



NGTL System and Foothills PipeLines Ltd.

Customer Operations Meeting

May 6, 2021



For information purposes only

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 May 6, 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



Safety Moment

Cleaning Safety

COVID-19 has encouraged us all to enhance our cleaning practices! While maintaining a clean space to protect ourselves and our families is important, it is just as important to be educated on the cleaners we are using and how dangerous they can be if used together incorrectly!

About 1 in 3* adults used chemicals or disinfectants unsafely while trying to protect against COVID-19

Stay safe while using household cleaning and disinfectant products



Always read instructions



Wear protective gear



Do not mix chemicals

*According to a nationally representative survey of 302 U.S. adults—May 6, 2020

CDC.GOV bit.ly/MMWR6520 MMWR

Agenda

- 1 Review outages in Daily Operating Plan (DOP)
- 2 Innovation: ORBIT

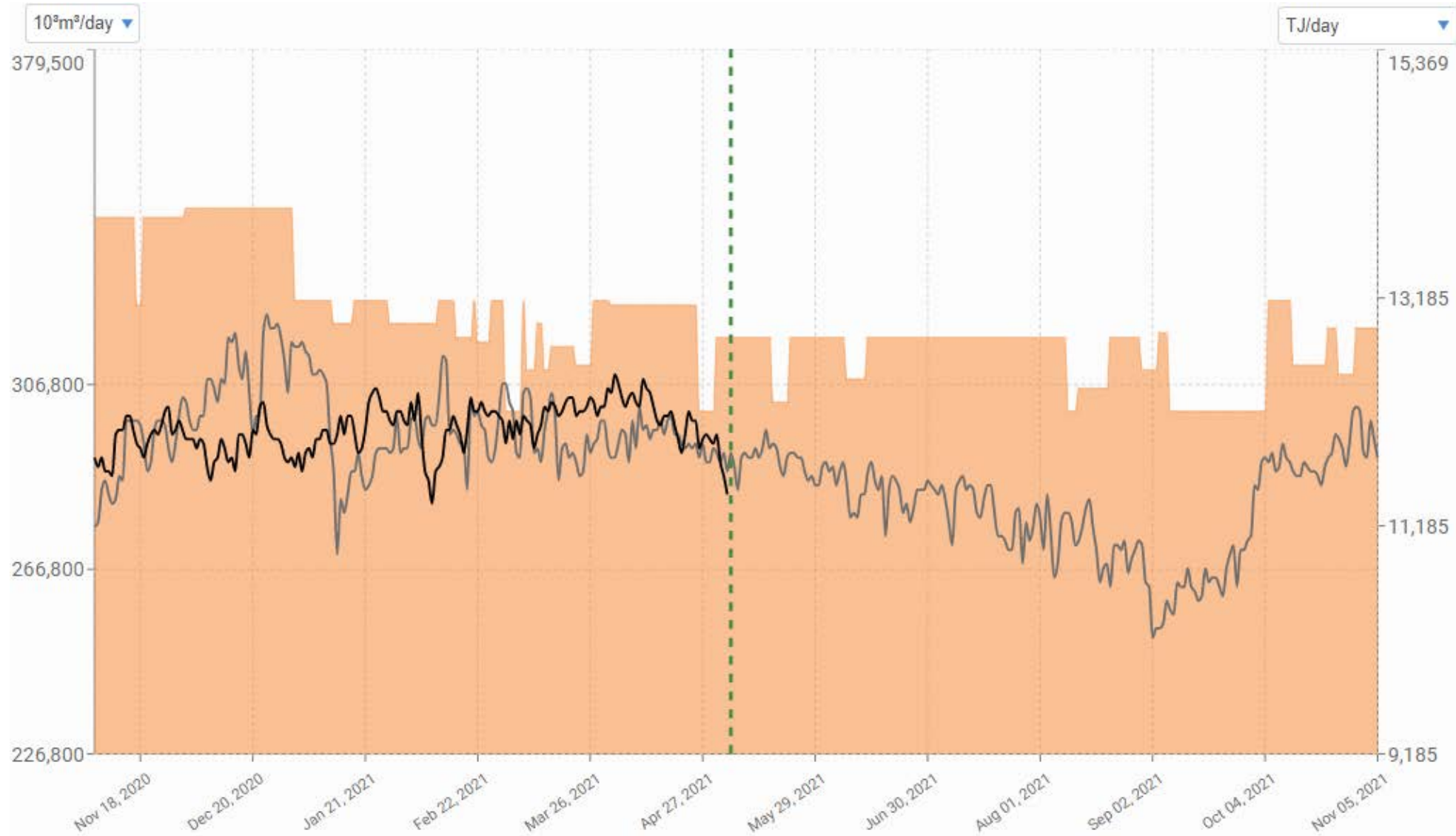


2021 Outage Review

From DOP as of Wednesday, May 5

Upstream James River

USJR Capability USJR Historical Flow USJR Actual Flow



For information purposes only

This slide is NOT applicable beyond the May 6, 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

