

NGTL System and Foothills Pipe Lines Ltd.

Customer Operations Meeting

February 14, 2019



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.

Potential impact to FT

Refers to outage periods where there is increased potential of FT impact. In some instances IT services may be authorized.

Partial impact to FT Refers to outage periods where FT impact is expected

Welcome and thank you for joining us!

Safety:

- In case of alarm or emergency, please proceed immediately to the ground-level exit
- Nearest stairs to ground-level exit are outside this room and directly to the left
- Muster points are located on the plus-15 level of TransCanada tower and Suncor Energy Centre

Participating via WebEx:

- Please sign-in through WebEx application <u>including your full name and company</u>
- 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

Safety Moment: Winter Driving Checklist



Blanket

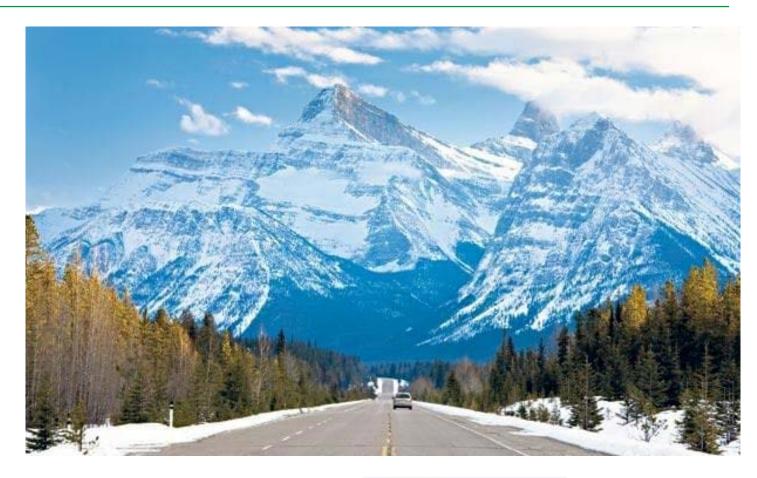
- Flashlight with extra batteries
- Ice Scraper and Snowbrush
- **Booster Cables**
 - Extra Clothing and Footwear
- **Emergency food**



Spare Tire



Phone and car charger





Dial 5-1-1 www.511.Alberta.ca У @511Alberta





- 1. NGTL System Operations Management
- 2. 2018 Firm Transportation Availability Review
- 3. 2019 Operational Outlook Update



- 1. NGTL System Operations Management
- 2. 2018 Firm Transportation Availability Review
- 3. 2019 Operational Outlook Update

Note on Natural Gas Advisory Panel (NGAP) Report "Roadmap to Recovery: Reviving Alberta's Natural Gas Industry"

- NGTL is reviewing the recommendations contained in the report
- NGTL's Tolls, Tariff, Facilities & Procedures (TTFP) committee is the appropriate venue for discussing policy related issues
- In reference to the report's recommendation for NGTL to reverse its 2017 "restriction protocol", NGTL will continue to follow its guiding principles of prioritizing firm service and optimizing throughput
- NGTL is participating in the Government of Alberta's process related to the report
- Customer Operations meetings are intended to provide education on NGTL system operations and communicate outage-related information

NGTL System Operations Management

Purpose: Provide awareness and education surrounding outages and throughput management as it relates to both upstream receipt and downstream delivery services

System Planning Fundamentals

- Flow Forecast
- Facility Requirements

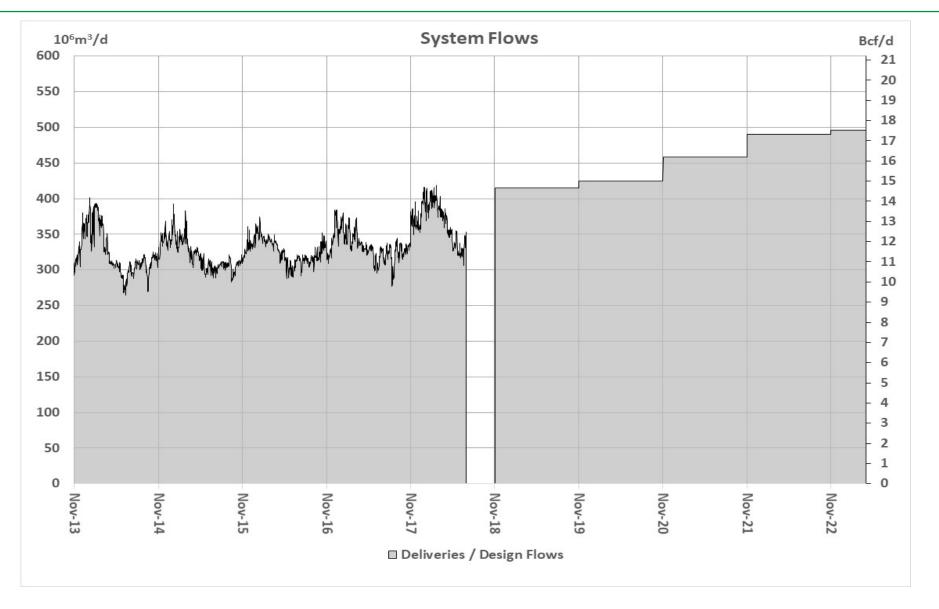
System Operations Fundamentals

- 1. Guiding Principles
- 2. Supply Demand Balance
- 3. System Linepack

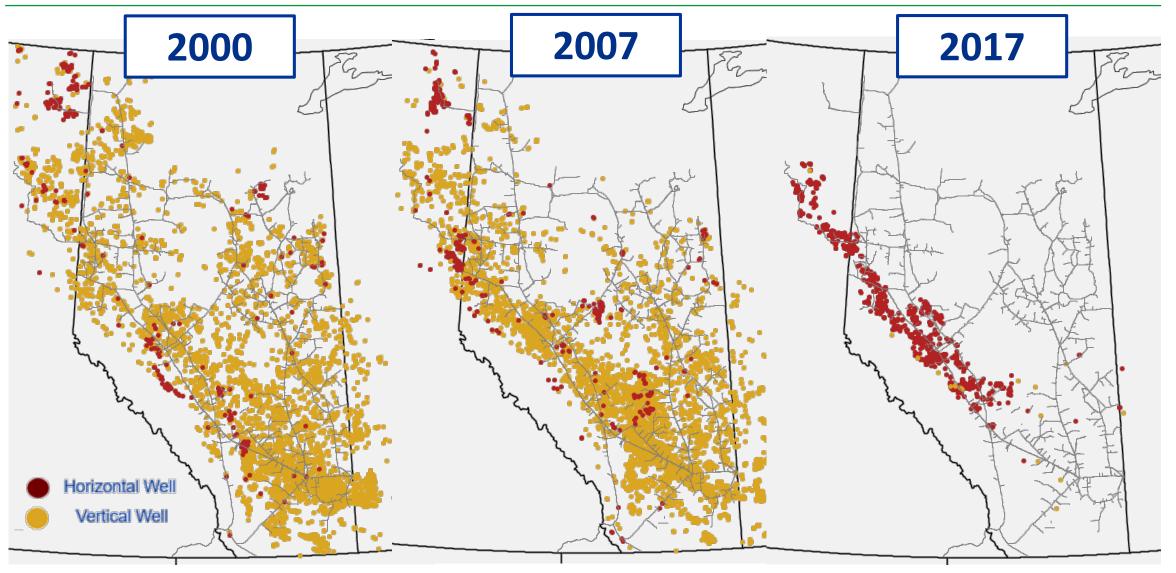
Throughput Management Fundamentals

- 4. Impact Assessment Capability and Area
- 5. Outage Reporting DOP and NrG Highway
- 6. Throughput Management Receipt and Delivery Service Availability

