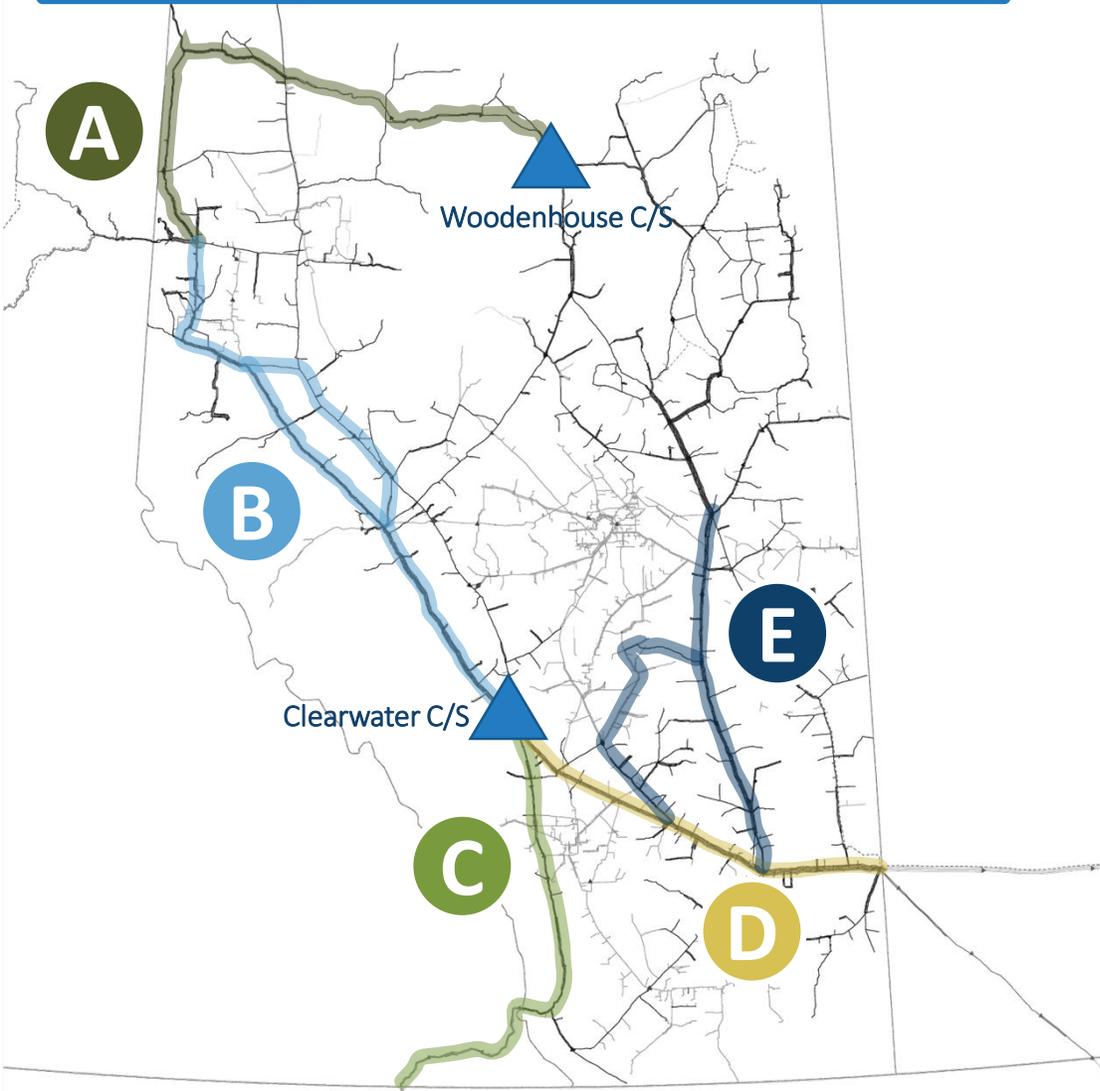


1. Planned maintenance (as communicated in DOP)
2. Takes place during applicable period (Summer 2019 or Summer 2020)*
3. Maintenance must take place at or upstream of Clearwater C/S & Woodenhouse C/S

**Please reference the February 14, 2019 Customer Operations Meeting materials for scenarios not subject to the Temporary Service Protocol*

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Service availability is more likely to be reduced by outages on the highlighted paths versus other paths



