



NGTL System and Foothills Pipelines Ltd.

Customer Operations Meeting

January 14, 2021



Welcome and Thank You for Joining Us

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 we will answer them at the best possible opportunity

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. TC Energy 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.

**No
impact to FT**

Refers to outage periods where FT impact is not expected

**Potential
impact to FT**

Refers to outage periods where there is potential of FT impact

**Partial
impact to FT**

Refers to outage periods where FT impact is expected

Important Notes



Outage information in this presentation is NOT applicable beyond the January 14, NGTL/Foothills Customer Operations (WebEx only) meeting



For current outage information, please refer to the most recent Daily Operating Plan (DOP) on my.TC Customer Express



This meeting will only cover operational topics related to the NGTL and Foothills systems. For information on Commercial and Regulatory topics, please contact your Marketing Representative

Our Focus During COVID-19



Protect our teams, partners and communities



Ensure no interruption to our customers



Secure supply of critical equipment and services with our partners

Notice something is off?

Please reach out: [Marketing Reps](#) or 403.920.PIPE

Safety Moment – Winter Walking Safety Tips

- Wear appropriate footwear with slip-resistant soles and good tread
- Stop often and scan for hazards
- Walk with your feet pointed slightly outward
- Keep your hands out of your pockets and extended to the side
- Walk slowly and take small steps

Agenda

1. Summary of Crowsnest Outages
2. Review outages in Daily Operating Plan (DOP)
3. Educational session: Linepack 101



Foothills BC Crowsnest Outages

Crowsnest K – Check Valve Replacement (Dec 3-24)

December 3

- Planned routine preventative maintenance work on Crowsnest K unit (expected outage duration of 1 day). Start-up issues upon completion.

December 4 - 7

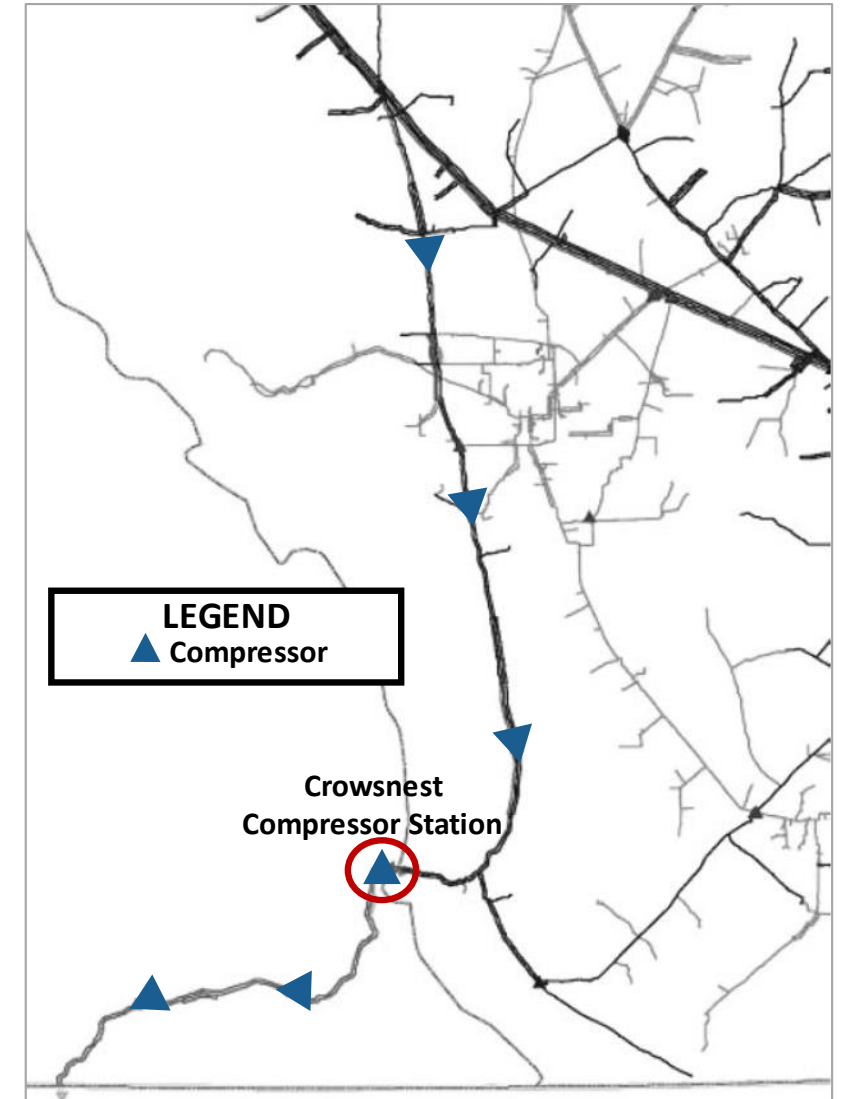
- Investigation/identification of cause (check valve) and option evaluation
- Dec 4: Zero IT restriction effective Dec 4 at 13:00 MST
- Dec 5: Partial FT restriction effective Dec 5 at 08:00 MST

December 8 - 23

- Design, engineering, and construction of valve replacement

December 24

- Unit returned to service and service restriction lifted at 13:00 MST



Crowsnest Compressor Station (Dec 25-27)

December 25

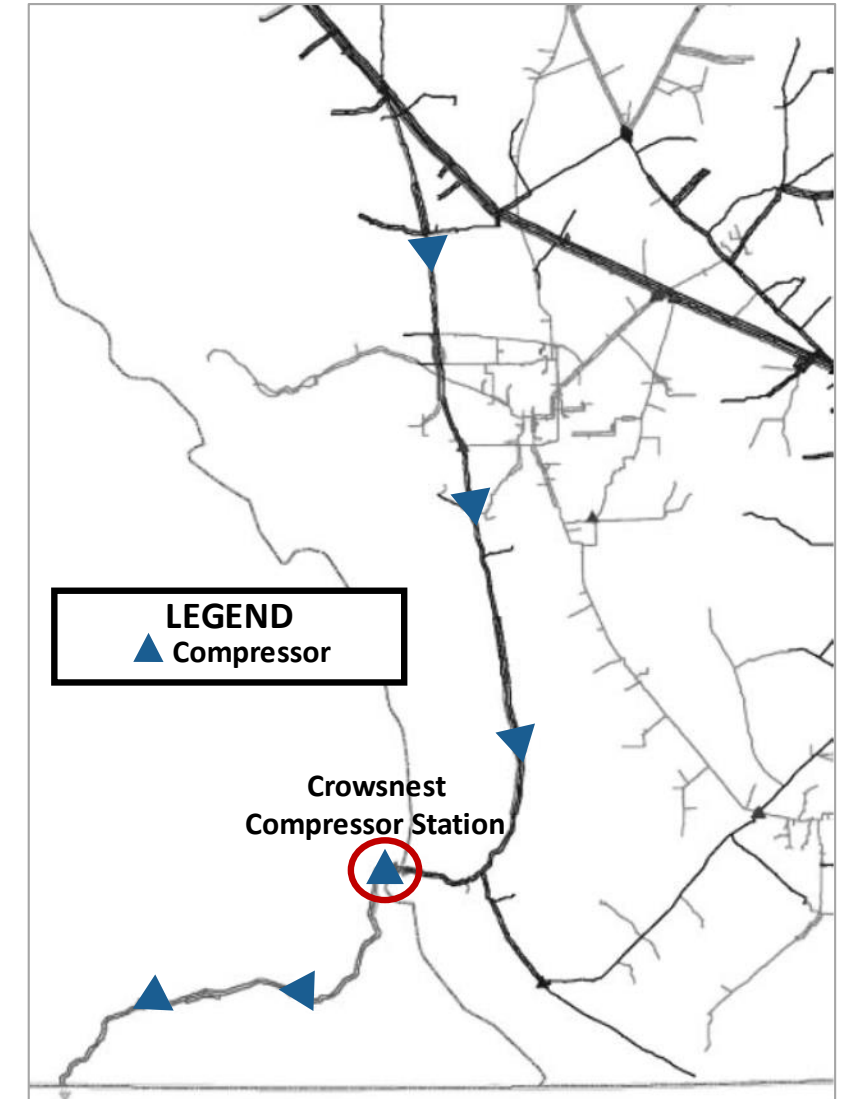
- Unplanned shutdown of Crowsnest K and H units resulting in full station outage. Startup issues with all units (no units running for 3 hours).

December 26

- Investigation/identification of cause (recycle valve) and option evaluation
- Partial FT restriction effective 08:00 MST. Partial increase in authorization effective 13:00 MST with some units returned to service.