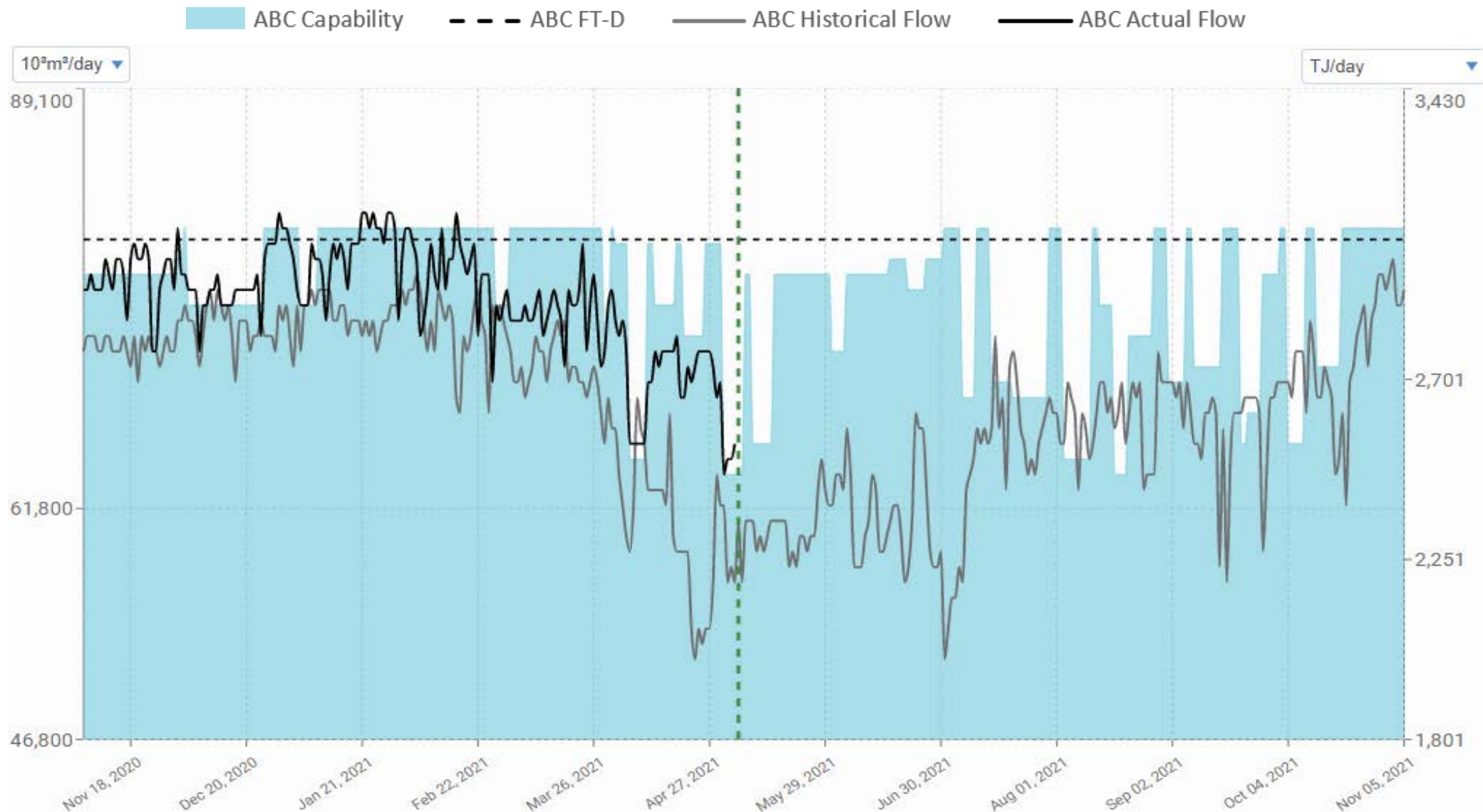
Partial
impact to FT

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
Meikle River D5 - Compressor Station Maintenance	17-May-21	21-May-21	303	14	N/A	260-310	Potential impact to FT-R USJR
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	170-210	Potential impact to FT-R Segments 2, 3, 4, partial 5, partial 7
Hidden Lake – Compressor Station Maintenance	18-Oct-21	7-Nov-21	319	6	194	145-180	Potential impact to FT-R Segments 2, 3, 4, and 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)



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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)	System	Service Allowable Location/Area
NPS 42 Western Alberta System Mainline Loop - Pipeline Maintenance	1-May-21	6-May-21	64	14	NGTL	Partial Impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 36 Western Alberta System Mainline – Pipeline Maintenance	7-May-21	15-Jun-21	77	1	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
NPS 36 Western Alberta System Mainline - Pipeline Maintenance	9-May-21	14-May-21	66	12	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	6	NGTL	Potential impact to FT-D: Alberta/BC and Alberta/Montana Borders
Turner Valley A3 - Compressor Station Maintenance	21-Jun-21	25-Jun-21	76	2	NGTL	Potential impact to FT-D: Segment 22 and partial 21
NPS 36 Western Alberta System Mainline Loop - Pipeline Maintenance	6-Jul-21	9-Jul-21	69	11	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
Winchell Lake - Compressor Station Maintenance	3-Aug-21	7-Aug-21	65	15	NGTL	Potential Impact to FT-D: Segment 22 and partial 21
NPS 36 BC Mainline - Pipeline Maintenance	4-Aug-21	10-Aug-21	65	15	FH BC	Potential impact to FT: Alberta/BC Border
NPS 36 Foothills Zone 8 Seg 3 - Pipeline Maintenance	13-Aug-21	17-Aug-21	75	5	FH BC	Potential impact to FT: Alberta/BC Border

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West Gate Delivery Area (WGAT)

Foothills Zone 8 (FHBC)