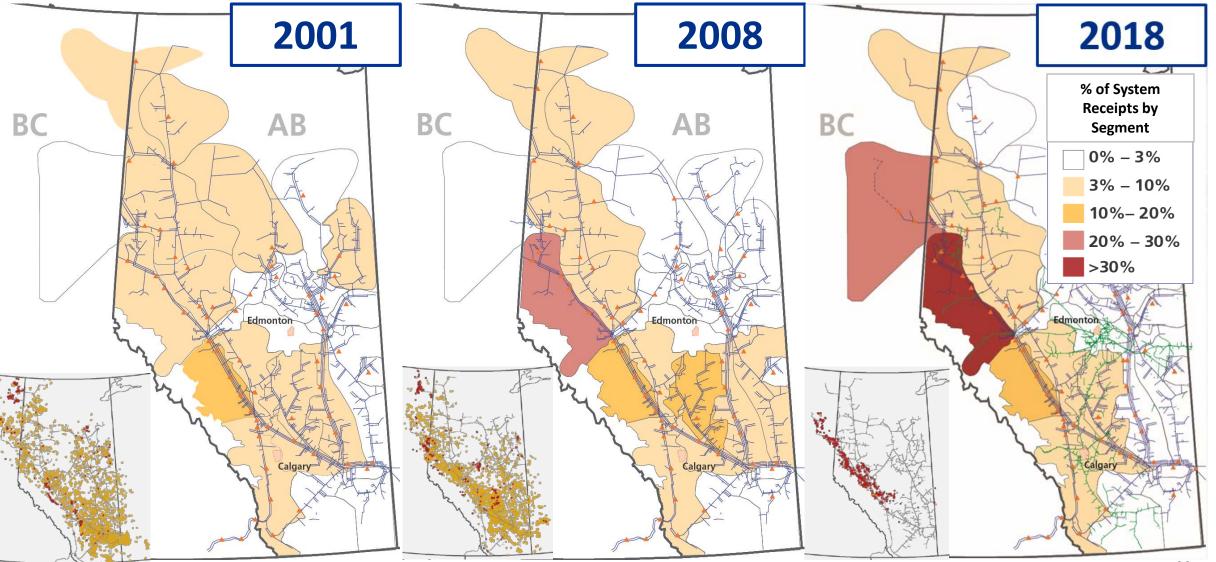
System Throughput



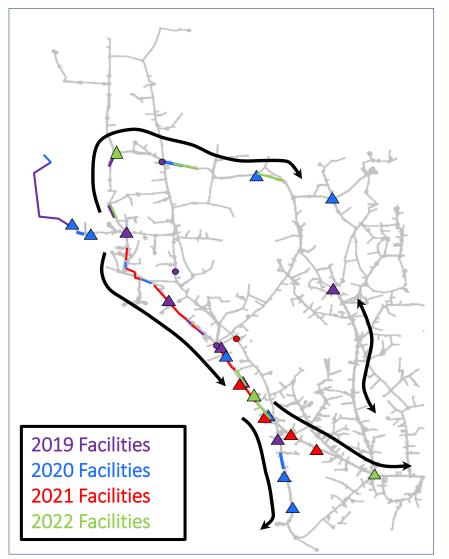
Evolution of Drilling Activity



System Supply Distribution



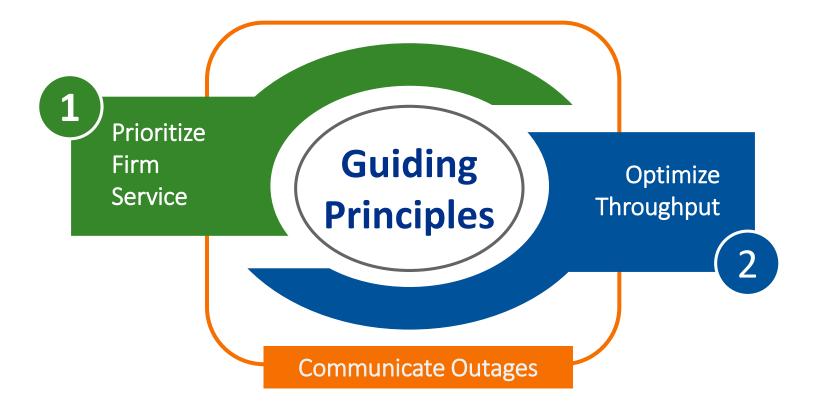
2018-2022 Expansion Facilities



- 3.1 bcf/d of incremental demand growth both intra-basin demand and at export locations
- Continuing to connect new supply and addressing geographic supply shift
- Planning and scheduling outages in a way that minimizes impact while achieving the required onstream timing

System Operation - Guiding Principles

General Terms and Conditions of the NGTL tariff state that firm transportation service must be prioritized ahead of interruptible transportation service



Linepack and Supply Demand Balancing



System supply will match system delivery within the range governed by the Supply Demand Balance Zone (SDBZ) aka 'tolerance'

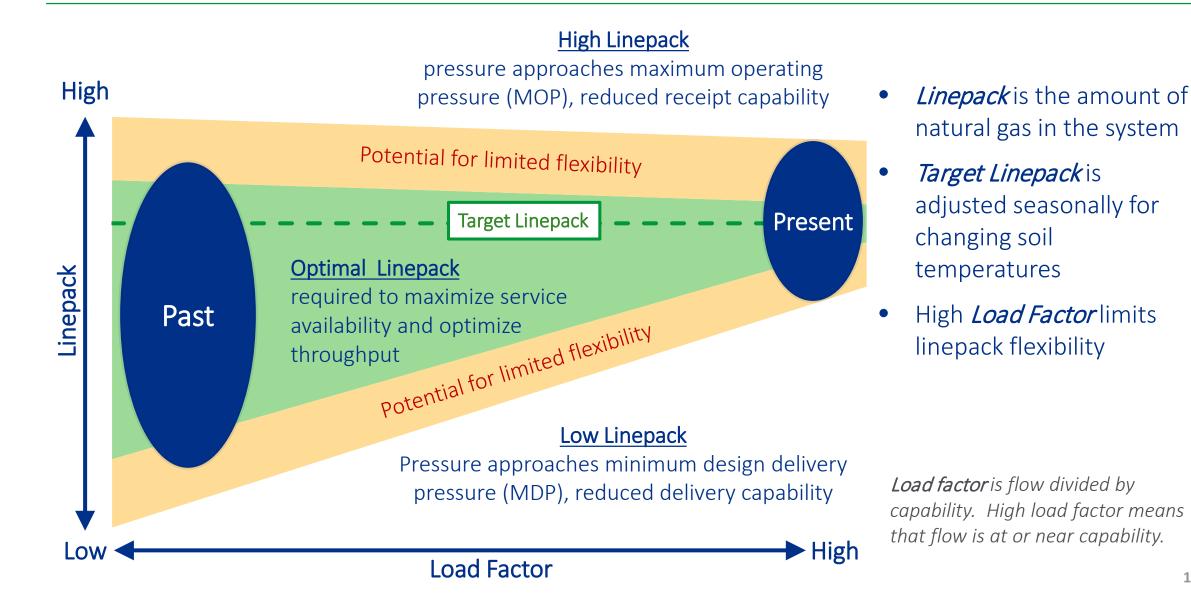
 Variations in field receipts and gas consumption are balanced by customer adjustment of storage utilization

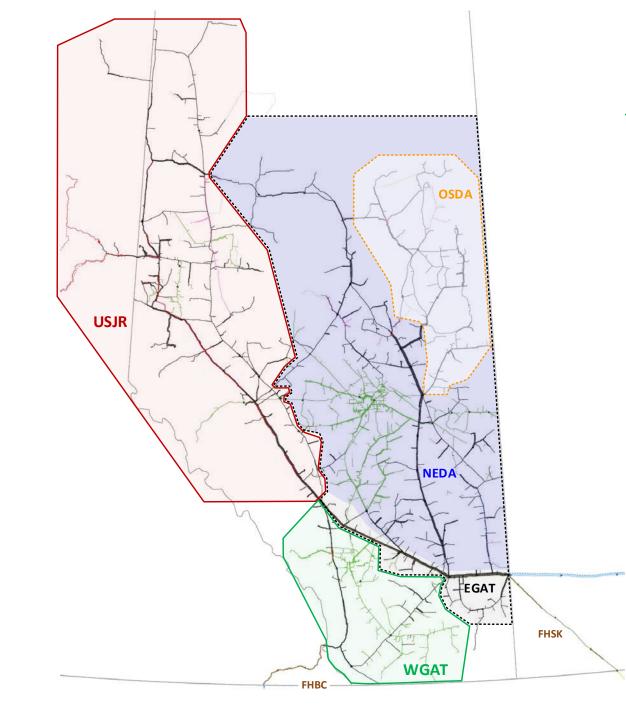


System linepack near target is *required* to maximize FT reliability and optimize throughput

- Periodic adjustment through purchase/sale, changing soil temperature
- Maintain aggregate Operating Balance Account (OBA) balance near zero
- Adjust SDBZ aka 'tolerance' if required to maintain customer supply demand balance in required range

Linepack Fundamentals





Area Definitions

USJR, Upstream James River receipt area

WGAT, Western Gate delivery area

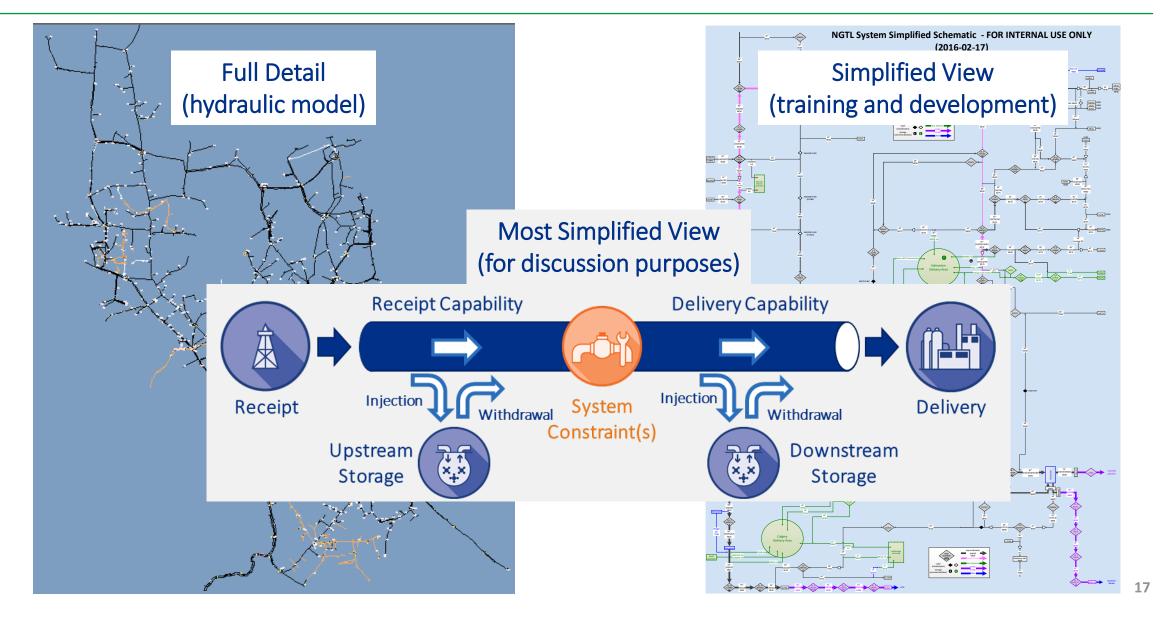
EGAT, Eastern Gate delivery area

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

FHBC, Foothill B.C. System

FHSK, Foothills Sask. System

Detailed versus Simplified System



Detailed versus Simplified - Common Complexities

Multiple system constraints:

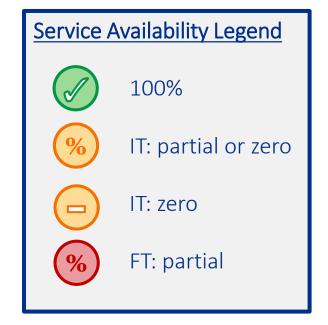
• often affect one another and not intuitive, assess through simulation

Highly dynamic receipts and deliveries:

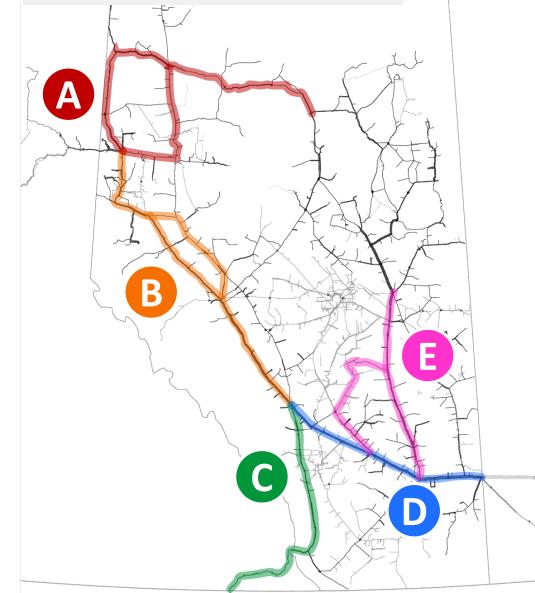
- Distribution of both receipts and deliveries affect both capability and area of impact
- Supply demand imbalance, linepack, and throughput volatility make system optimization difficult

Facility availability and performance:

- Planned maintenance is strategically planned to minimize impact
- Unplanned maintenance and facility performance is addressed expeditiously



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



Flow Path Relationships and Impact Assessment

Potential for reduced service availability:

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

<u>Simulation Input (order of significance)</u>:

- 1. Facility availability (outages)
- 2. Supply demand distribution
- 3. Pipeline MOP constraints
- 4. Air and soil temperature

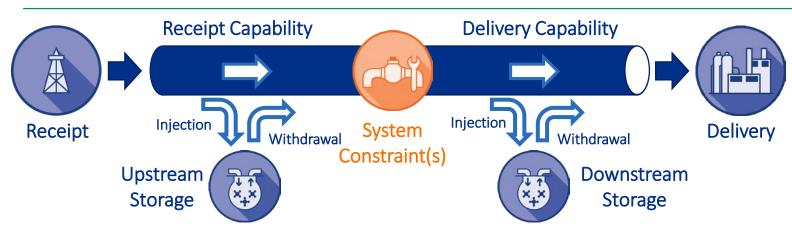
Simulation Output:

- IT-R/IT-S withdrawal area of impact and capability (associated IT-D/IT-S injection area of impact)
- FT-R area of impact and capability

Outage Communication: as soon as information available

- Initial and revised assessments, DOP
- Finalized and confirmed assessment, NrG Highway

Storage and Operational Capability



Operational Capability influenced by storage:

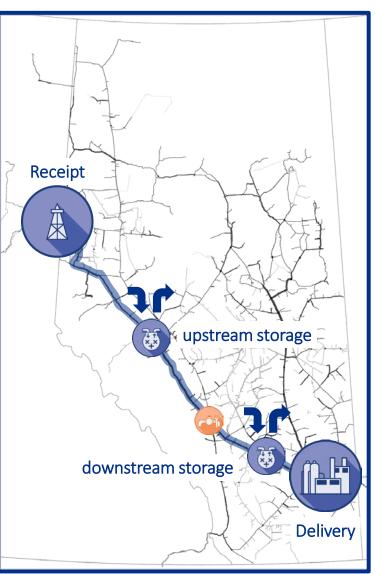
- Storage activity is dynamic and unpredictable
- Operational capability assumes zero storage injection/withdrawal

Storage Upstream of Constraint(s):

- Injection acts as a local market which increases receipt area capability
- Withdrawal shares available receipt capability

Storage Downstream of Constraint(s):

- Withdrawal acts as a local supply which increases delivery area capability
- Injection shares available delivery capability



How do I know where and when interruptible delivery and storage injection will be available?

System constraint(s) describes the location(s) on the system where flow capability is reduced

Upstream of system constraint(s)

- Deliveries and storage injection increase the receipt capability local 'market' for area receipts
- ✓ Deliveries and storage injection generally available and helpful

Downstream of system constraint(s): IT available....

- \checkmark ...when delivery capability exceeds firm delivery flow
- \checkmark ...when interruptible delivery served by downstream storage withdrawal
 - periods of high gas consumption related to Alberta weather, periods of reduced supply
- ✓ ...when elimination of IT will not achieve the required flow reduction, FT receipt restriction required
 - receipt flow governed by firm receipt allowable flow not downstream IT allowable

How do I know which areas and services will be affected during outages?

During periods of upstream and downstream storage withdrawal...

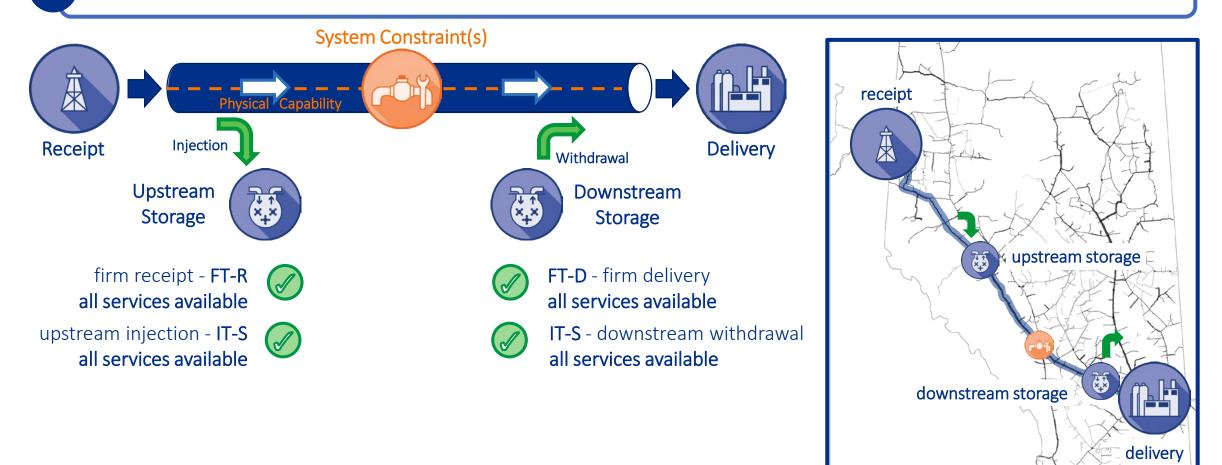
A Limit IT-R/IT-S withdrawal availability upstream of system constraint(s)