December 27

- All units returned to service and service restrictions lifted at 13:00 MST



Crowsnest K – Recycle Valve Repair (Jan 4-8)

January 3 - 4

- Unplanned shutdown of Crowsnest K unit overnight. Investigation/identification of cause (recycle valve).
- Zero IT restriction effective Jan 4 at 13:00 MST

January 5

- Recycle valve removed from service. Replacement parts ordered from vendor with ETA of the following week.
- Partial FT restriction effective 08:00 MST Jan 5

January 7 - 8

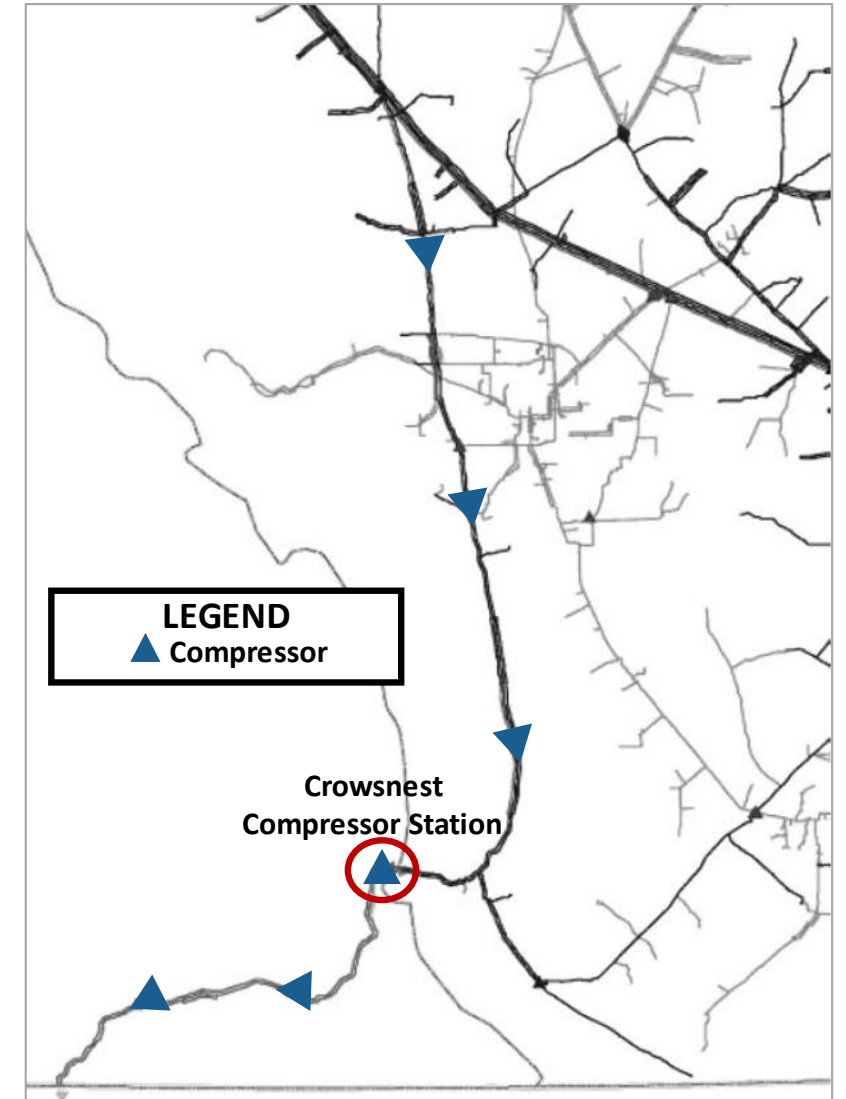
- Arrival of parts on site and installation

January 8

- Unit returned to service end of day

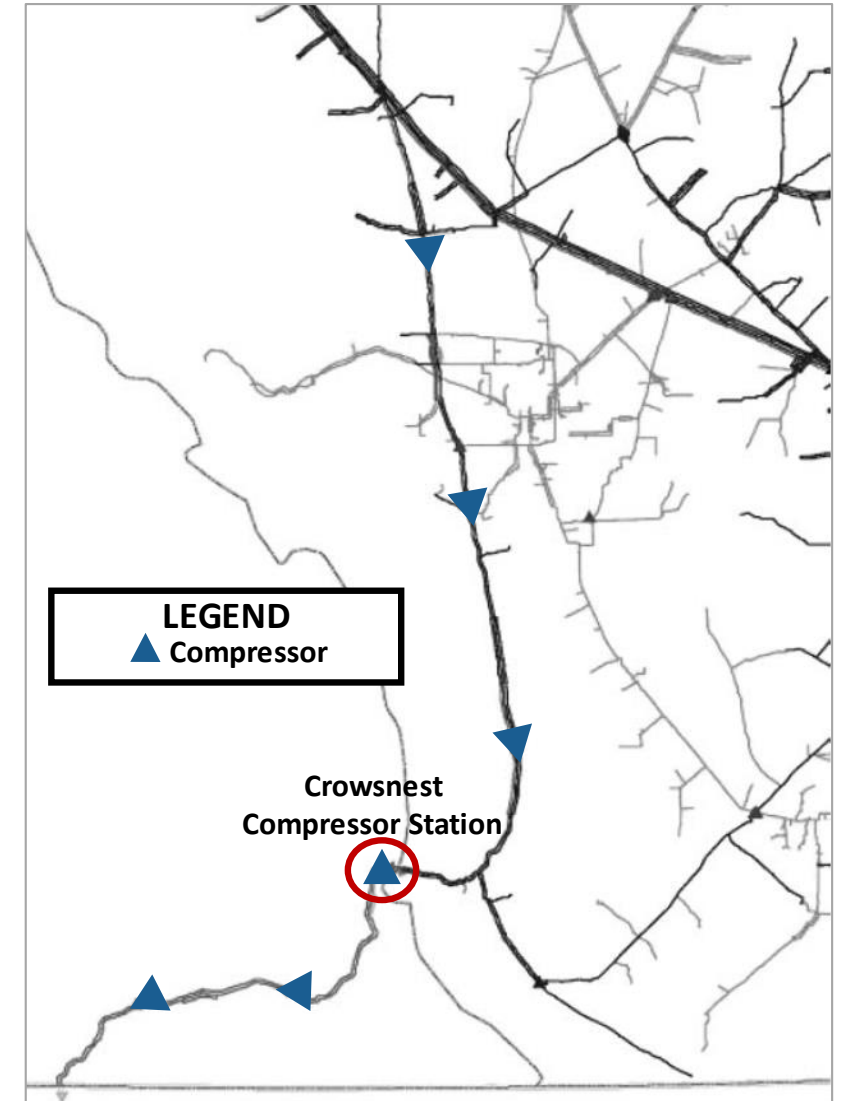
January 9

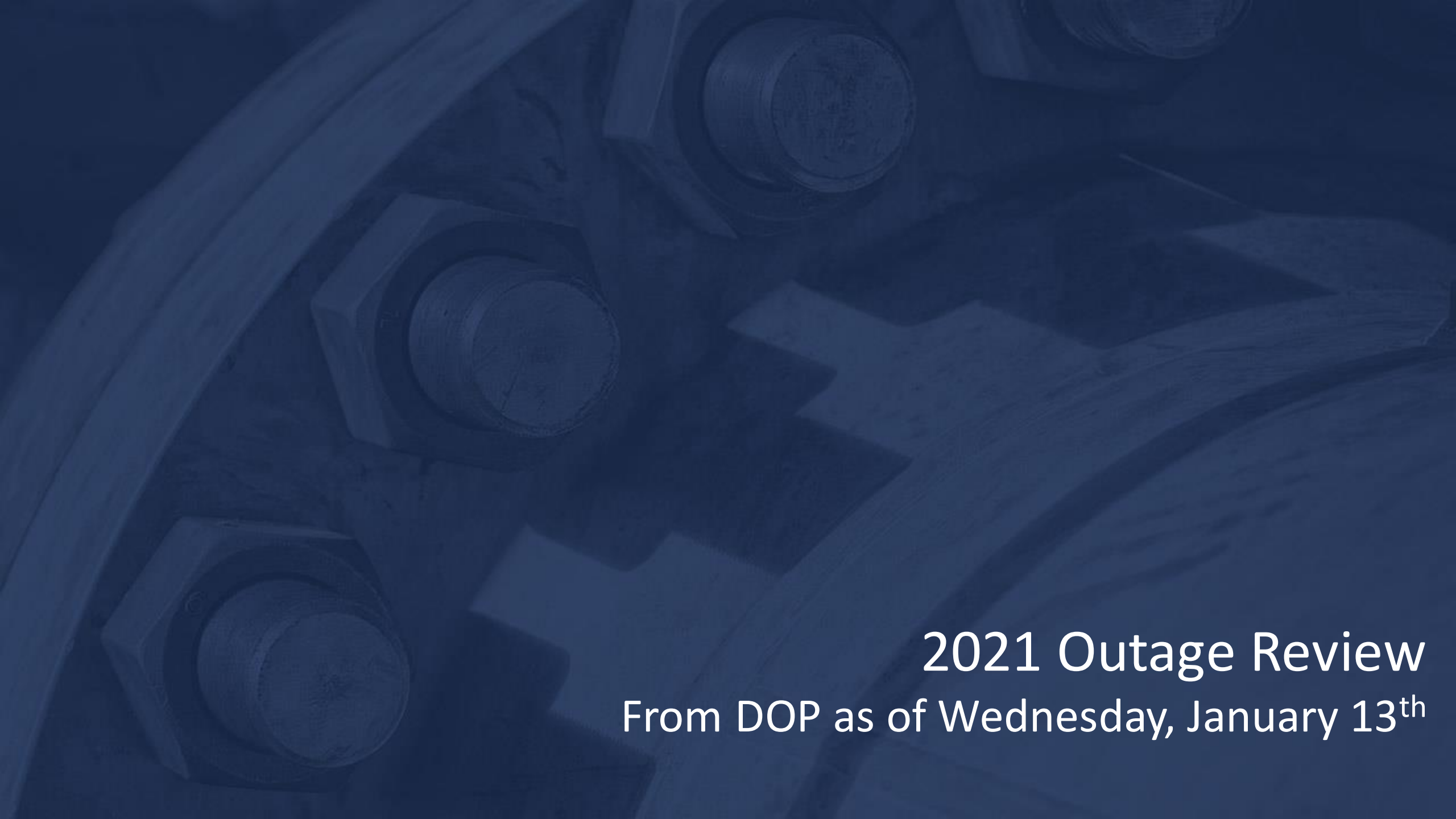
- Service restrictions lifted at 08:00 MST Jan 9