No
impact to FT

Potential
impact to FT

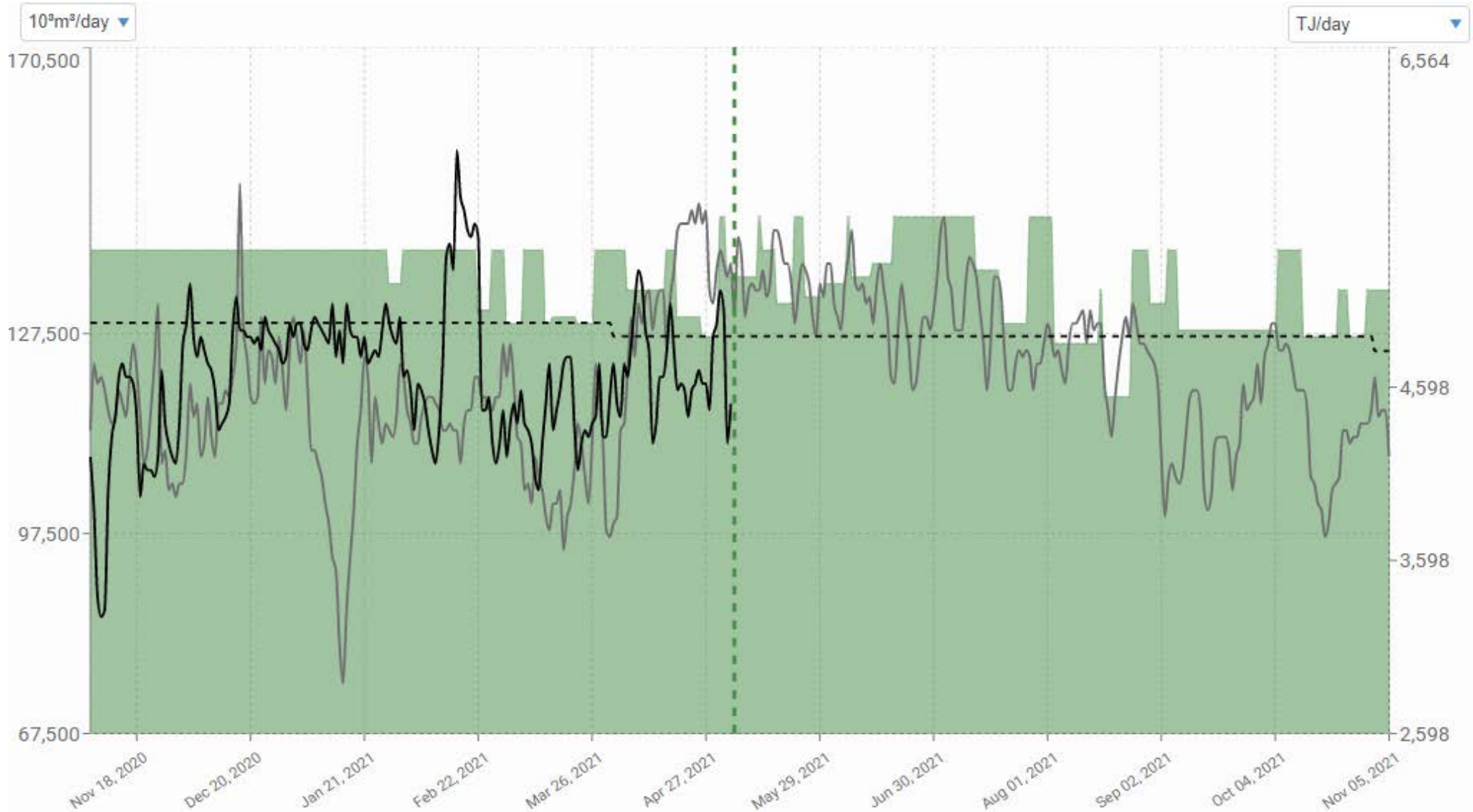
Partial
impact to FT

Outage Description	Start	End	Capability/ Allowable (10 ⁶ m ³ /day)	Impact (10 ⁶ m ³ /d)	System	Service Allowable Location/Area
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	19-Aug-21	23-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 36 Foothills Zone 7 Leg 1A – Pipeline Maintenance	1-Sep-21	5-Sep-21	70	10	NGTL	Potential Impact to FT-D: Segment 22 and partial 21
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 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
Clearwater – Compressor Station Maintenance	27-Sep-21	1-Oct-21	77	3	NGTL	Potential impact to FT: Segment 22 and partial 21
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
NPS 36 BC Mainline – Pipeline Maintenance	12-Oct-21	18-Oct-21	71	9	FH BC	Potential impact to FT: Alberta/BC Border

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East Gate

EGAT Capabilitv — EGAT FT-D — EGAT Historical Flow — EGAT Actual Flow



East Gate Delivery Area (EGAT)

Foothills Zone 9 (FHSK)