Guiding Principle Linepack at Target Supply Demand in Balance

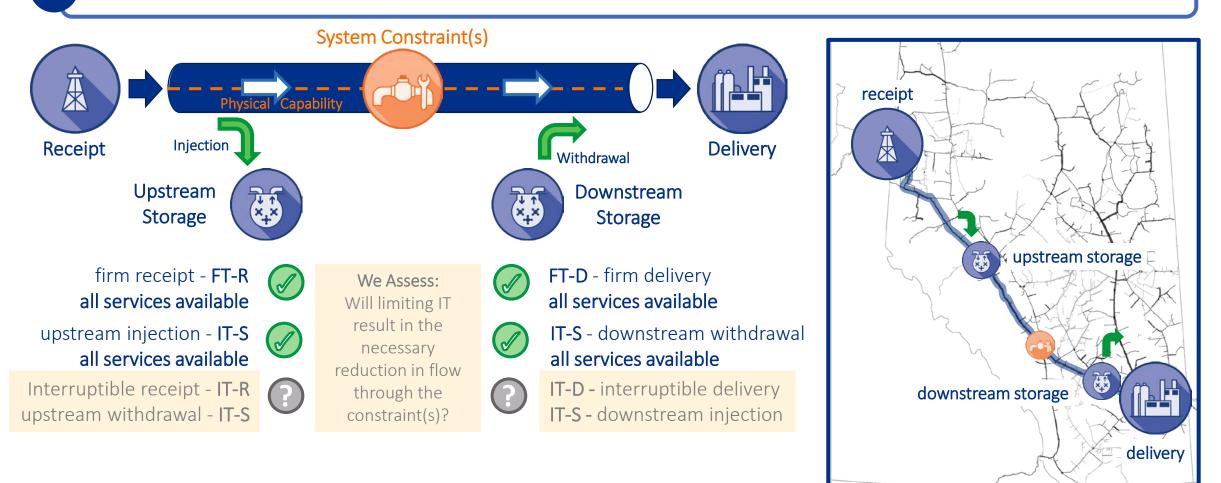
Required

Fundamentals

Limiting interruptible receipt service availability - typical during periods of upstream and downstream storage withdrawal



Limiting interruptible receipt service availability - typical during periods of upstream and downstream storage withdrawal



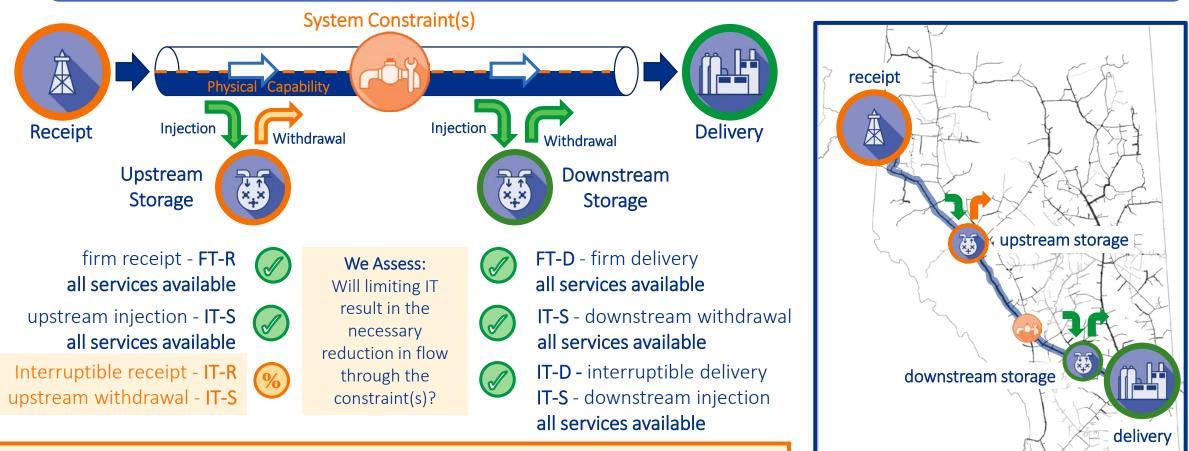
Guiding Principle

Linepack at Target

Supply Demand in Balance

Required

Limiting interruptible receipt service availability - typical during periods of upstream and downstream storage withdrawal



Yes, but limited or no downstream IT present therefore, throughput reduction through reduced IT-R/IT-S withdrawal availability

*Actual service authorizations will depend on several factors

Guiding Principle

Linepack at Target

Supply Demand in Balance

Required

How do I know which areas and services will be affected during outages?

During periods of upstream and downstream storage withdrawal...

Limit IT-R/IT-S withdrawal availability upstream of system constraint(s)

During periods of upstream and downstream storage injection, <u>and</u> if FT restriction can be avoided through IT limitation...

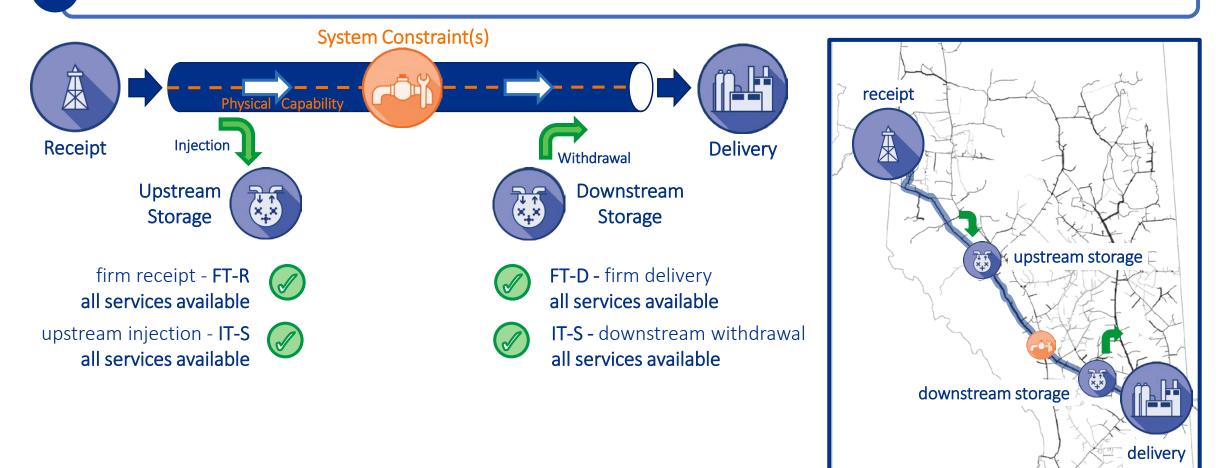
- B Limit IT-R/IT-S withdrawal availability upstream <u>and/or</u> IT-D/IT-S injection availability downstream of system constraint(s)
 - Supply Demand Balance: less downstream delivery = less upstream receipt
 - IT-D in NW and NE Alberta may be excluded, local deliveries increase receipt capability

Guiding Principle Linepack at Target Supply Demand in Balance

Required

Fundamentals

Preservation of firm receipt service availability – typical during periods of downstream storage injection

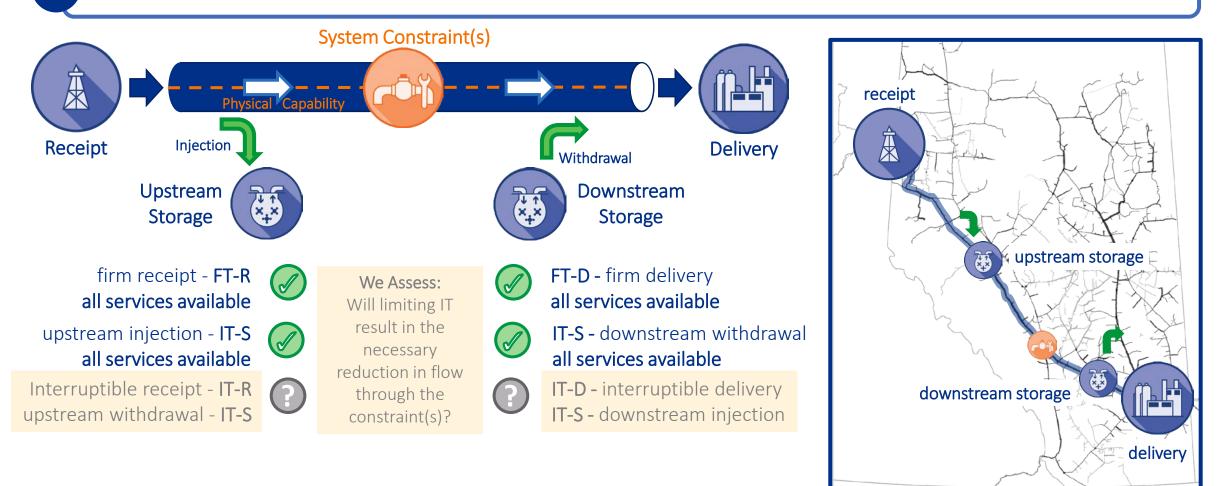


B

Guiding Principle Linepack at Target **Fundamentals** Supply Demand in Balance

Required

Preservation of firm receipt service availability – typical during periods of downstream storage injection



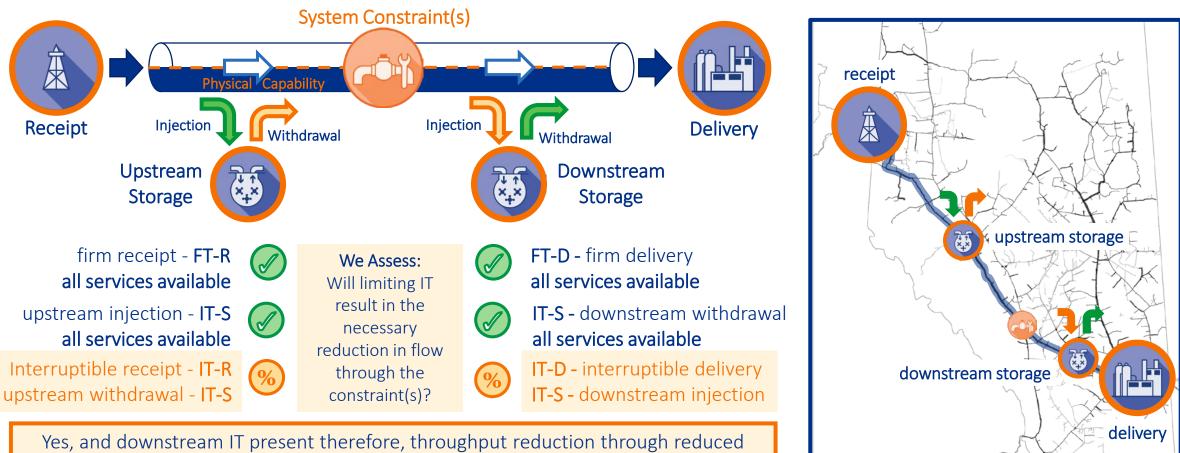
B

Simplified Outage Management Scenarios Fundamentals

Guiding Principle Linepack at Target Supply Demand in Balance

Required

Preservation of firm receipt service availability – typical during periods of downstream storage injection



IT-R/IT-S withdrawal and/or IT-D/IT-S injection availability

B

How do I know which areas and services will be affected during outages?