Summary

- Unplanned shutdowns on Dec 25 and Jan 4 related to the initial incident in December – now believed to be resolved.
- None of the incidents were related to reliability of rotating equipment.
- Collaboration, creativity, and dedication from several teams resulted in a significant reduction of outage duration.
- West path is fully contracted and operating at capacity resulting in limited operational flexibility. Unplanned outages have high potential to impact firm service

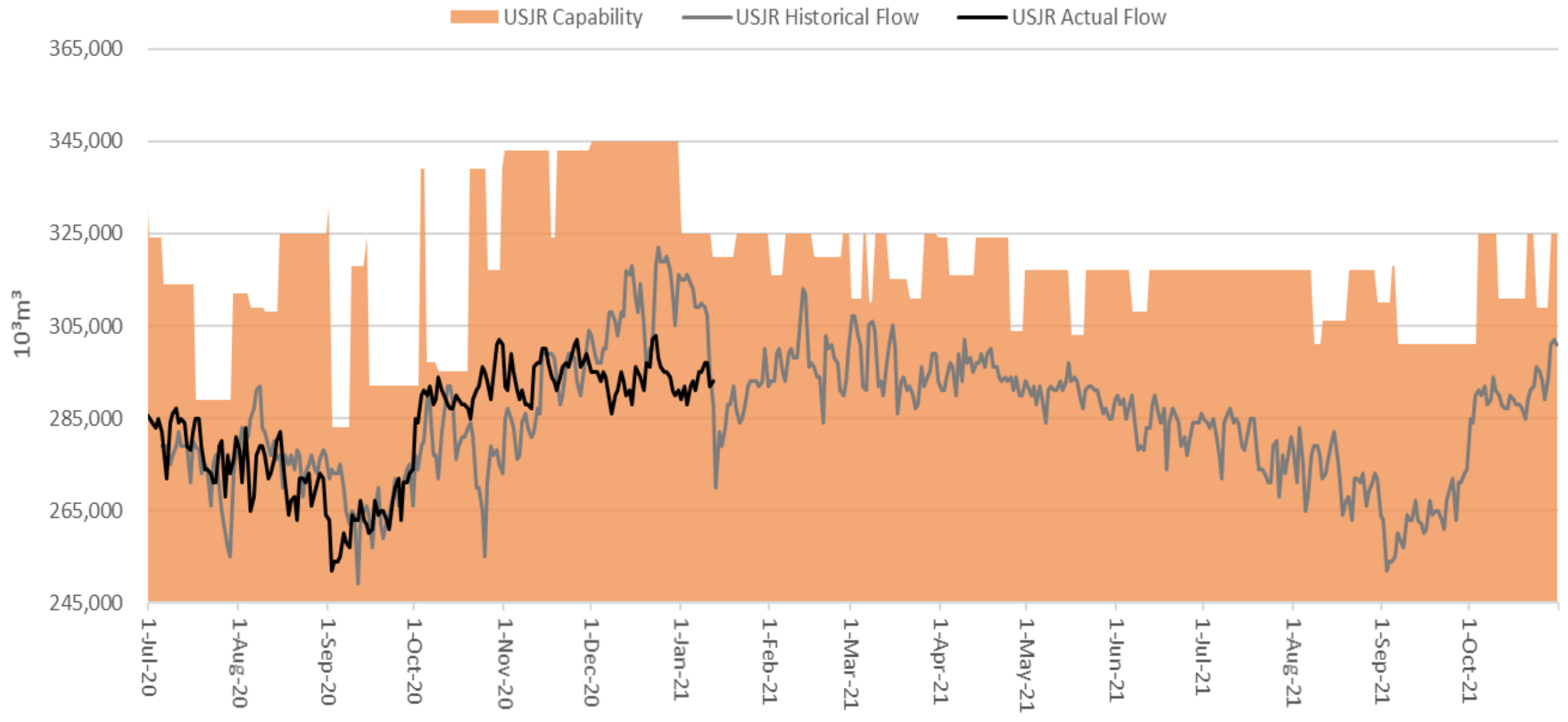




2021 Outage Review

From DOP as of Wednesday, January 13th

Upstream James River



This slide is **NOT** applicable beyond the Jan 14, NGTL/Foothills Customer Operations meeting on WebEx.
Please refer to the DOP on TC Customer Express for current outage information

Upstream James River Receipt Area (USJR)

No
impact to FT

Potential
impact to FT

Partial
impact to FT

Outage Description	Start	End	USJR Outage Capability (10 ⁶ m ³ /d)	USJR Impact (10 ⁶ m ³ /d)	Area Outage Capability (10 ⁶ m ³ /d)	Typical Outage Area Flows (10 ⁶ m ³ /d)	Location/Area
NPS 30 Grande Prairie Mainline - Pipeline Maintenance	12-Jan-21	19-Jan-21	320	5	194	145-180	Potential impact to FT-R Segments 2, 3, 4, and partial 7
Berland River B2 – Compressor Station Maintenance	1-Feb-21	5-Feb-21	316	8	N/A	260-310	Potential impact to FT-R USJR
Wolf Lake A3 – Compressor Station Maintenance	16-Feb-21	25-Feb-21	320	5	N/A	260-310	Potential impact to FT-R USJR
Vetchland - Compressor Station Modifications	1-Mar-21	5-Mar-21	311	14	N/A	260-310	Potential impact to FT-R USJR
Woodenhouse C3 – Compressor Station Maintenance	8-Mar-21	9-Mar-21	316	9	190	145-180	Potential impact to FT-R Segments 2, 3, 4, and partial 7
Otter Lake B2 – Compressor Station Maintenance	8-Mar-21	9-Mar-21	310	15	184	145-180	Potential impact to FT-R Segments 2, 3, 4, and partial 7
Nordegg – Compressor Station Maintenance	15-Mar-21	21-Mar-21	315	10	N/A	260-310	Potential impact to FT-R USJR
Hidden Lake North – Compressor Station Maintenance	22-Mar-21	26-Mar-21	315	10	189	145-180	Potential impact to FT-R Segments 2, 3, 4, and partial 7
Goodfish – Compressor Station Maintenance	22-Mar-21	26-Mar-21	311	14	185	145-180	Potential impact to FT-R Segments 2, 3, 4, and partial 7
Meikle River C – Compressor Station Maintenance	26-Apr-21	30-Apr-21	304	20	N/A	260-310	Potential impact to FT-R USJR
Meikle River D5 - Compressor Station Maintenance	17-May-21	21-May-21	303	14	N/A	260-310	Potential impact to FT-R USJR

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Upstream James River Receipt Area (USJR)