Flow path relationships and impact assessment

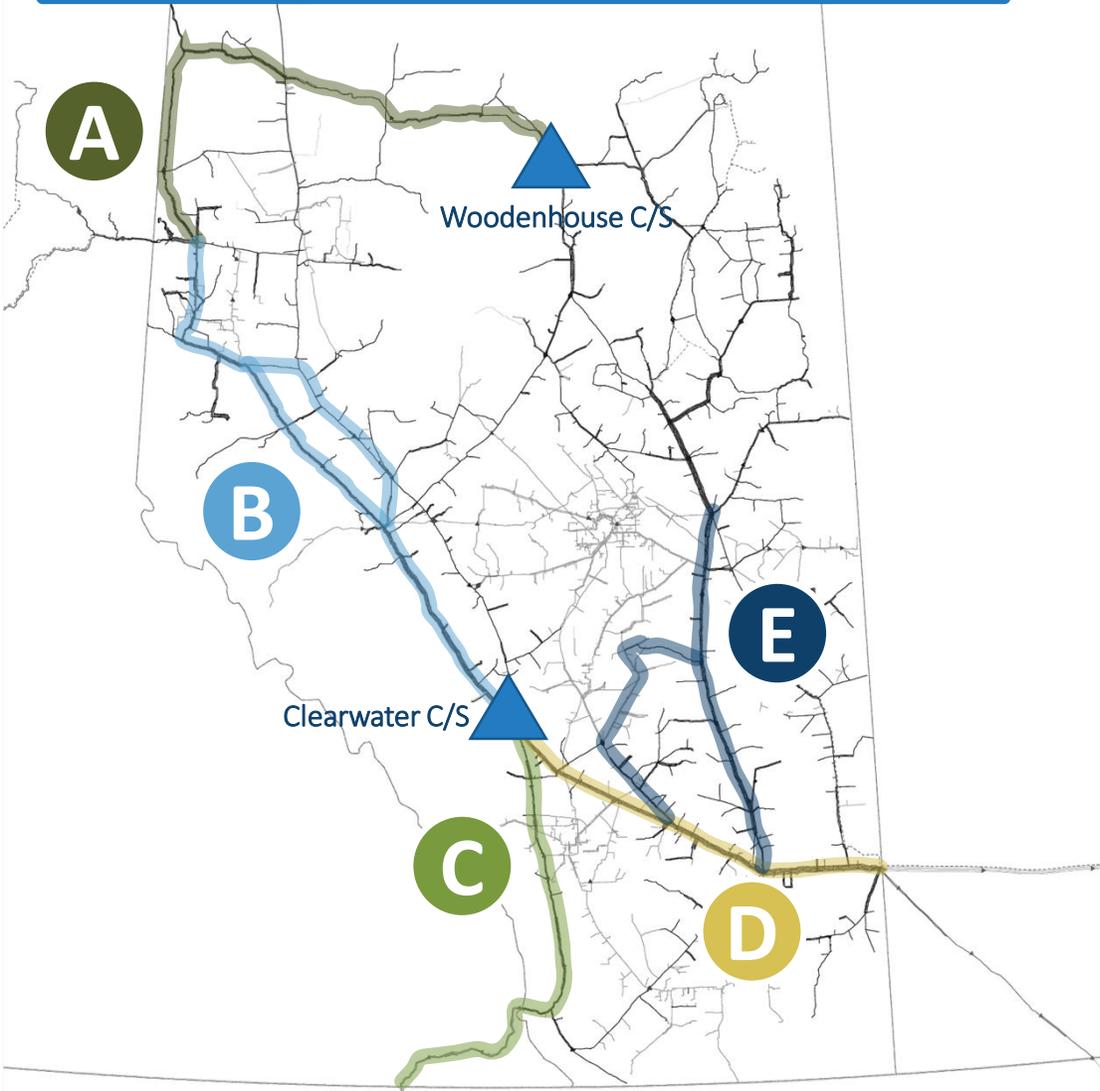
CURRENT STATE

Potential for reduced service availability:

- A** Upstream FT-R and/or downstream IT-D/IT-S
- B** Upstream FT-R or downstream IT-D/IT-S
- C** WGAT/FHBC only (NGTL or FHBC)
- D** EGAT only (includes NEDA/OSDA)
- E** NEDA only (includes OSDA)

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Service availability is more likely to be reduced by outages on the highlighted paths versus other paths



Flow path relationships and impact assessment

DURING TEMPORARY SERVICE PROTOCOL

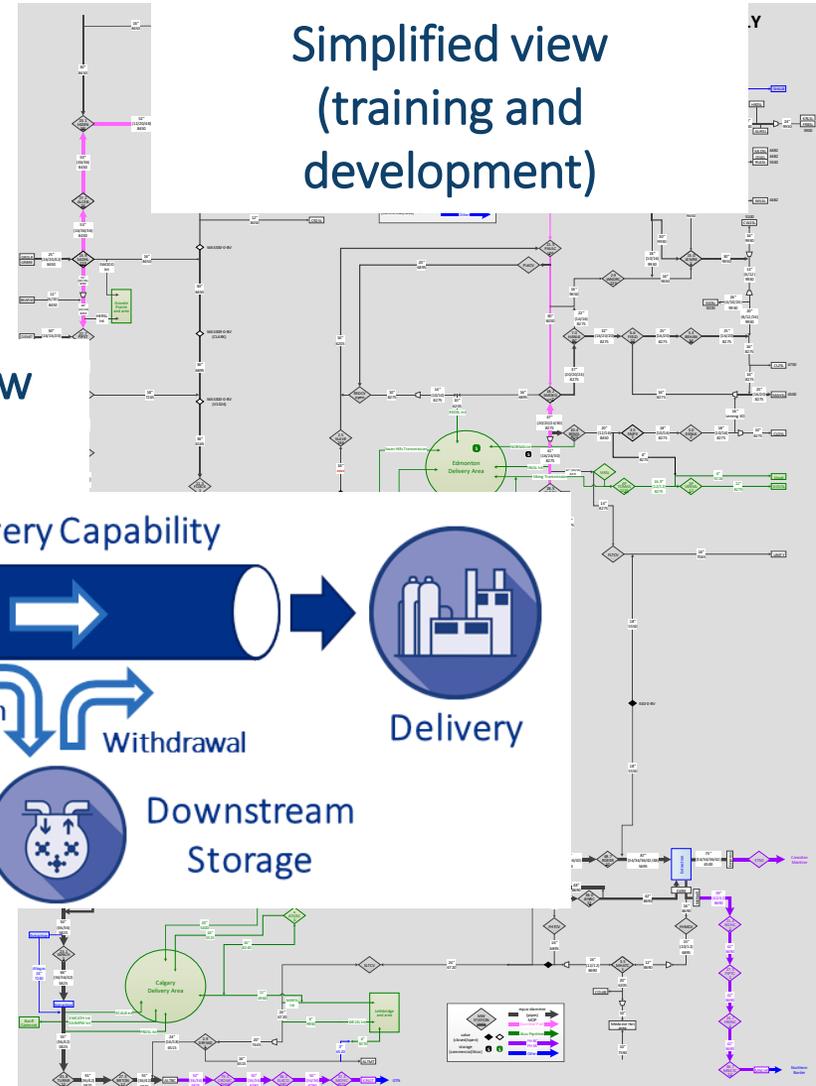
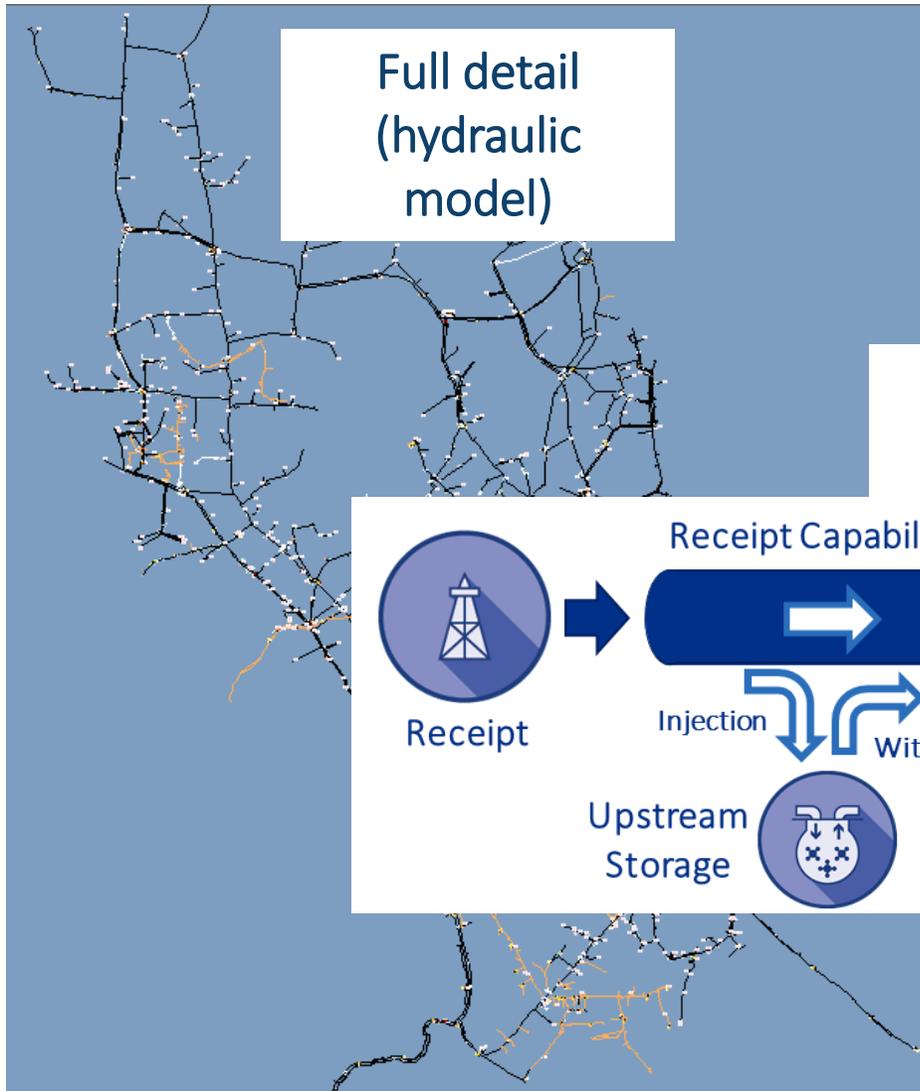
Potential for reduced service availability:

- A Upstream FT-R ~~and/or downstream IT-D/IT-S~~ **
- B Upstream FT-R ~~or downstream IT-D/IT-S~~
- C WGAT/FHBC only (NGTL or FHBC)
- D EGAT only (includes NEDA/OSDA)
- E NEDA only (includes OSDA)

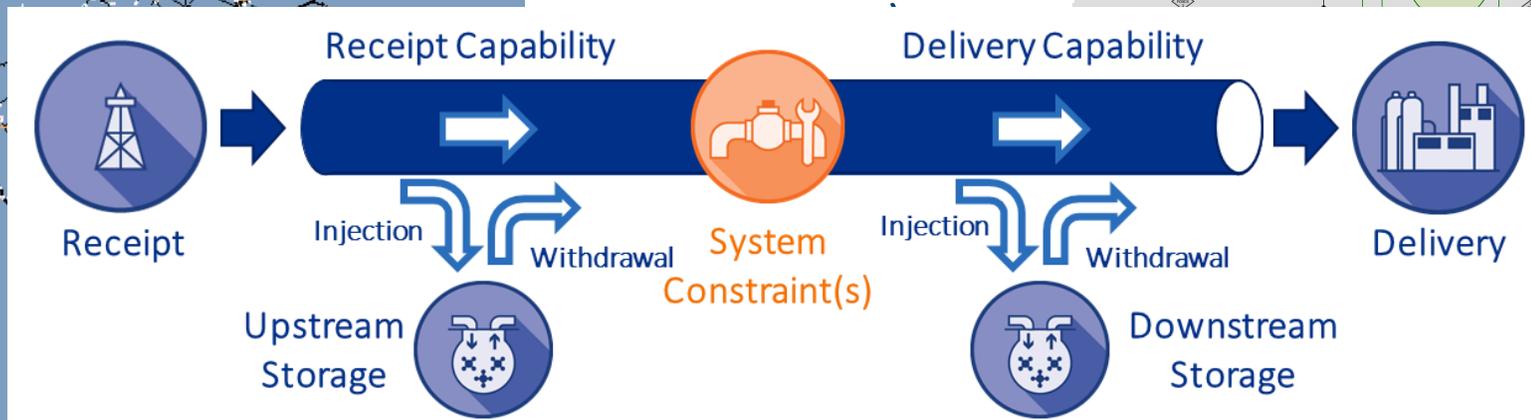
**Area specific delivery constraints will continue to be managed through current practices

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Detailed versus simplified system



Most simplified view
(for discussion)