During periods of upstream and downstream storage withdrawal...

Limit IT-R/IT-S withdrawal availability upstream of system constraint(s)

During periods of upstream and downstream storage injection, <u>and</u> if FT restriction can be avoided through IT limitation...



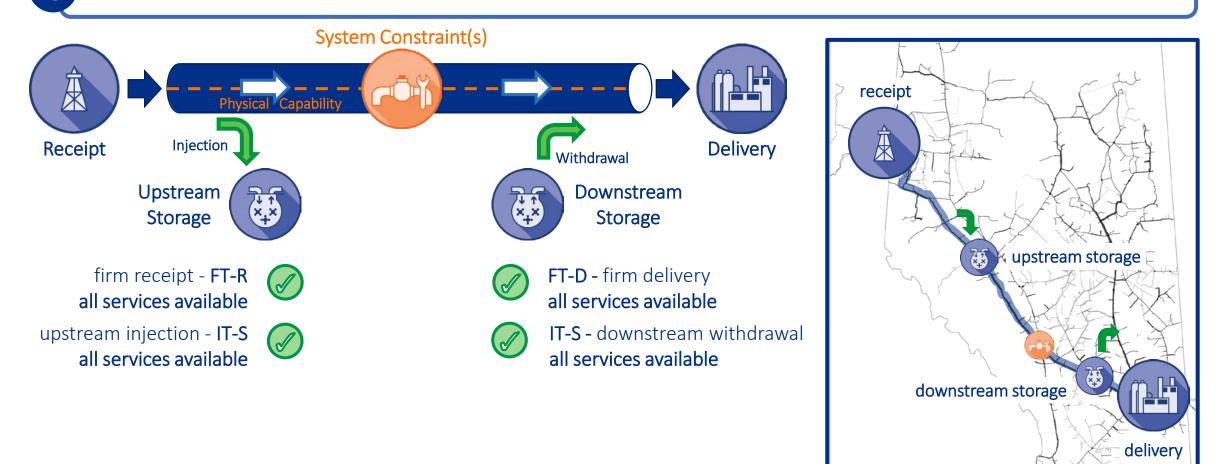
- Limit IT-R/IT-S withdrawal availability upstream **<u>and/or</u>** IT-D/IT-S injection availability downstream of system constraint(s).
 - Supply Demand Balance: less downstream delivery = less upstream receipt
 - IT-D in NW and NE Alberta may be excluded, local deliveries increase receipt capability

When FT restriction cannot be avoided through IT limitation...



- No IT-R/IT-S upstream withdrawal and reduced FT-R upstream
- Upstream receipt governed by % FT allowable: Downstream IT limitation no longer affects upstream receipt flow
- Segment 1 FT-R typically not included as local receipts required for operability of compression
- DOP: Potential for downstream IT limitation is removed

Firm receipt service availability reduced - required when flow reduction through limitation of IT is insufficient



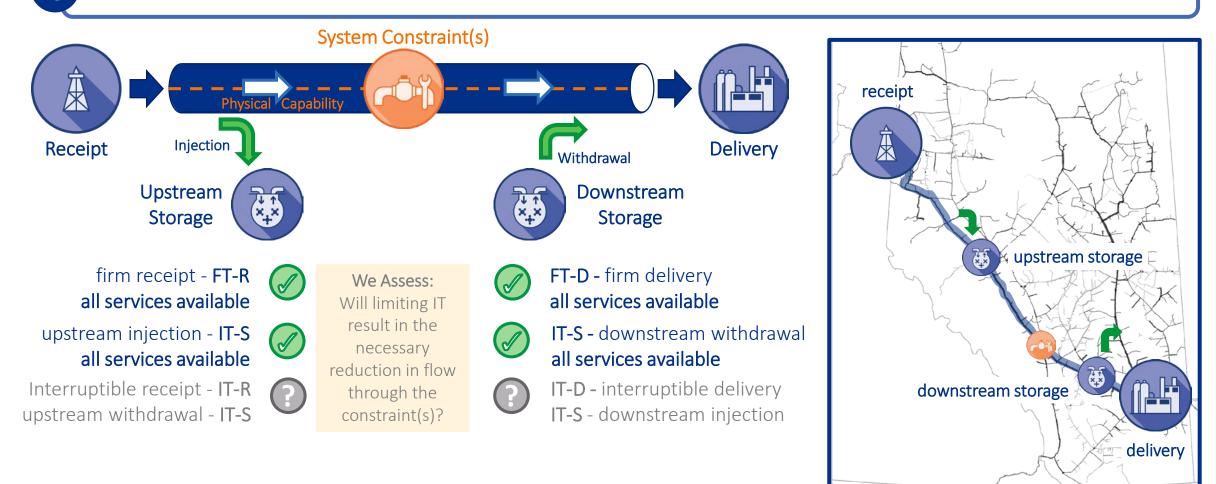
Guiding Principle

Linepack at Target

Supply Demand in Balance

Required

Firm receipt service availability reduced - required when flow reduction through limitation of IT is insufficient



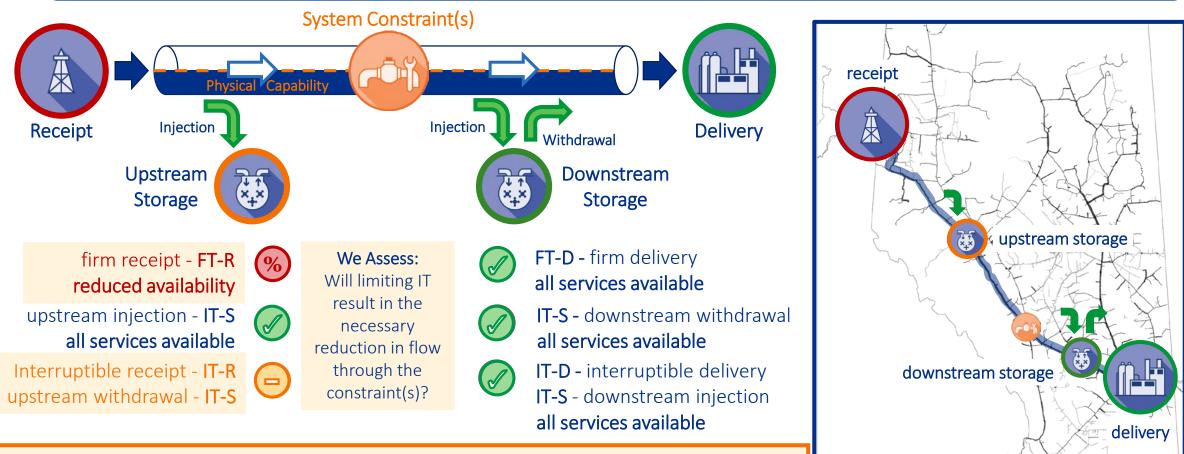
Guiding Principle

Linepack at Target

Supply Demand in Balance

Required

Firm receipt service availability reduced - required when flow reduction through limitation of IT is insufficient



No because downstream IT is insufficient or downstream withdrawal is present therefore, throughput reduction through no IT-R/IT-S upstream withdrawal <u>and</u> reduced FT-R upstream

*Actual service authorizations will depend on several factors

Guiding Principle

Linepack at Target

Supply Demand in Balance

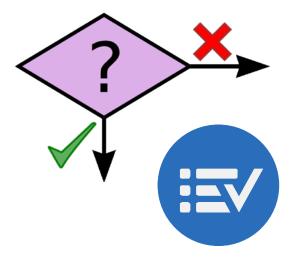
Required

Outage Communication Interpretation – USJR Receipt Area



Partial Impact to FT-R: Highly confident FT limitation is required Lower likelihood of limiting IT downstream of the system constraint(s)

- Potential for downstream IT limitation remains if outage affects both receipt and delivery capability
- Confirmation of allowable and area via NrG Notice



Potential Impact to FT-R along with **No Impact to FT-D anticipated:** FT limitation not expected

Higher likelihood of limiting IT downstream of the system constraint(s)

- Potential remains to avoid upstream FT impact with downstream IT limitation
- Downstream entries removed from DOP close to outage execution if
 - a) there is no downstream IT utilization, or
 - b) FT-R limitation is unavoidable