No
impact to FT

Potential
impact to FT

Partial
impact to FT

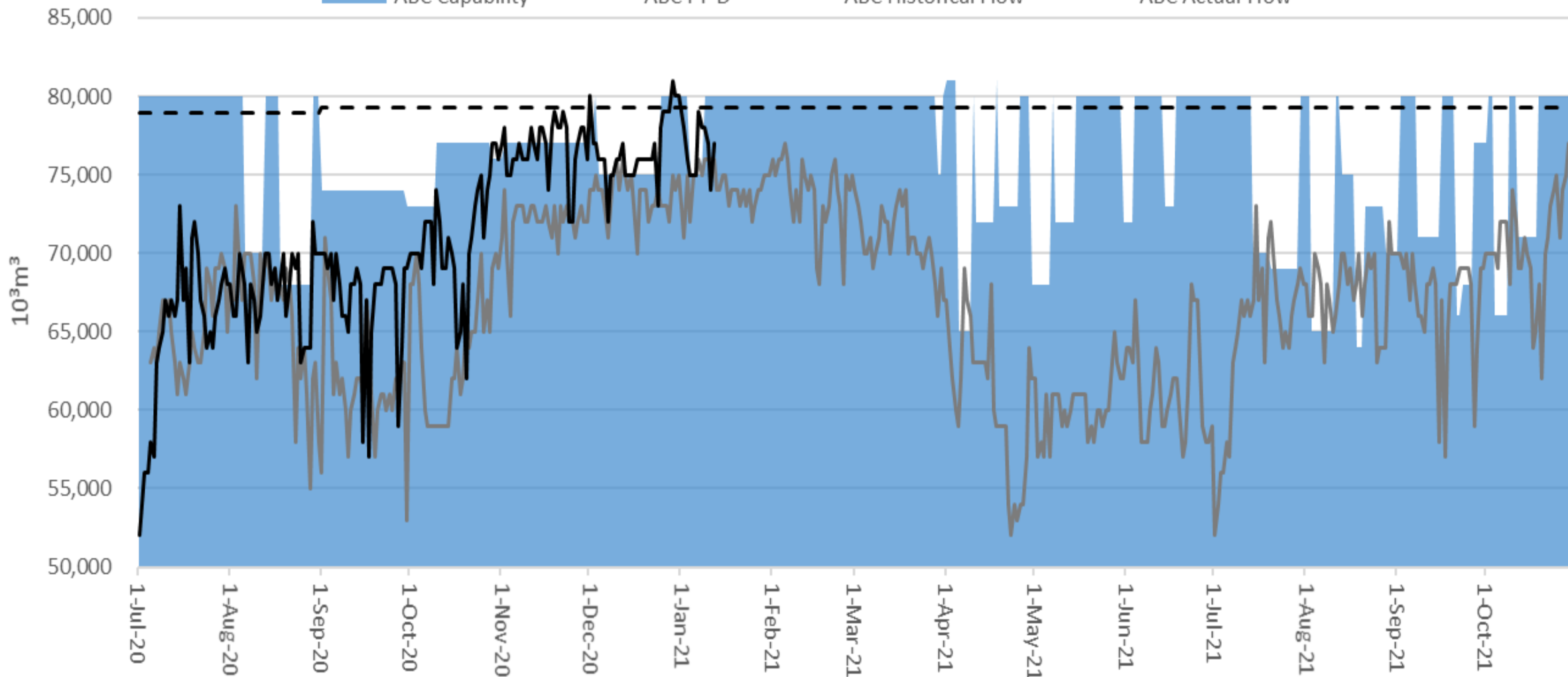
Outage Description	Start	End	USJR Outage Capability (10 ⁶ m ³ /d)	USJR Impact (10 ⁶ m ³ /d)	Area Outage Capability (10 ⁶ m ³ /d)	Typical Outage Area Flows (10 ⁶ m ³ /d)	Location/Area
Wolf Lake A2 - Compressor Station Maintenance	7-Jun-21	12-Jun-21	308	9	N/A	260-310	Potential impact to FT-R USJR
Berland River - Compressor Station Maintenance	9-Aug-21	11-Aug-21	301	16	N/A	260-310	Potential impact to FT-R USJR
Berland River A1 – Compressor Station Maintenance	9-Aug-21	13-Aug-21	306	11	N/A	260-310	Potential impact to FT-R USJR
NPS 36 Edson Mainline Extension - Pipeline Maintenance	14-Aug-21	20-Aug-21	306	11	N/A	260-310	Potential impact to FT-R USJR
Otter Lake - Compressor Station Maintenance	30-Aug-21	3-Sep-21	310	8	191	145-180	Potential impact to FT-R Segments 2, 3, 4, and partial 7
Gold Creek - Compressor Station Modifications	7-Sep-21	4-Oct-21	301	17	175	145-180	Potential impact to FT-R Segments 2, 3, 4, and partial 7
Clearwater - Compressor Station Maintenance	27-Sep-21	1-Oct-21	310	8	N/A	260-310	Potential impact to FT-R USJR
Latornell - Compressor Station Maintenance	12-Oct-21	16-Oct-21	311	14	N/A	260-310	Potential impact to FT-R USJR
Latornell A2 - Compressor Station Maintenance	12-Oct-21	21-Oct-21	311	14	222	170-211	Potential impact to FT-R Segments 2, 3, 4, partial 5, partial 7
Alces River - Compressor Station Maintenance	25-Oct-21	29-Oct-21	309	16	N/A	260-310	Potential impact to FT-R USJR

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Alberta-B.C. Border

(includes both NGTL and Foothills BC outages)

ABC Capability ABC FT-D ABC Historical Flow ABC Actual Flow



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West Gate Delivery Area (WGAT) Foothills Zone 8 (FHBC)

No
impact to FT

Potential
impact to FT

Partial
impact to FT

Outage Description	Start	End	Capability/ Allowable (10 ⁶ m ³ /day)	Impact (10 ⁶ m ³ /d)	Pipeline	Service Allowable Location/Area
Crowsnest B - Compressor Station Maintenance	29-Mar-21	30-Mar-21	75	6	FH BC	Potential impact to FT: Alberta/BC Border
Burton Creek - Compressor Station Maintenance	5-Apr-21	9-Apr-21	65	16	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 36 Western Alberta System Mainline - Pipeline Maintenance	11-Apr-21	17-Apr-21	72	9	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 36 Foothills Pipeline Zone 7 Leg 1C - Pipeline Maintenance	19-Apr-21	25-Apr-21	73	8	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 42 Western Alberta System Mainline Loop - Pipeline Maintenance	30-Apr-21	6-May-21	68	12	NGTL	Potential Impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 36 Western Alberta System Mainline - Pipeline Maintenance	8-May-21	14-May-21	72	8	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
Burton Creek A3 - Compressor Station Maintenance	31-May-21	3-Jun-21	72	8	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 36 Western Alberta System Mainline Loop - Pipeline Maintenance	14-Jun-21	18-Jun-21	73	7	NGTL	Potential impact to FT-D: Alberta/BC Border
NPS 36 Foothills Pipeline Zone 8 Seg 2 - Pipeline Maintenance	14-Jul-21	19-Jul-21	70	10	FH BC	Potential impact to FT: Alberta/BC Border
NPS 42 Western Alberta System Mainline Loop - Pipeline Modification	20-Jul-21	29-Jul-21	69	11	NGTL	Potential Impact to FT-D: Alberta/BC Border

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Please refer to the DOP on TC Customer Express for current outage information

West Gate Delivery Area (WGAT) Foothills Zone 8 (FHBC)