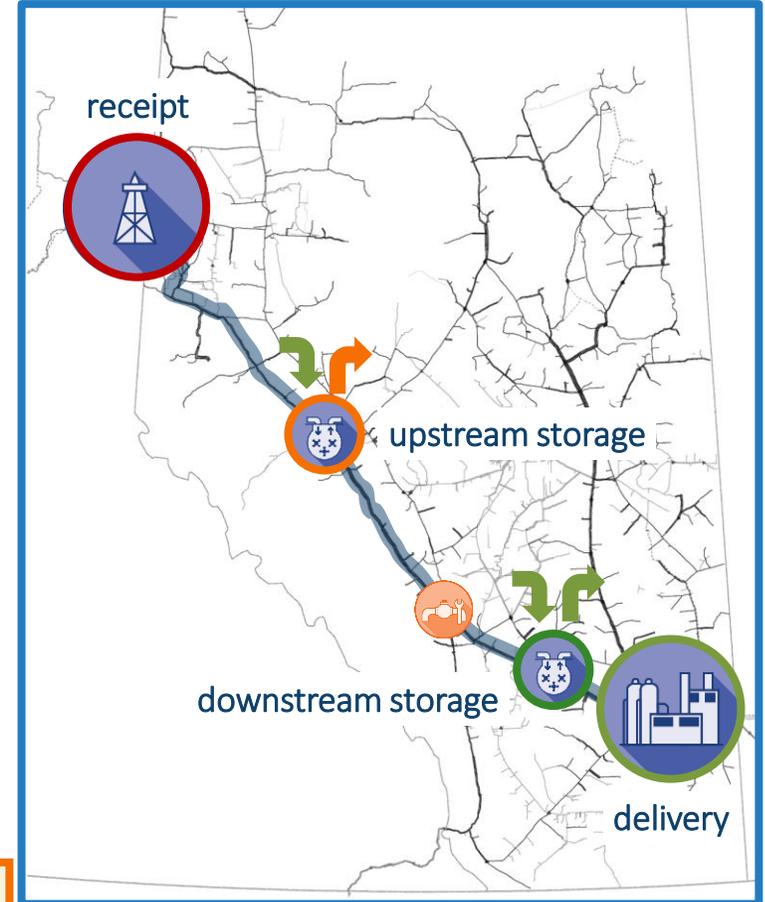
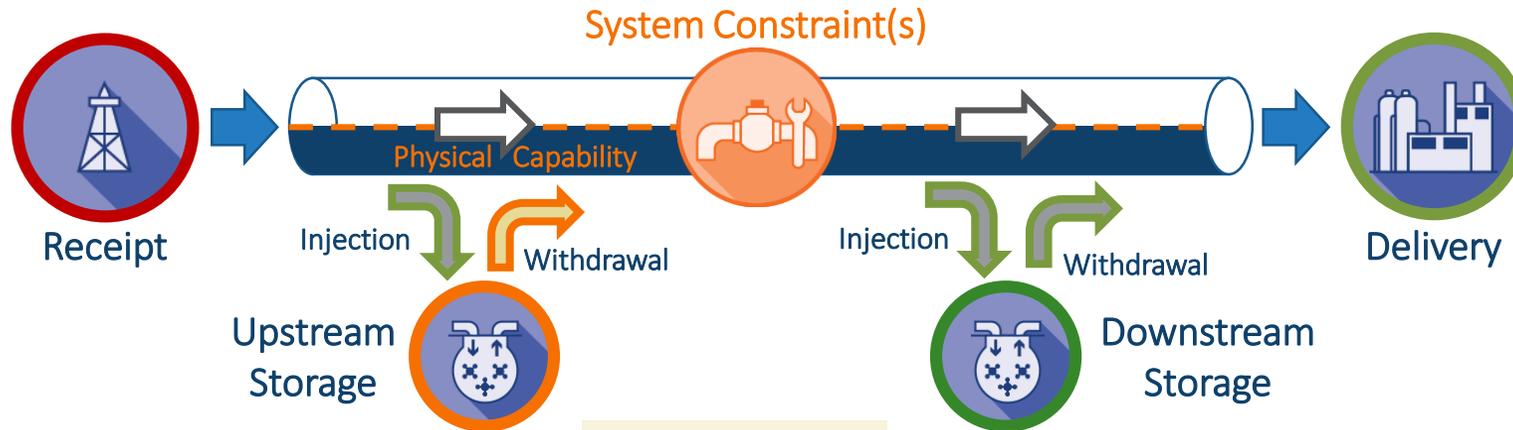
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Implications to Scenario C (from February 14 Customer Operations Meeting)

C

- ✓ Planned maintenance
- ✓ Maintenance is upstream of bottleneck
- ✓ Summer period

TEMPORARY SERVICE PROTOCOL ENACTED
Firm receipt service availability reduced



- firm receipt - FT-R %
reduced availability
- upstream injection - IT-S ✓
all services available
- Interruptible receipt - IT-R -
- upstream withdrawal - IT-S -

We Assess:
What FT-R Allowable Percentage will result in the necessary reduction in flow through the constraint(s)?

- ✓ FT-D - firm delivery all services available
- ✓ IT-S - downstream withdrawal all services available
- ✓ IT-D - interruptible delivery IT-S - downstream injection all services available

Throughput reduction through no IT-R/IT-S upstream withdrawal and reduced FT-R upstream

**Actual service authorizations will depend on several factors*

Implementation of Temporary Service Protocol is subject to NEB approval

Historical Example: June 11-14 NPS 36 NW Mainline Loop

Work: NPS 36 Northwest Mainline Loop, planned maintenance (June 11-14)

	Current Service Protocol	Temporary Service Protocol
USJR FT-R Allowable	100%	79.6%
EGAT IT Allowable	2%	100%*

System Impact (current system management strategies): Managed with IT-D reduction

System Impact (Temporary protocol):