No
impact to FT

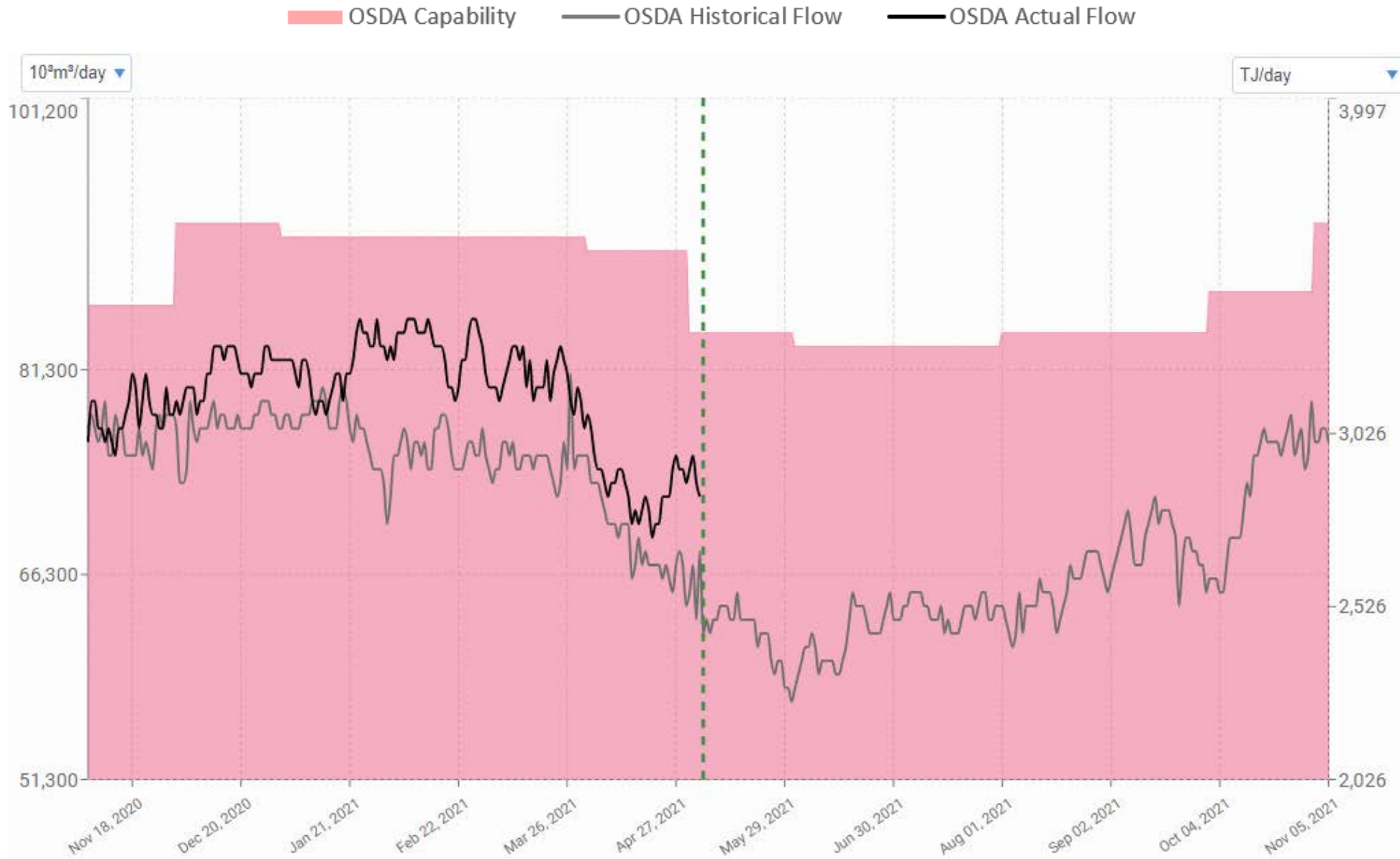
Potential
impact to FT

Partial
impact to FT

Outage Description	Start	End	Capability (10 ⁶ m ³ /day)	Impact (10 ⁶ m ³ /d)	System	Service Allowable Location/Area
NPS 48 Central Alberta System Mainline Loop 2 Pipeline Modification	3-May-21	11-May-21	136	9	NGTL	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	16-May-21	140	5	NGTL	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	17-May-21	21-May-21	132	13	NGTL	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
Princess – Compressor Station Maintenance	25-May-21	30-May-21	133	12	NGTL	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	NGTL	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
Hussar B8 – Compressor Station Maintenance	7-Jun-21	8-Jun-21	140	5	NGTL	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	NGTL	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
Acme – Compressor Station Maintenance	12-Jul-21	25-Jul-21	137	8	NGTL	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	NGTL	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	3-Aug-21	15-Aug-21	126	19	NGTL	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
Crawling Valley – Compressor Station Maintenance	16-Aug-21	30-Aug-21	140	5	NGTL	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	NGTL	No impact to FT-D anticipated: Empress/McNeill Borders Segments 15, 16, 17, 18, 19, 20, 23, partial 21, and partial 28
Monchy 1 – Compressor Station Maintenance	7-Sep-21	29-Oct-21	69	-	FH SK	Potential impact to FT: McNeill Border

*Potential to impact Tranche 3 EGAT Firm contracts

Oil Sands Delivery Area



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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