No
impact to FT

Potential
impact to FT

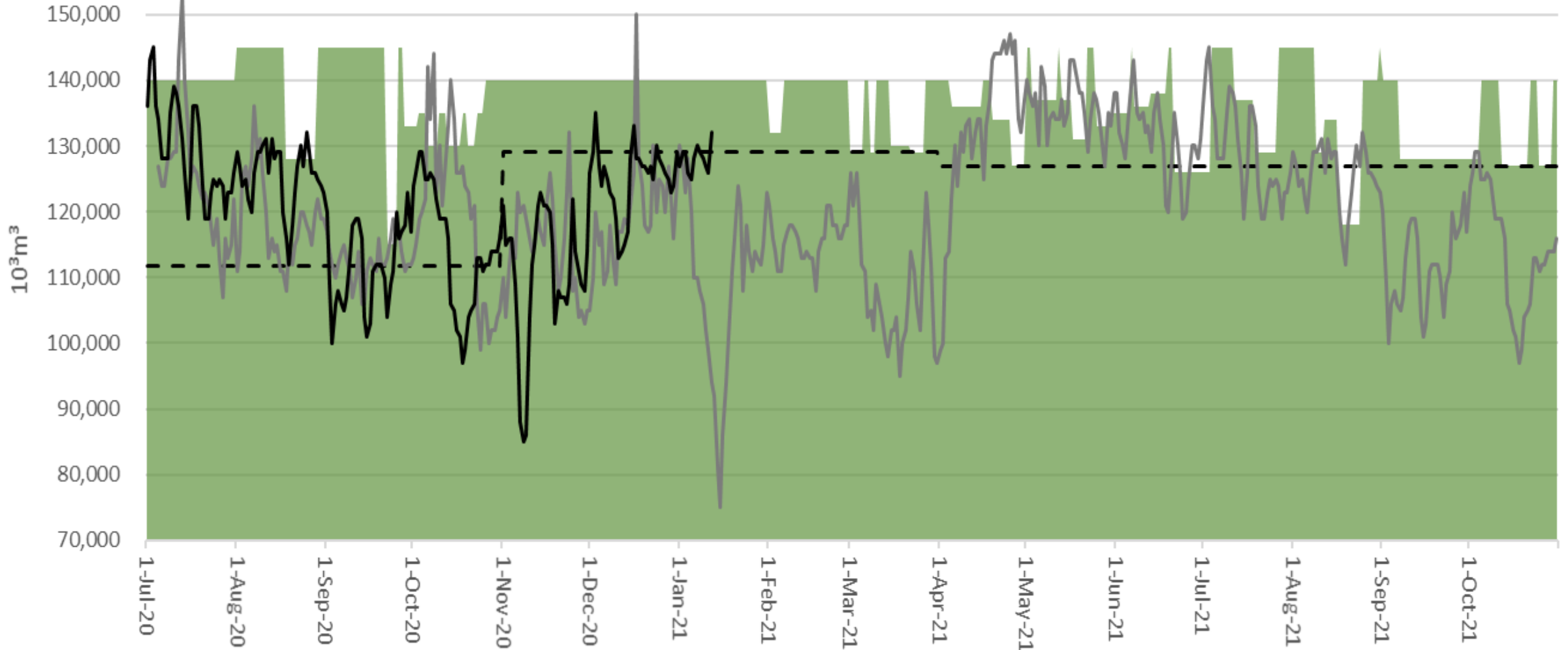
Partial
impact to FT

Outage Description	Start	End	Capability/ Allowable (10 ⁶ m ³ /day)	Impact (10 ⁶ m ³ /d)	Pipeline	Service Allowable Location/Area
Winchell Lake - Compressor Station Maintenance	3-Aug-21	7-Aug-21	65	15	NGTL	Potential Impact to FT-D: Alberta/BC Border
NPS 36 BC Mainline - Pipeline Maintenance	4-Aug-21	8-Aug-21	65	15	FH BC	Potential impact to FT: Alberta/BC Border
NPS 36 Foothills Zone 8 Seg 3 - Pipeline Maintenance	11-Aug-21	15-Aug-21	75	5	FH BC	Potential impact to FT: Alberta/BC Border
Crowsnest A – Compressor Station Maintenance	17-Aug-21	20-Aug-21	64	16	FH BC	Potential Impact to FT: Alberta/BC Border
NPS 36 Foothills Zone 8 Seg 4 - Pipeline Maintenance	18-Aug-21	22-Aug-21	73	7	FH BC	Potential impact to FT: Alberta/BC Border
Turner Valley A1 and A2 - Compressor Station Maintenance	23-Aug-21	27-Aug-21	73	7	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 42 Western Alberta System Mainline Loop - Pipeline Maintenance	8-Sep-21	15-Sep-21	71	9	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 36 BC Mainline - Pipeline Maintenance	16-Sep-21	20-Sep-21	71	9	FH BC	Potential impact to FT: Alberta/BC Border
NPS 36 Western Alberta System Mainline - Pipeline Modification	21-Sep-21	26-Sep-21	68	12	NGTL	Potential Impact to FT-D: Alberta/BC and Alberta/Montana Borders
Elko - Compressor Station Maintenance	21-Sep-21	22-Sep-21	66	14	FH BC	Potential Impact to FT: Alberta/BC Border
Moyie – Compressor Station Maintenance	4-Oct-21	8-Oct-21	66	14	FH BC	Potential impact to FT: Alberta/BC Border

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East Gate

EGAT Capability EGAT FT-D EGAT Historical Flow EGAT Actual Flow



East Gate Delivery Area (EGAT) Foothills Zone 9 (FHSK)

No
impact to FT

Potential
impact to FT

Partial
impact to FT

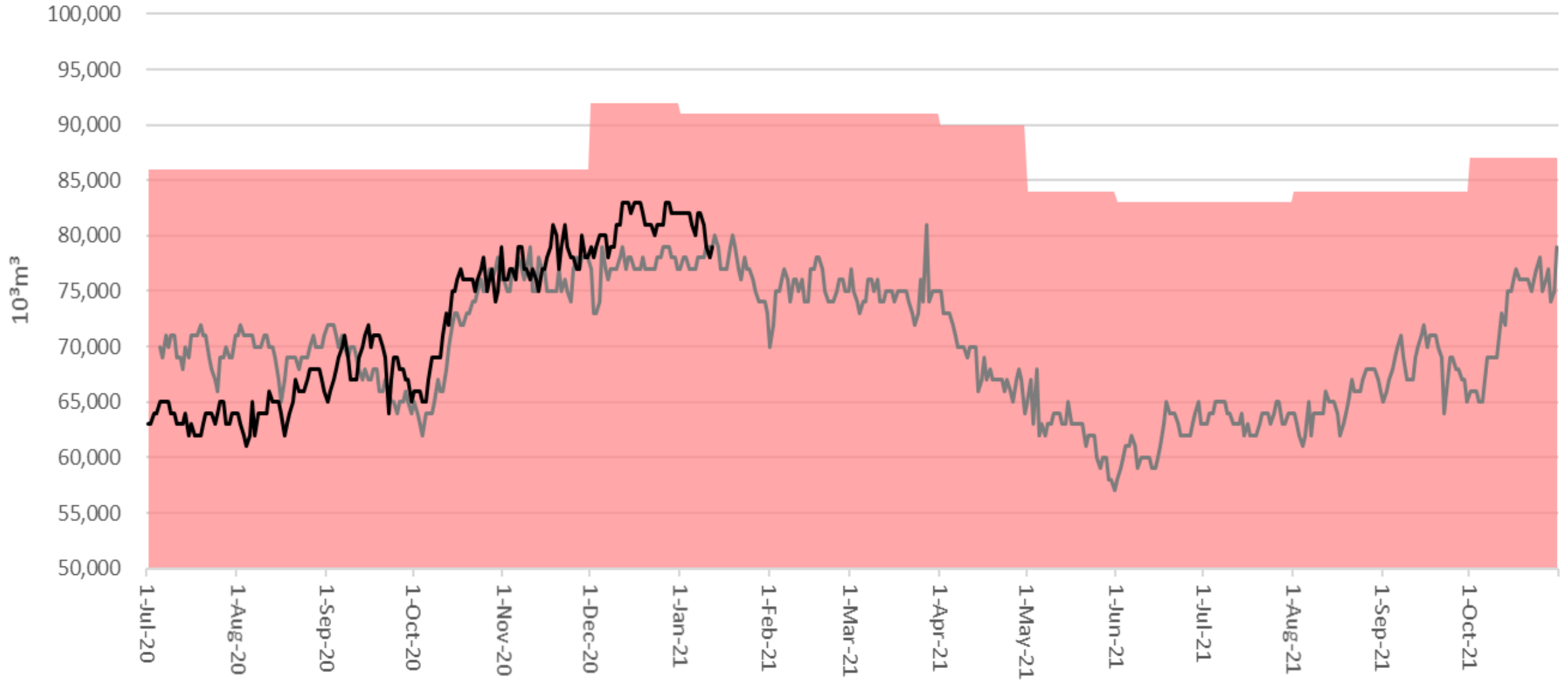
Outage Description	Start	End	Capability/ Allowable (10 ⁶ m ³ /day)	Impact (10 ⁶ m ³ /d)	Service Allowable Location/Area
Beiseker – Compressor Station Maintenance	29-Mar-21	1-Apr-21	136	4	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 48 Central Alberta System Mainline Loop 2 Pipeline Modification	19-Apr-21	30-Apr-21	134	6	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 48 Central Alberta System Mainline Loop 2 Pipeline Modification	3-May-21	11-May-21	137	8	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 48 Central Alberta System Mainline Loop 2 Pipeline Modification	13-May-21	21-May-21	137	8	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 42 Central Alberta System M/L Lp Pipeline Modification	26-May-21	5-Jun-21	135	10	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 30 Central Alberta System M/L Pipeline Modification	8-Jun-21	18-Jun-21	138	7	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 42 Edson and Central Alberta System Mainline Loop* Pipeline Maintenance	21-Jun-21	3-Jul-21	126	19	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 42 Foothills Pipeline Zone 6 Pipeline Maintenance	19-Jul-21	26-Jul-21	129	16	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
NPS 42 Foothills Pipeline Zone 6* Pipeline Maintenance	17-Aug-21	24-Aug-21	118	27	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28