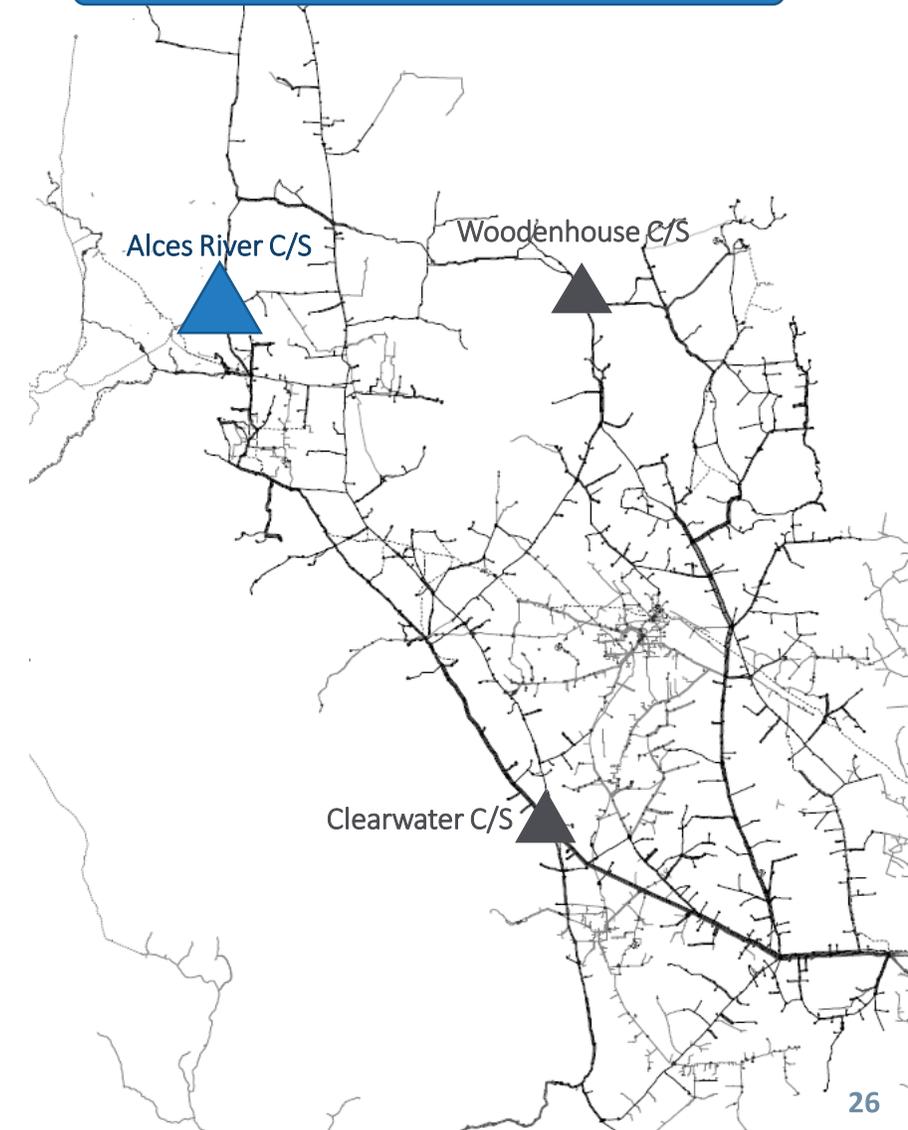
- EGAT/WGAT would be unaffected by this outage
- *EGAT/WGAT capabilities may have been influenced by other outages
- FT-R allowable would become 79.6% based on assumed 377 10⁶m³/d (13,308 mmcf/d) FT-R for greater USJR excl Segment 1 and an outage capability of 300 10⁶m³/d (10,590 mmcf/d) -> (300/377 = 79.6%)

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Illustrative example of Temporary Service Protocol: *Alces River station outage*

- Annual Maintenance at the Alces River Compressor Station
- Assumptions:
 - Planned, August 1-15, 2020
 - $10 \times 10^6 \text{m}^3/\text{d}$ loss of USJR receipt capability:
 - Base operational capability $345 \times 10^6 \text{m}^3/\text{d}$
 - Outage capability of $335 \times 10^6 \text{m}^3/\text{d}$
 - $20 \times 10^6 \text{m}^3/\text{d}$ of IT-D/IT-S (injection) flowing in EGAT/WGAT delivery areas
 - $480 \times 10^6 \text{m}^3/\text{d}$ total FT-R in USJR Area
- Current Practice:
 - reduce downstream IT-D by $10 \times 10^6 \text{m}^3/\text{d}$ to cause a corresponding reduction in USJR receipts
 - maintain 100% FT-R Allowable
- Practice under potential temporary service protocol:
 - Allow 100% IT-D or up to physical delivery capacity of EGAT and WGAT areas
 - Reduce FT-R in the USJR area to 70%:
 - Based on $335 \times 10^6 \text{m}^3/\text{d}$ USJR capability divided by total FT-R $480 \times 10^6 \text{m}^3/\text{d}$