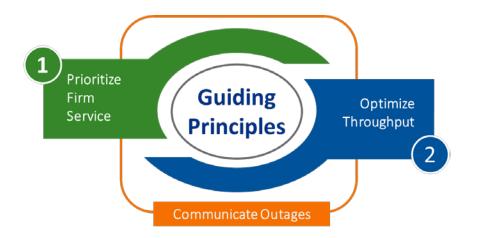
NGTL System Operations Management

- *Guiding Principles* and *Fundamentals* such as supply demand in balance and linepack at target are prerequisites to prioritize FT and optimize throughput
- *Outages on egress paths from the USJR receipt area* may affect receipt, storage, and delivery services in different ways depending on the circumstances at the time of the outage
- *Complexities and dynamics of the system operation and throughput* make prediction difficult and leads to various service availability scenarios
- Flow through constrained areas will be reduce by *limiting IT services first if beneficial*, followed by FT services if necessary
- Most USJR area outages described in DOP are either:
 - *Partial FT* high confidence FT limitation is required, low likelihood of downstream IT limitation
 - *Potential FT* limitation of upstream and/or downstream IT is expected to avoid FT limitation



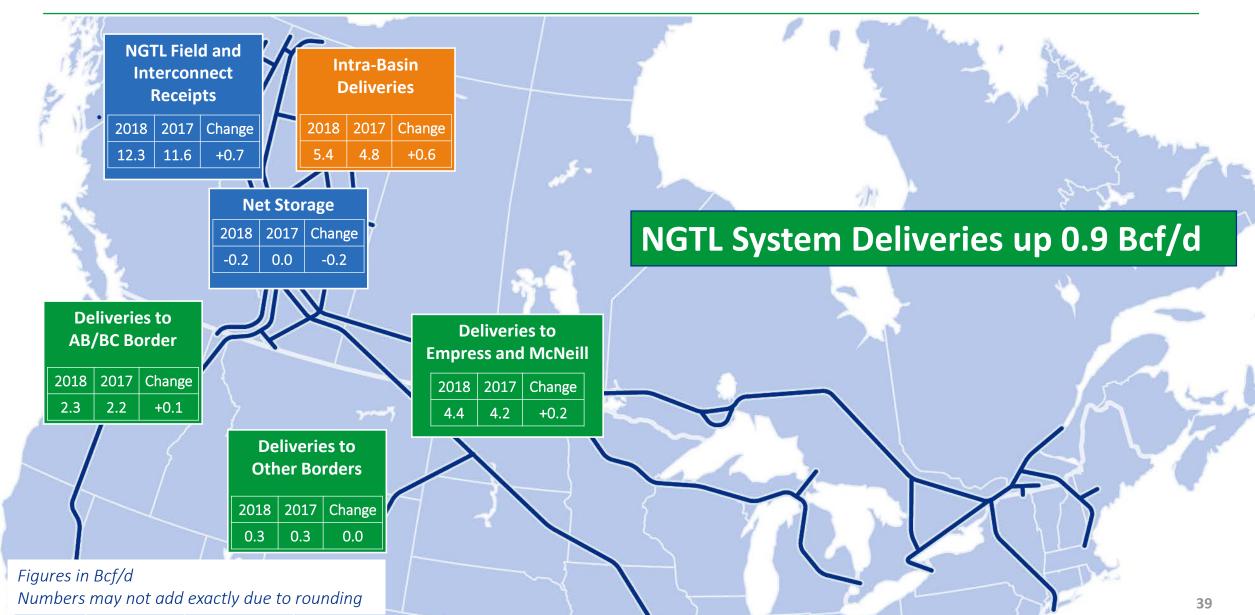
- 1. NGTL System Operations Management
- 2. 2018 Firm Transportation Availability Review
- 3. 2019 Operational Outlook Update

Recap: NGTL Guiding Principles



- Drivers for Outages:
 - New Facility Additions
 - Planned & Unplanned Maintenance
 - Dynamic System Conditions
- Integrated Planning Process with emphasis on maximizing firm service availability
 - Maintenance events planned, bundled and executed to minimize firm-service impacting days
- Unplanned events communicated in a timely manner with most up to date information
 - High focus on timely return to service of affected equipment

NGTL System Average Volumes



Service Availability – Upstream James River (USJR)



 \mathbb{A}

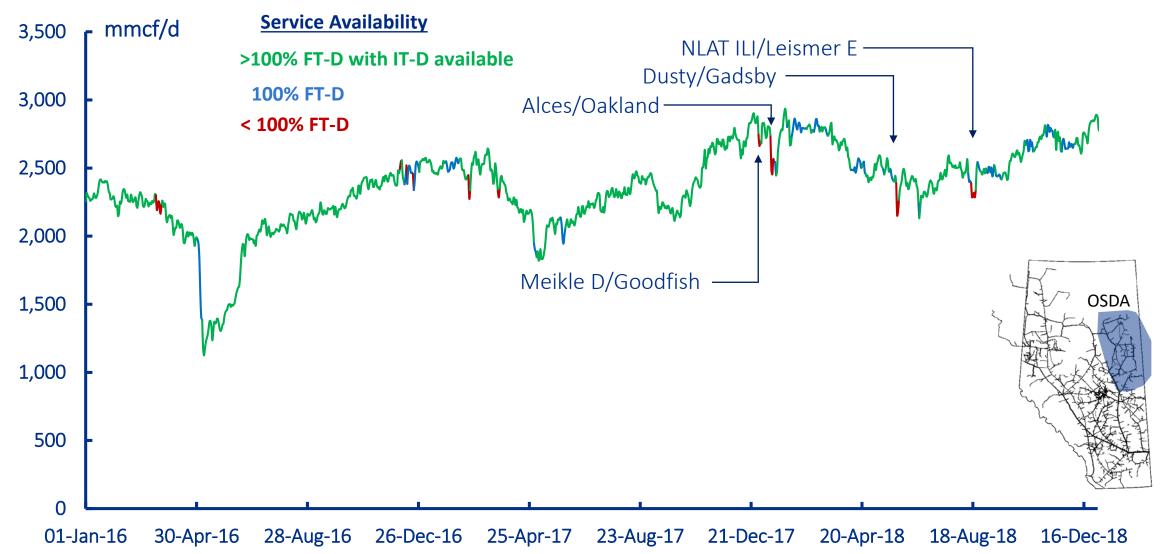
USJR Summary

Å

- Planned Events:
 - Expansion related activities
 - Saddle Hills & Gordondale Lateral Loop No.3 Tie-ins
 - Maintenance
 - Goodfish CS, GPML Inline Inspections
- Unplanned Events:
 - Unplanned Compression
- Total Days (2018): 28
- Total Days (2017): 55

Service Availability – Oil Sands Delivery Area (OSDA)



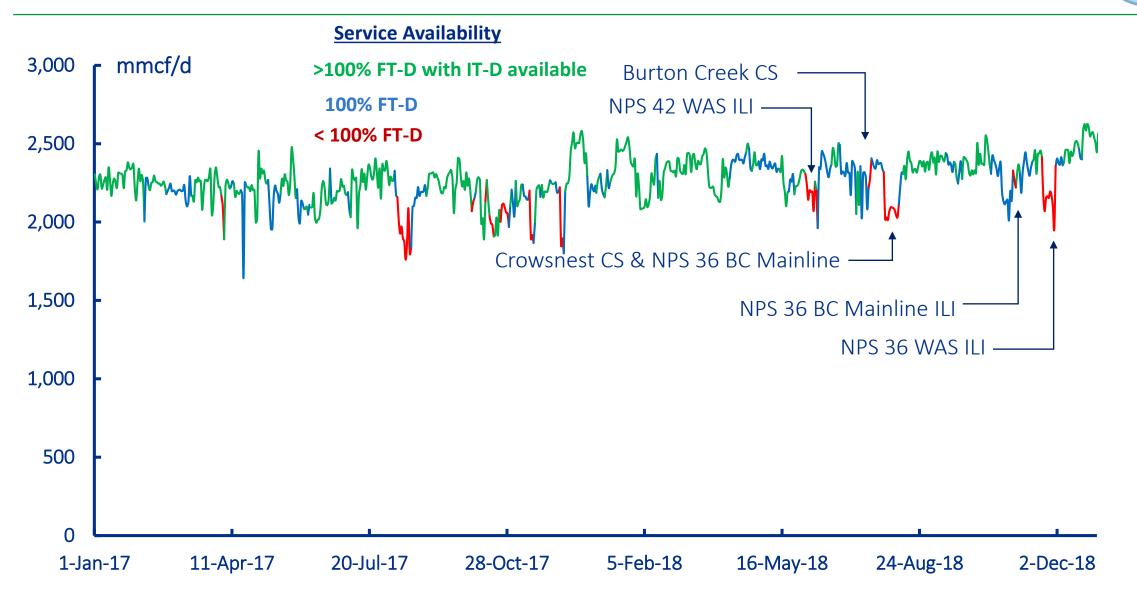


OSDA Summary



- Restrictions shown affected NEDA area data shown for OSDA which is a subset of the NEDA area
- Planned Events:
 - Compressor Maintenance (Dusty/Gadsby)
- Unplanned Events:
 - Compressor Outages
 - Meikle D/Alces River/Goodfish/Oakland
 - Inline Inspection of NLAT 24/30
 - Higher than anticipated deliveries
- Total Days (2018): 17
- Total Days (2017): 8