*Potential to impact Tranche 3 EGAT Firm contracts

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Please refer to the DOP on TC Customer Express for current outage information

Oil Sands Delivery Area

OSDA Capability OSDA Historical Flow OSDA Actual Flow



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Northeast Delivery Area (NEDA) Oil Sands Delivery Area (OSDA)

No
impact to FT

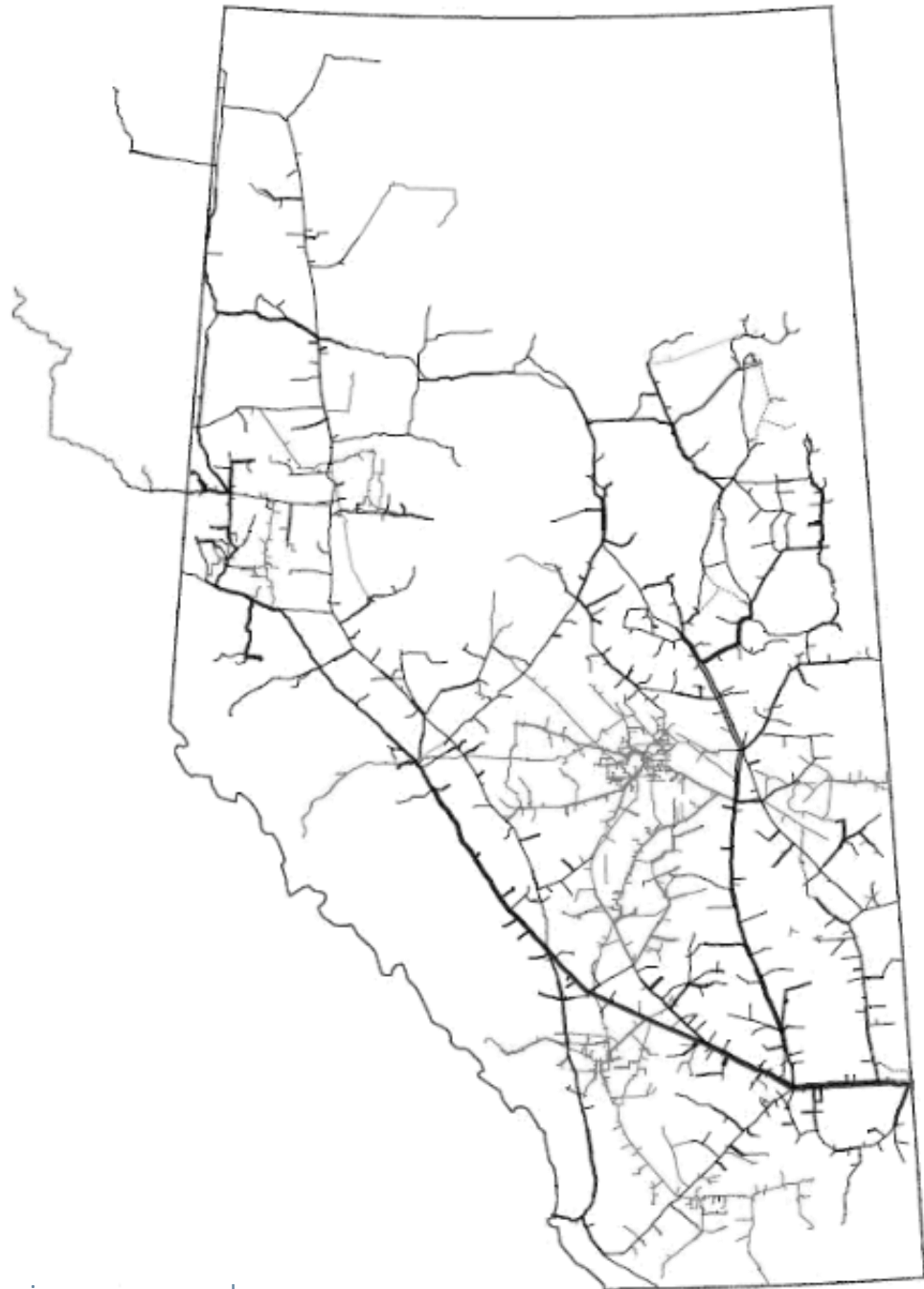
Potential
impact to FT

Partial
impact to FT

Outage Description	Start	End	Capability/ Allowable (10 ⁶ m ³ /day)	Typical Flow (10 ⁶ m ³ /d)	Service Allowable Location/Area
Gadsby – Compressor Station Maintenance	15-Mar-21	19-Mar-21	120	90 - 100	No impact to FT-D anticipated NEDA Segments 6, 10, 11, 12, 13, 14, 15, 16, 17, 23, 24, partial 28



Linepack 101



What is linepack?

Target Linepack – *accounting*

- The gas owned by the pipeline for the purposes of effective and efficient operation.

Actual Linepack – *physical*

- The physical gas in the system at any point in time.

Packing: increasing linepack inventory
Drafting: decreasing linepack inventory

Target (accounting) linepack is more static
Actual (physical) linepack is dynamic



Why is linepack important?

- All gas pipelines need linepack to function.
- It is important to balance linepack to operate effectively.

High Linepack

- High linepack in receipt areas may lead to reduced ability to receive gas onto the system (producer impact)
- Reduced flexibility at compressor stations leads to unstable operation

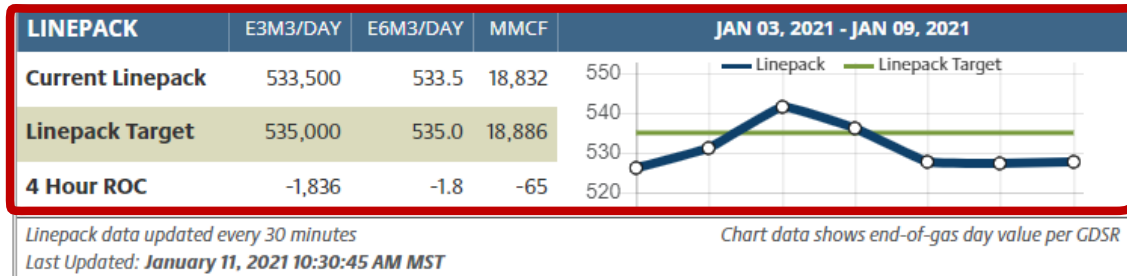
Low Linepack

- Low linepack in delivery areas may lead to reduced ability to delivery gas off the system (consumer impact)
- Reduced pipeline efficiency and loss of system capability.

Where can I find linepack info?

NGTL Dashboard (current & historical linepack)

TC Customer Express > Pipelines > NGTL System



Current System Report (current linepack & other operational values)

TC Customer Express > Pipelines > NGTL System > Current System Report

Current System at: Jan 11, 2021 10:30:47 MST				
Parameter	Value - SI	Units - SI	Value - Imp.	Units - Imp.
NGTL Linepack Current	533456	e3m3	18832	MMcf
NGTL Linepack 4Hour ROC	-3178	e3m3	-112	MMcf
NGTL - Field Receipts	320756	e3m3/d	11323	MMcf/d
NGTL - Intra-Delivery Flow w/o Storage	169227	e3m3/d	5974	MMcf/d
NGTL - Flow Differential (Receipts - Deliveries)	-21967	e3m3/d	-775	MMcf/d
NGTL - Instantaneous Delivery Flow	397037	e3m3/d	14016	MMcf/d
NGTL - Receipt Flow	375069	e3m3/d	13240	MMcf/d
NGTL - Net Storage Flow (Receipts - Deliveries)	47092	e3m3/d	1662	MMcf/d