Details in this example are hypothetical

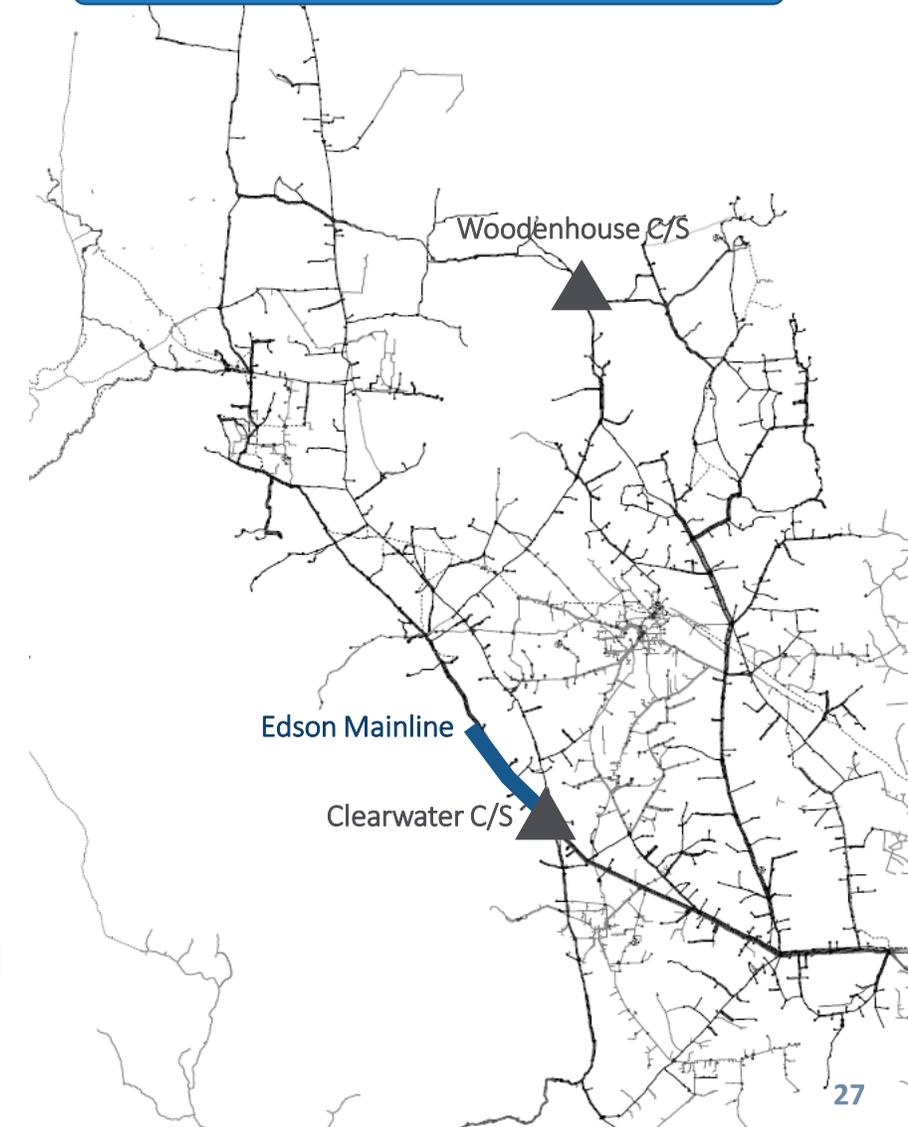


Implementation of Temporary Service Protocol is subject to NEB approval

Illustrative example of Temporary Service Protocol: *Edson Mainline pipe maintenance*

- Inline inspection along the Edson Mainline
- Assumptions:
 - Planned, October 20 to November 4, 2020
 - 28 $10^6\text{m}^3/\text{d}$ loss of USJR receipt capability (~ 1 Bcf/d)
 - Base operational capability 345 $10^6\text{m}^3/\text{d}$
 - Outage capability of 317 $10^6\text{m}^3/\text{d}$
 - 30 $10^6\text{m}^3/\text{d}$ of IT-D/IT-S (injection) flowing in EGAT/WGAT delivery areas
 - 480 $10^6\text{m}^3/\text{d}$ total FT-R in USJR Area
- Current Practice:
 - Reduce downstream IT-D to firm-only to cause necessary reduction in USJR receipts
 - Maintain 100% FT-R Allowable
- Practice under potential temporary service protocol:
 - Allow 100% IT-D or up to physical delivery capacity of EGAT and WGAT areas
 - Reduce FT-R in the USJR area to 66%
 - Based on 317 $10^6\text{m}^3/\text{d}$ USJR capability divided by total FT-R 480 $10^6\text{m}^3/\text{d}$

Details in this example are hypothetical

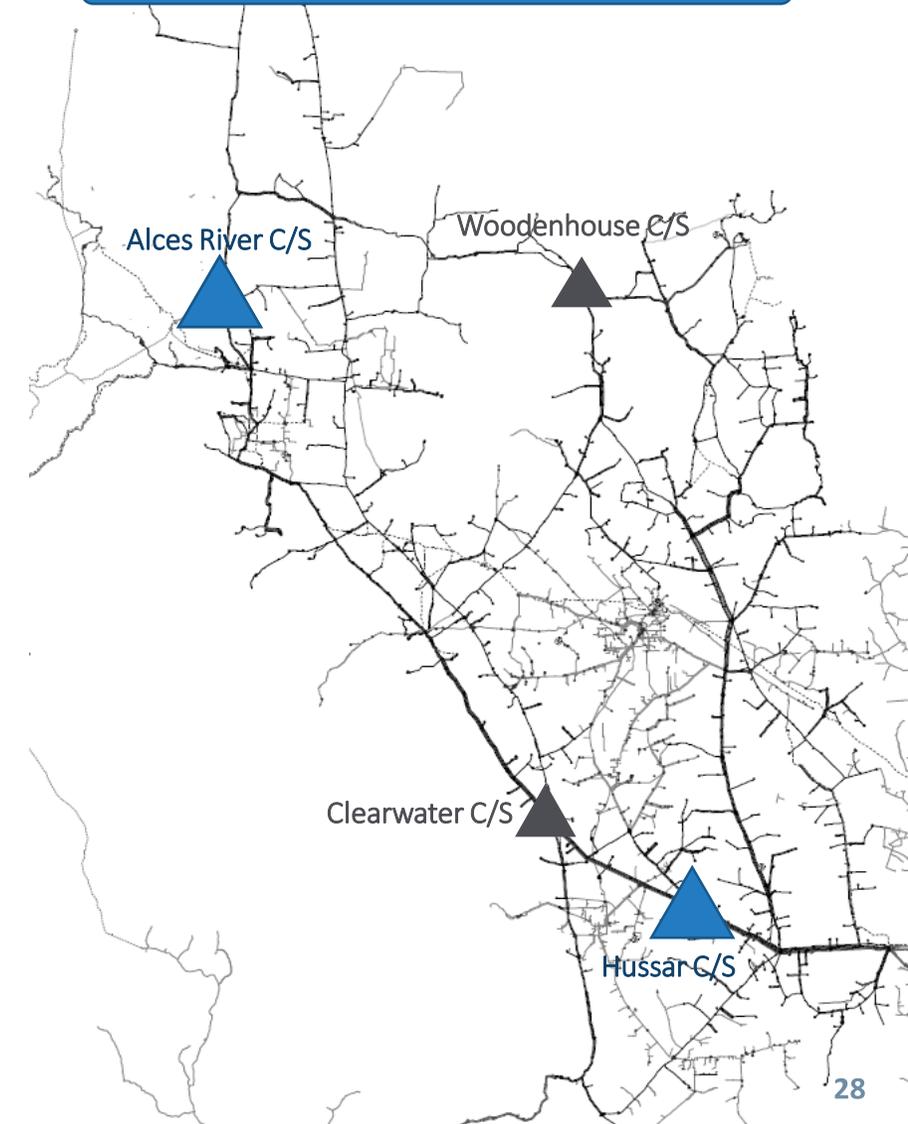


Implementation of Temporary Service Protocol is subject to NEB approval

Illustrative example of Temporary Service Protocol: *Concurrent Hussar station outage with Alces River station outage*