Service Availability – West Gate (WGAT) & Foothills BC (FHBC)



WGAT Summary

WGAT Area

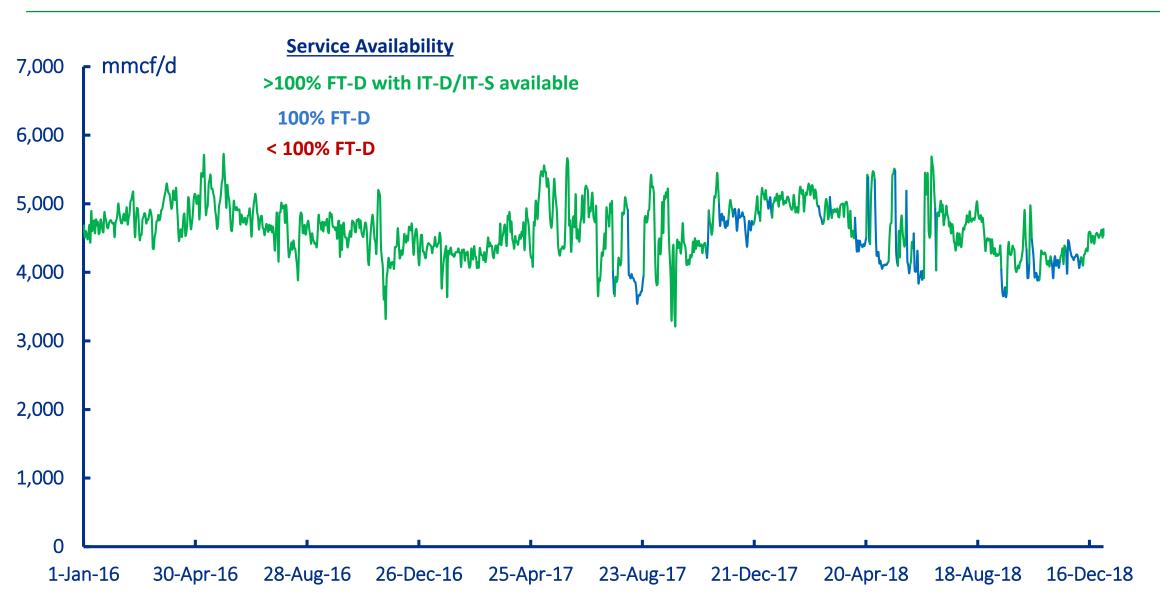
- Planned Events:
 - 5 Planned Inline Inspections (WAS Mainline & Loop)
 - Compressor Maintenance (Burton Creek)
- Total Days: 20

Foothills BC

- Planned Events:
 - Pipe Inline inspections and Cutouts (FH BC and BC Mainline)
 - Compressor Maintenance (Crowsnest)
- Total Days: 13
- Total Days (2018) for WGAT and FHBC: 33
- Total Days (2017) for WGAT and FHBC: 30



Service Availability – Empress/McNeill

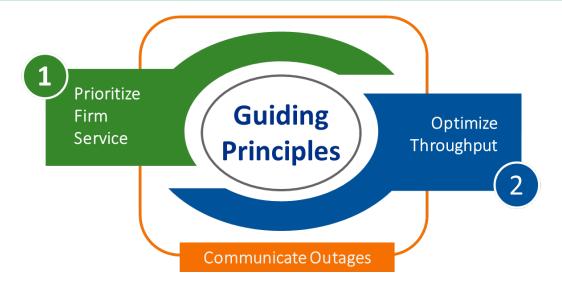




Empress/McNeill Summary

- Planned Events:
 - None affecting FT-D
- Unplanned Events:
 - None affecting FT-D
- Total Days: 0

Summary

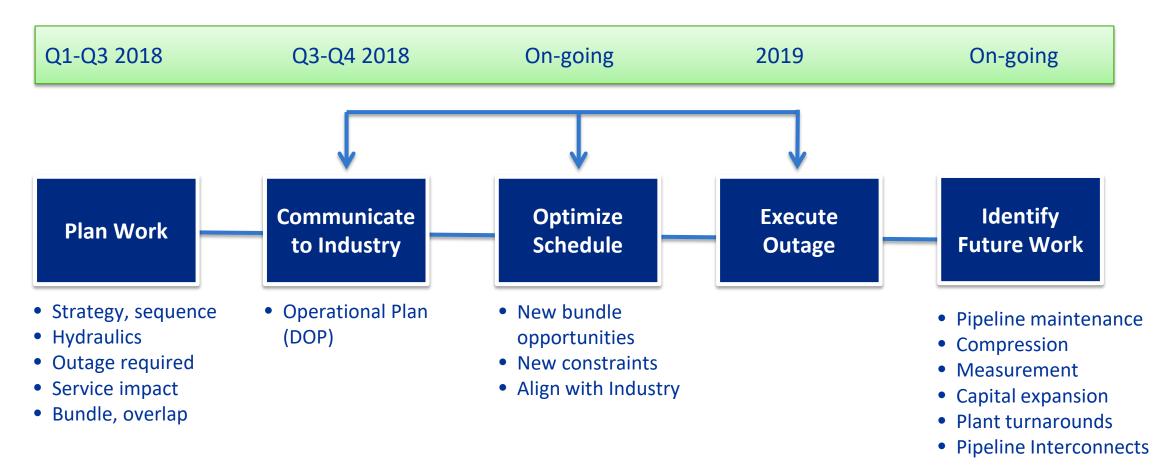


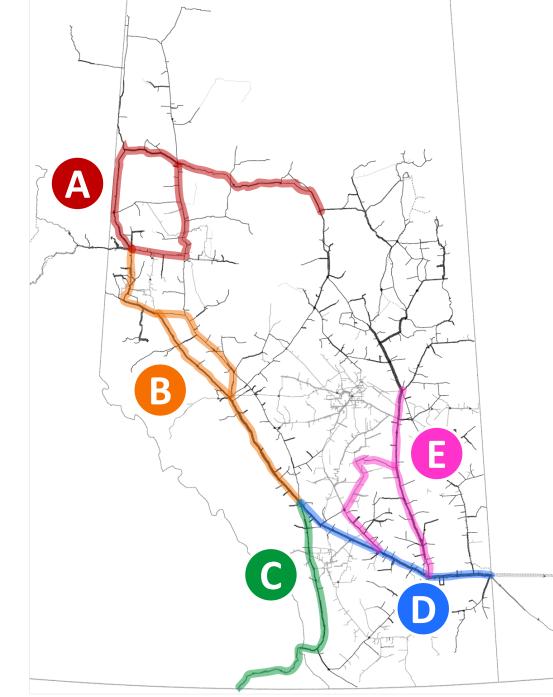
Aroo	Outage Days Affecting Firm Service			
Area	2017	2018		
WGAT & FHBC	30	33		
Empress/McNeill	0	0		
OSDA	8	17		
USJR	55	28		



- 1. NGTL System Operations Management
- 2. 2018 Firm Transportation Availability Review
- 3. 2019 Operational Outlook Update

2019 Program Timeline:





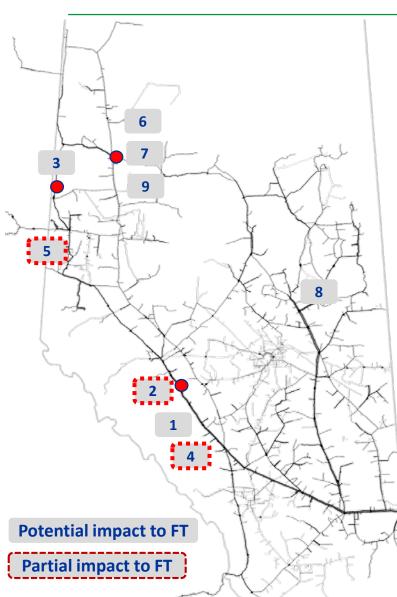
Flow Path Relationships

Potential for reduced service availability: Upstream FT-R and/or downstream IT-D/IT-S Upstream FT-R or downstream IT-D/IT-S R WGAT/FHBC only (NGTL or FHBC) EGAT only (includes NEDA/OSDA) D NEDA only (includes OSDA) Outage Communication: as soon as information available:

- Initial and revised assessments, DOP
- Finalized and confirmed assessment, NrG Highway