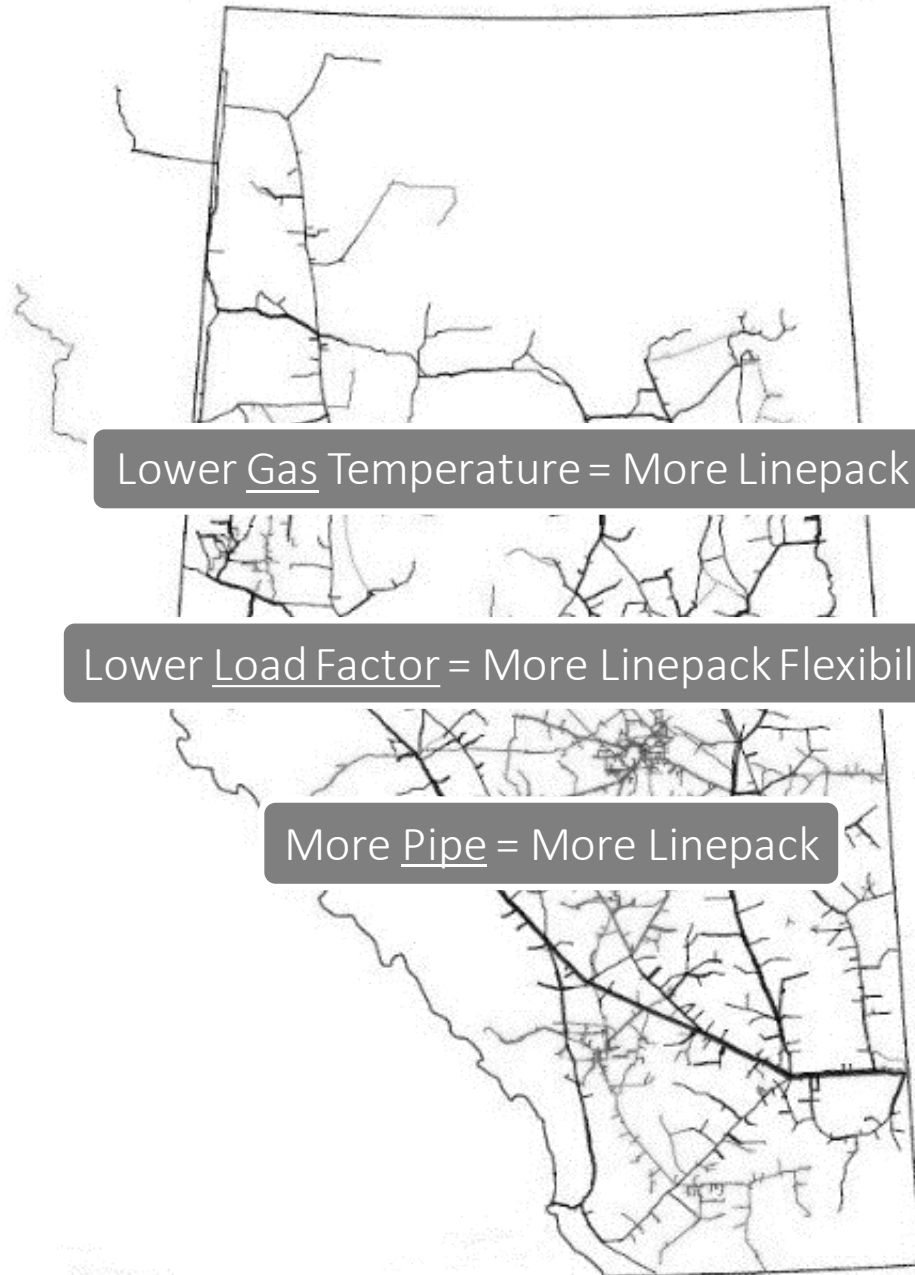
Gas Day Summary Report

(end of day snapshot of linepack & detailed operational values)

TC Customer Express > Pipelines > NGTL System > Gas Day Summary Report

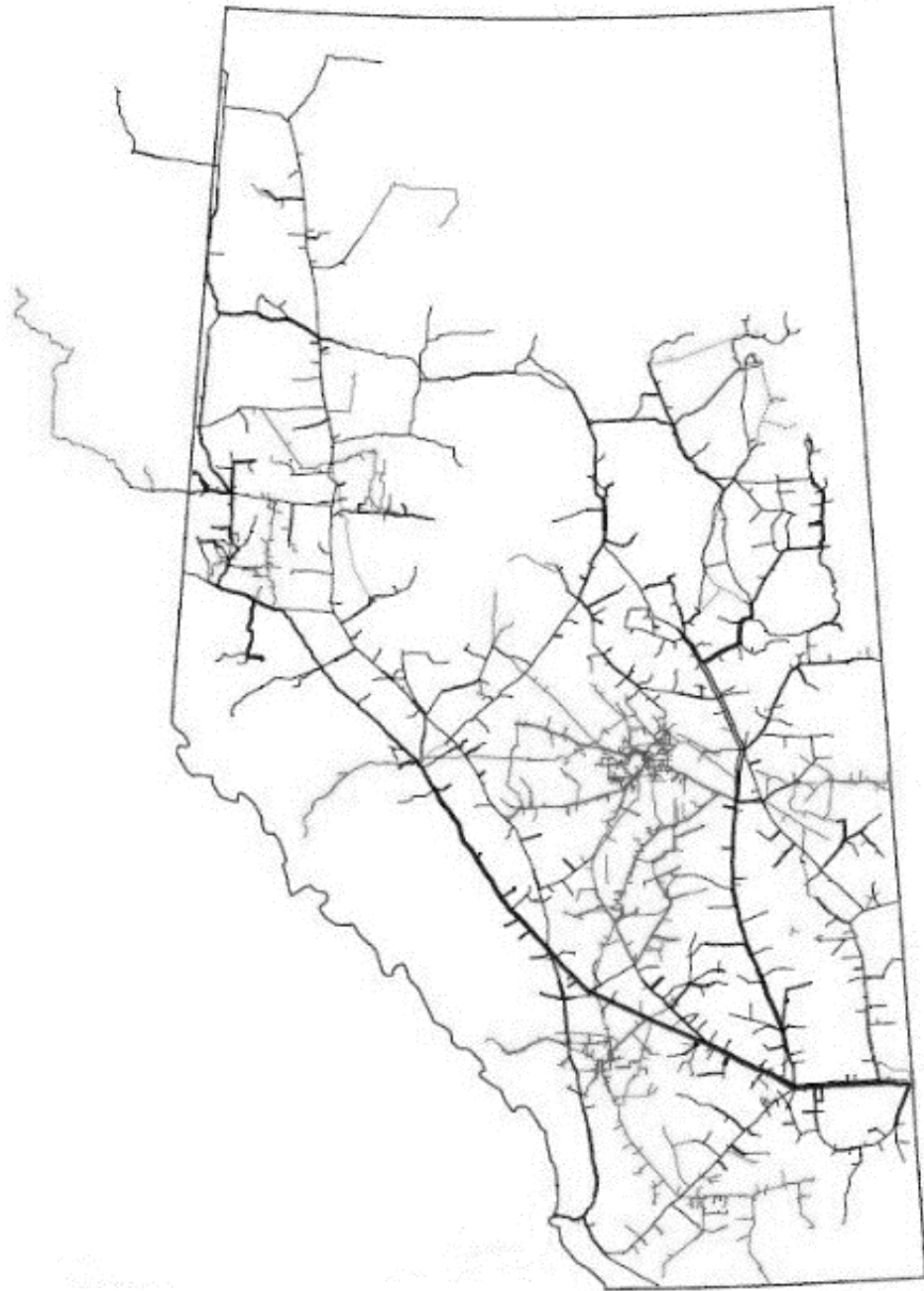
NOVA Gas Transmission Ltd. Gas Day Summary Report (E6M3) For: 2021-Jan-10 as of 2021-Jan-11 09:00			
Pipeline System:	NGTL		
Gas Day:	2021-Jan-10		
VOLUME SUMMARY	Prorated NOM	Extrapolated VOL	08:00 NOM
EMPRESS BORDER	104.0	103.0	102.5
MCNEILL BORDER	24.1	23.9	24.3
ALBERTA-B.C. BDR	76.9	77.1	76.9
GORDONDALE BORDER	-1.2	-1.2	-1.2
GROUND BIRCH EAST	-5.7	-5.7	-6.2
*OTHER BORDERS	8.6	8.5	8.8
Total Export Deliveries (Gross)	213.6	212.5	212.5
Intraprovincial	284.2	171.1	271.6
Total Storage + Intraprovincial	354.7	171.1	325.5
**Total Net Storage	-44.1	-46.0	-61.1
Total Storage Deliveries	70.5	0.0	53.9
Total Storage Receipts	-114.6	-46.0	-115.0
Total NGTL Deliveries	568.4	383.6	538.0
Total NGTL Receipts	685.4	389.0	686.5
***NGTL Field Receipts		336.1	
End of Day Linepack		534.3	
Linepack Rate of Change		4.7	
Linepack Change (Last 24 hours)		6.7	
Linepack Target		535.0	
Tolerance		-1/1 (%)	
Tolerance Last Changed		2021-Jan-06 at 08:00	
Total SD Account (TJ)		208.6	
Total OBA Account (TJ)		-214.0	

What factors affect linepack?



- Gas temperature and system average gas pressure – *air temperature, soil temperature, system operation*
- Supply & demand distribution and load factor – *volume of flow and where*
- The amount of pipeline in service – *size of the bottle*

A system operating at or near maximum capability must have linepack tightly controlled to maximize throughput



How do you manage linepack?

Purchase and Sale: Preposition linepack in a range that is required for the expected operation.

- Seasonal, expansion facilities, and outage related adjustments.

Operator Balancing Agreements (OBA): Imbalance management with connected pipelines and storage operators

- Daily review and refinement based on interconnect ability to support.