- Annual PM at both Hussar and Alces River compressor stations
- Assumptions:
 - Planned, August 1-15, 2020
 - 10 $10^6\text{m}^3/\text{d}$ loss of USJR receipt capability (due to Alces)
 - Base USJR operational capability 345 $10^6\text{m}^3/\text{d}$, outage capability of 335 $10^6\text{m}^3/\text{d}$
 - 15 $10^6\text{m}^3/\text{d}$ loss of EGAT delivery capability (due to Hussar Station)
 - 20 $10^6\text{m}^3/\text{d}$ of IT-D/IT-S (injection) flowing in EGAT/WGAT delivery areas
 - 480 $10^6\text{m}^3/\text{d}$ total FT-R in USJR Area
- Current Practice:
 - Reduce IT-D by 15 $10^6\text{m}^3/\text{d}$ to manage delivery capability loss due to Hussar Station.
 - Allow 100% FT-R USJR
 - Impact of Alces River is 'hidden' behind impact of Hussar Station
- Practice under potential temporary service protocol:
 - Unchanged – Hussar Station is the driver for throughput

Details in this example are hypothetical



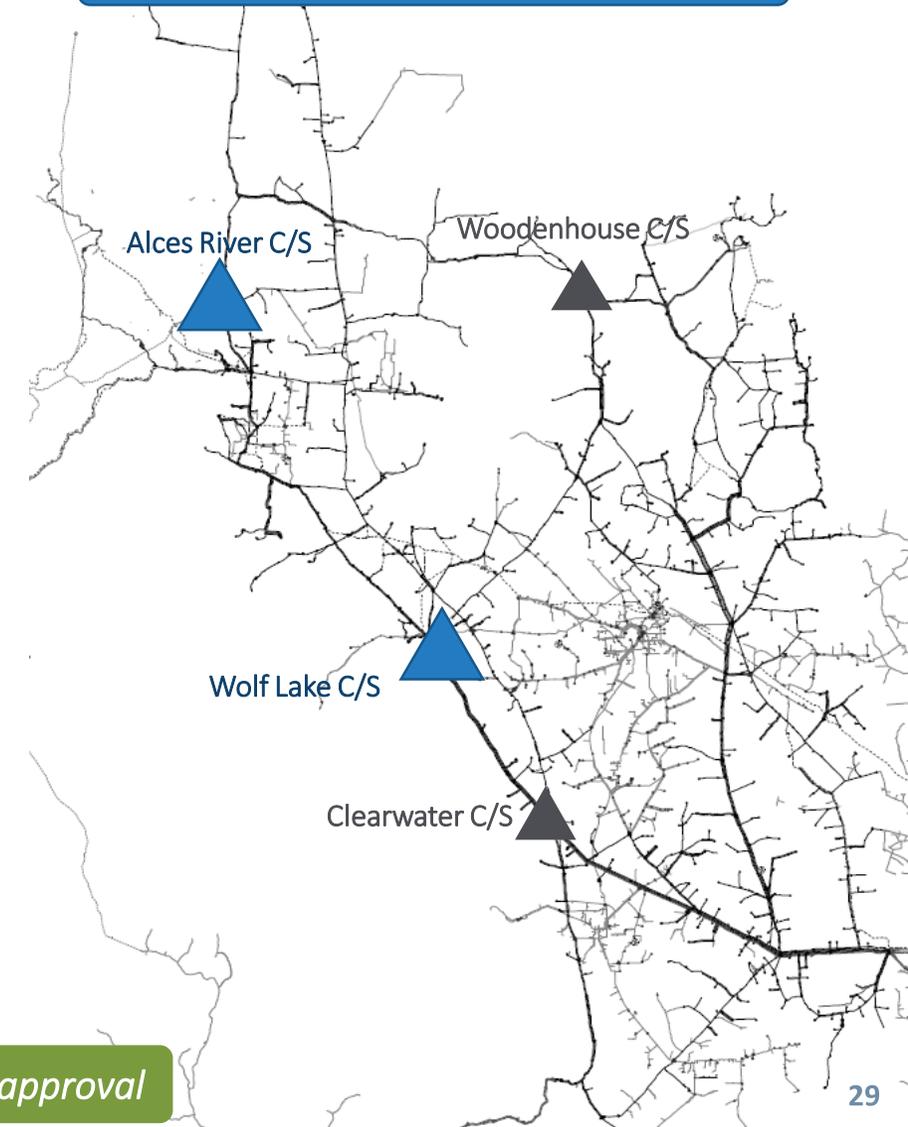
Implementation of Temporary Service Protocol is subject to NEB approval

Illustrative example of Temporary Service Protocol:

Concurrent unplanned Wolf Lake station outage with planned Alces River station outage

- Annual PM Alces River compressor station, unplanned outage at Wolf Lake compressor station
- Assumptions:
 - Alces - Planned, August 1-15, 2020
 - 10 $10^6\text{m}^3/\text{d}$ loss of USJR receipt capability (due to Alces)
 - Base USJR operational capability 345 $10^6\text{m}^3/\text{d}$, outage capability of 335 $10^6\text{m}^3/\text{d}$
 - Wolf Lake – Unplanned, August 5-??, 2020
 - 10 $10^6\text{m}^3/\text{d}$ incremental loss of USJR receipt capability (due to Wolf Lake Station)
 - 20 $10^6\text{m}^3/\text{d}$ of IT-D/IT-S (injection) flowing in EGAT/WGAT delivery areas
 - 480 $10^6\text{m}^3/\text{d}$ total FT-R in USJR Area
- Current Practice:
 - Reduce IT-D to Firm only to manage incremental loss of USJR receipt capability as a result of unplanned Wolf Lake Outage during Alces River planned work
 - Continue to allow 100% FT-R USJR, reduce FT-R allowable if required
- Practice under potential temporary service protocol:
 - August 1 – 5: manage via FT-R restriction (Alces is driver)
 - August 5 – ??: Depends on prognosis for Wolf Lake.....
 - In this example, likely remain at partial FT-R, adjust allowable percentage to manage capability loss
 - Considerations: capability loss is close to amount of IT-D available to be reduced – transition to 100% FT-R, 0% IT-D may not be sustainable