*Actual service authorizations will depend on several factors

2019 Upstream James River Receipt Area – Outage Highlights



	Facility Outage	Planned Outage Timing	Service Allowable	Capacity/A 10 ³ m ³ /d	Allowable TJ/d
	1. NPS 42 Edson Mainline Loop 2 <i>Pipeline Maintenance (removed)</i>	Deferred 2020	N/A	N/A	N/A
	2. Swartz Creek Compressor Station Modifications	Feb 20 – 28, 2019	Partial impact to FT-R (Greater USJR excluding Segment 1)	295,000	11,210
	3. Alces River B3 Compressor Station Maintenance	Apr 9 – 11, 2019	Potential impact to FT-R	298,000	11,324
	4. NPS 48 Edson Mainline Loop 3 <i>Pipeline</i> <i>Maintenance</i>	May 6 – 11, 2019	Partial impact to FT-R	255,000	9,690
	5. NPS 36 Groundbirch M/L & Gordondale Lateral Loop 3 Pipeline Maintenance	May 11 - 16, 2019	Local impact	0	0
	6. Meikle River B2 & C4 <i>Compressor Station Modifications (revised)</i>	July 9 – 24, 2019	Potential impact to FT-R	309,000	11,742
	7. Meikle River D5 Compressor Station Modifications (revised)	Aug 7 – 22, 2019	Potential impact to FT-R	305,000	11,590
-	8. NPS 30 & 42 Paul Lake and Flat Lake Lateral Loop 3 & 4 Pipeline Maintenance (revised)	Sep 9 – 16, 2019	Potential impact to FT-R	303,000	11,514
Ę	9. Meikle River C Compressor Station Maintenance (revised)	Sep 9 – 15, 2019	Potential impact to FT-R	306,000	11,722

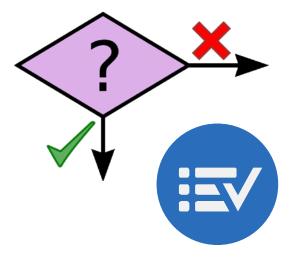
Outage Communication Interpretation – USJR Receipt Area



Partial Impact to FT-R: Highly confident FT limitation is required

Lower likelihood of limiting IT downstream of the system constraint(s)

- Potential for downstream IT limitation remains if outage affects both receipt and delivery capability
- Confirmation of allowable and area via NrG Notice



Potential Impact to FT-R along with **No Impact to FT-D anticipated:** FT limitation not expected

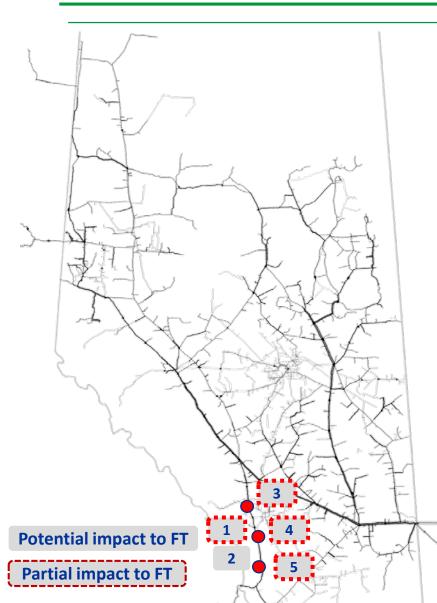
Higher likelihood of limiting IT downstream of the system constraint(s)

- Potential remains to avoid upstream FT impact with downstream IT limitation
- Downstream entries removed from DOP close to outage execution if
 - a) there is no downstream IT utilization, or
 - b) FT-R limitation is unavoidable

2019 Western Gate & Eastern Gate Delivery Area Summary

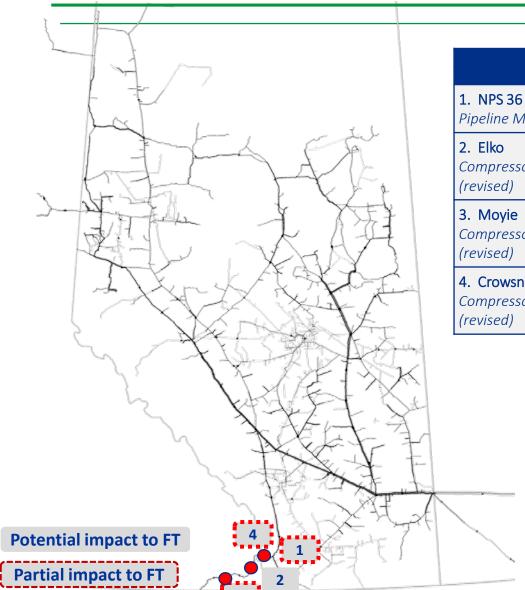
		Service Allowable		Capacity/Allowable				
Facility Outage	Planned Outage Timing	USJR	WGAT/EGAT		ate Delivery 644 TJ/d	Eastern Ga Apr 2019 CD	te Delivery Q: 4,278 TJ/d	Flow Path
				10 ³ m ³ /d	b/LT	10 ³ m ³ /d	b/LT	
Swartz Creek Compressor Station Modifications	Feb 20 – 28, 2019	<u>Partial</u> impact to FT-R (Greater USJR excluding Segment 1)	No impact to FT-D anticipated	69,000	2,644	118,000	4,528	В
Alces River B3 Compressor Station Maintenance	Apr 9 – 11, 2019	Potential impact to FT-R	No impact to FT-D anticipated	69,000	2,644	118,000	4,528	A
NPS 48 Edson Mainline Loop 3 Pipeline Maintenance	May 6 – 11, 2019	<u>Partial</u> impact to FT-R	No impact to FT-D anticipated	69,000	2,644	111,000	4,278	В
Meikle River B2 & C4 Compressor Station Modifications (revised)	July 9 – 24, 2019	Potential impact to FT-R	No impact to FT-D anticipated	69,000	2,644	126,000	4,827	A
Meikle River D5 Compressor Station Modifications (revised)	Aug 7 – 22, 2019	Potential impact to FT-R	No impact to FT-D anticipated	69,000	2,644	122,000	4,674	A
NPS 30 & 42 Paul Lake and Flat Lake Lateral Loop 3 & 4 Pipeline Maintenance (revised)	Sep 9 – 16, 2019	Potential impact to FT-R	No impact to FT-D anticipated	69,000	2,644	120,000	4,597	A
Meikle River C Compressor Station Maintenance	Sep 9 – 15, 2019	Potential impact to FT-R	No impact to FT-D anticipated	69,000	2,644	123,000	4,712	A

2019 Western Gate Delivery Area – Outage Highlights



Facility Outage	Facility Outage Planned Outage Timing Service Allowable		Capacity/Allowable 10 ³ m³/d TJ/d		
1. NPS 42 Western Alberta System Mainline Loop Pipeline Maintenance	Apr 4 – 11, 2019	Partial impact to FT-D	61,000	2,337	
2. NPS 36 Western Alberta System Mainline Pipeline Maintenance (revised)	May 5 – 16, 2019	Potential impact to FT-D	66,000	2,528	
3. Winchell Lake <i>Compressor Station Modifications</i>	July 8 – 21, 2019	Partial impact to FT-D	65,000	2,490	
4. Turner Valley <i>Compressor Station Modifications</i> <i>(revised)</i>	Oct 7 – 16, 2019	Partial impact to FT-D	61,000	2,337	
5. Burton Creek <i>Compressor Station Modifications</i> <i>(revised)</i>	Nov 18 – 27, 2019	Partial impact to FT-D	66,000	2,528	

2019 Foothills BC Receipt Area – Outage Highlights



Facility Outage	Planned Outage Timing	Service Allowable	Capacity/Allowable 10 ³ m³/d TJ/d		
1. NPS 36 BC Mainline <i>Pipeline Maintenance (revised)</i>	Jun 14 – 26, 2019	Partial impact to FT-R	59,000	2,260	
2. Elko <i>Compressor Station Maintenance</i> <i>(revised)</i>	July 8 – 11, 2019	Potential impact to FT-R	62,000	2,375	
3. Moyie <i>Compressor Station Maintenance</i> <i>(revised)</i>	July 12 – 15, 2019	Partial impact to FT-R	59,000	2,260	
4. Crowsnest A <i>Compressor Station Maintenance</i> <i>(revised)</i>	July 16 – 19, 2019	Partial impact to FT-R	57,000	2,184	



NGTL and Foothills Contact Information

Inquiries	Availability	Team	Functions	Contact Information
General assistance	7am-10 pm MT, 7 day/week	TransCanada Call Centre	Customer service for nominations, allocations, and measurement	403-920-PIPE (7473) or toll-free at 1-877-920-PIPE (7473); and nominations@transcanada.com
Contracts and Billing	Business hours	Contracts	Support for contracts	NGTL: ngtl_contracting@transcanada.com FH:
		Billing	Support for billing	ab ft openseason@transcanada.com ngtl_billing@transcanada.com
Operations planning and outage coordination	Business hours	Operations Planning	New facility integration, operating plan strategies, outage planning and coordination, linepack management, connected pipeline agreements, event/emergency management	http://www.transcanada.com/customerexpress/2 880.html

NGTL and Foothills Contact Information

Inquiries	Availability	Team	Functions	Contact Information
Sales and service	Business hours	Customer Account Managers	Service inquiries and new service requests	NGTL: http://www.tccustomerexpress.com/875.html FH: Ashley Stowkowy: 920-5828
Multi- stakeholder interests	Business hours	Commercial Collaboration	Multi-stakeholder initiatives, customer meetings, and the Tolls, Tariff, Facilities and Procedures (TTFP) committee	http://www.tccustomerexpress.com/872.html
All other contacts		TransCanada Natural Gas Pipelines		http://www.tccustomerexpress.com/852.html