Daily Supply Demand Balancing: Adjust customer tolerance band based on anticipated system flexibility.

- Daily review and notification through bulletin, text, and/or phone call.

Variability of receipts, deliveries, and system operation makes linepack and linepack requirements uncertain

Contact information

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Cullen Dancy

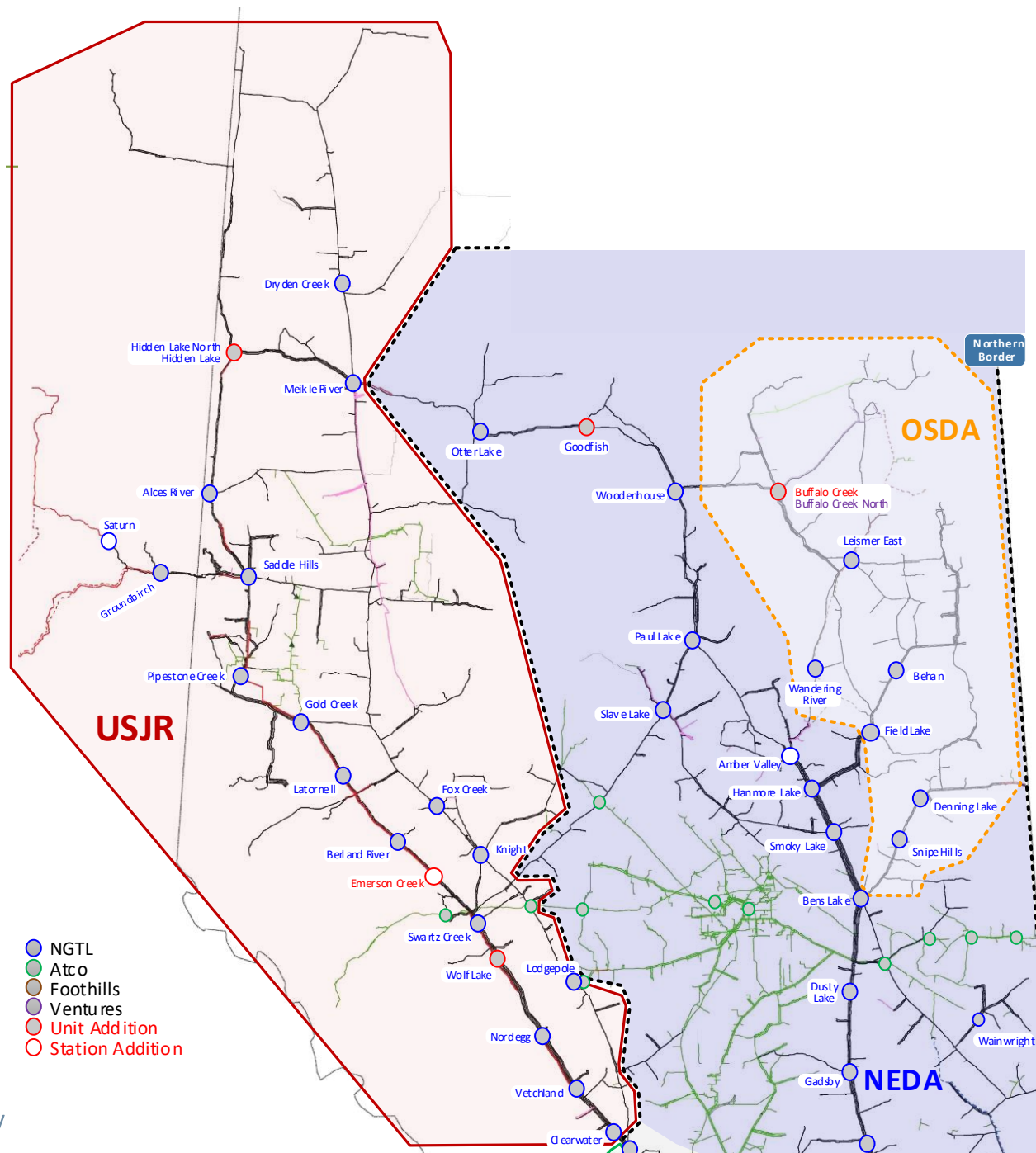
Operations Planning - West

cullen_dancy@tcenergy.com

587-933-0785

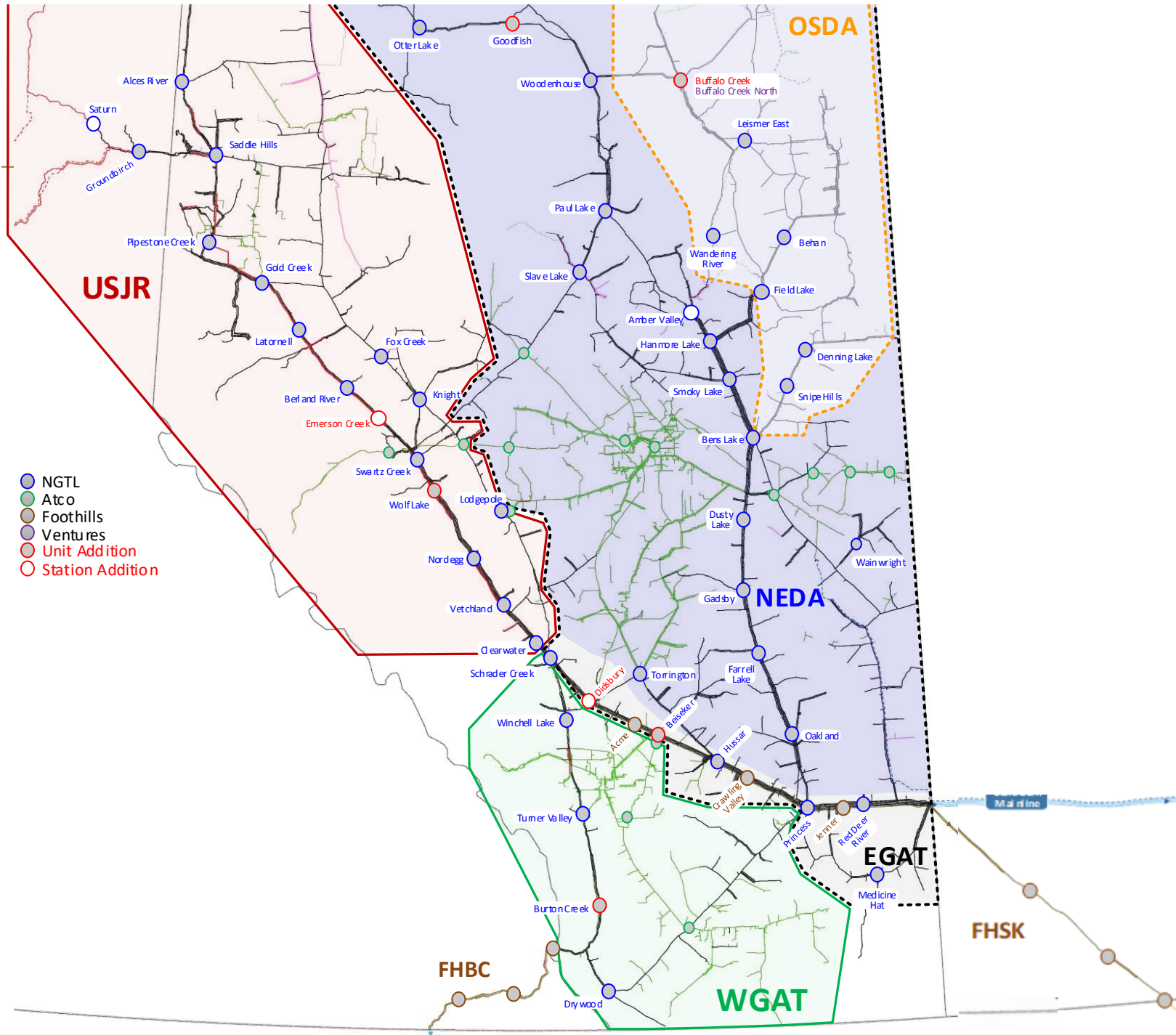


Reference Maps and Flow Paths



- NGTL
- Atco
- Foothills
- Ventures
- Unit Addition
- Station Addition

For informational purposes only



Commonly Referenced Flow Paths

NWML

NCC

GPML

EDSML

CAS

WAS

NLAT

EAS

SLAT

- Northwest Mainline (NWML)
- Grande Prairie Mainline (GPML)
- Edson Mainline (EDSML)
- Western Alberta System Mainline (WAS)
- Central Alberta System Mainline (CAS)
- Eastern Alberta System Mainline (EAS)
- South Lateral (SLAT)
- North Lateral (NLAT)
- North Central Corridor (NCC)

Click [HERE](#) to access this information on Customer Express