Details in this example are hypothetical



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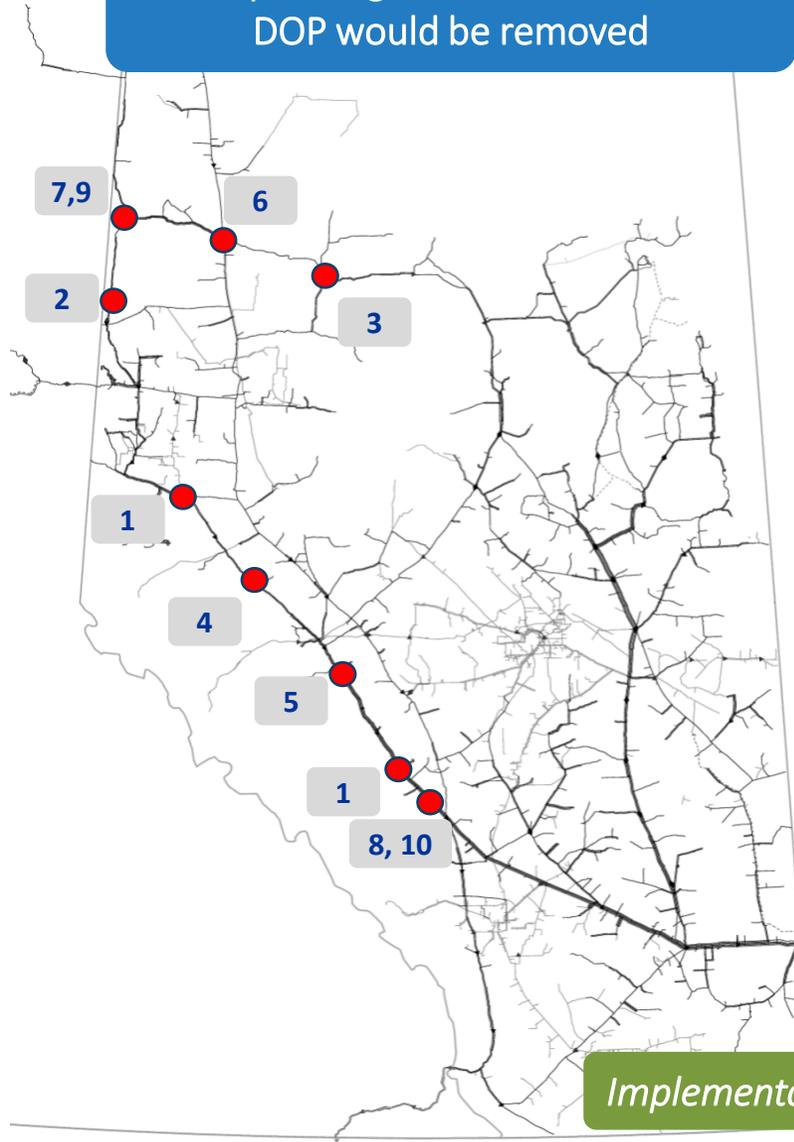


2019 OUTAGES

SUBJECT TO POTENTIAL CHANGE

2019 Potential Upstream James River Outages – Subject to NEB approval of Temporary Service Protocol

Corresponding EGAT/WGAT entries in DOP would be removed



Facility Outage	Planned Outage Timing	Current Service Allowable	Potential Revised Service Allowable	Capacity 10 ⁶ m ³ /day	
				Outage	Base
1. Vetchland & Gold Creek B1 <i>Compressor Station Maintenance</i>	Sep 3 – 6, 2019	Potential impact to FT-R	Partial impact to FT-R	293	309
2. Alces River <i>Compressor Station Maintenance</i>	Sep 7 - 13, 2019	Potential impact to FT-R	Partial impact to FT-R	292	309
3. Otter Lake <i>Compressor Station Maintenance</i>	Sep 7 - 15, 2019	Potential impact to FT-R	Partial impact to FT-R	292	309
4. Berland River <i>Compressor Station Modifications</i>	Sep 16 - 25, 2019	Potential impact to FT-R	Partial impact to FT-R	288	309
5. Wolf Lake <i>Compressor Station Modifications</i>	Sep 26 – Oct 2, 2019	Potential impact to FT-R	Partial impact to FT-R	299	309
6. Meikle River C <i>Compressor Station Maintenance</i>	Oct 15 – 19, 2019	Potential impact to FT-R	Partial impact to FT-R	298	312
7. Hidden Lake <i>Compressor Station Maintenance</i>	Oct 25 – Nov 3, 2019	Potential impact to FT-R	Partial impact to FT-R	306	312
8. Clearwater 5 <i>Compressor Station Maintenance</i>	Oct 28 – 31, 2019	Potential impact to FT-R	Partial impact to FT-R	307	312
9. Hidden Lake North <i>Compressor Station Maintenance</i>	Oct 28 – Nov 3, 2019	Potential impact to FT-R	Partial impact to FT-R	298	312
10. Clearwater <i>Compressor Station Maintenance</i>	Oct 30 – Nov 10, 2019	Potential impact to FT-R	Partial impact to FT-R	325	335

Outage date, duration, and impact may be subject to change. Refer to DOP for all planned outages with potential service impact.

Implementation of Temporary Service Protocol is subject to NEB approval

Conclusion

- 2020 maintenance plan to be communicated in Q4 2019 via Customer Ops meeting
- No changes will be made to system management practices or DOP in advance of NEB decision
 - Upon NEB decision NrG bulletin will be issued informing market of the outcome
 - If approved, NrG bulletin will include the start date and DOP will be updated

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