There are currently no outages planned that are specific to OSDA or NEDA



Innovation: ORBIT

Development of ORBIT

Envisioned a better and more efficient way to interpret and analyze data







Ops Planner

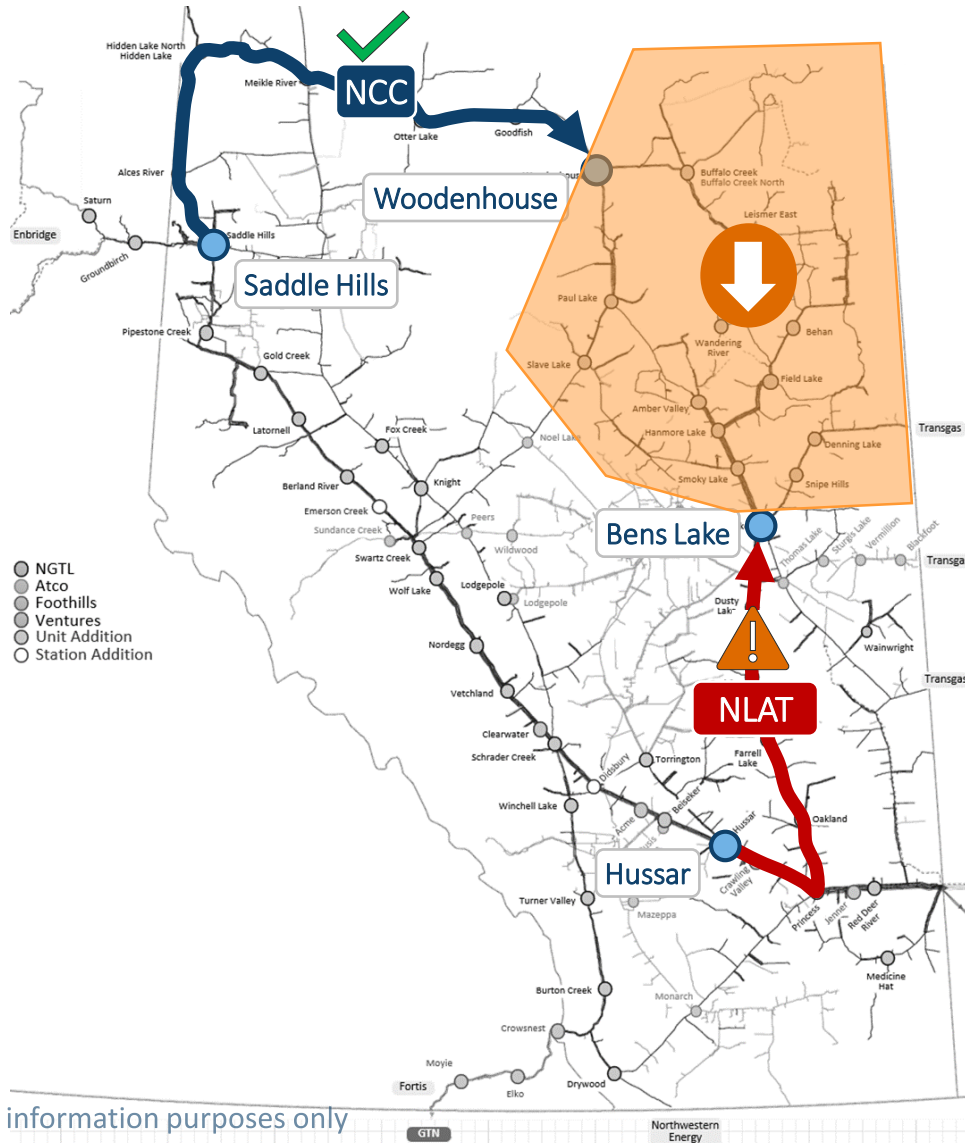
ORBIT

Ops Planners augmented with machine learning

ORBIT (Operations Resiliency Business Intelligence Tool)

-  Detects anomalies and patterns faster than any humans using advanced analytics and our comprehensive knowledge base
-  Informs of unusual or undesired patterns so that they can be assessed, resolved, and tracked effectively and efficiently
-  This helps find and locate problems before trouble arises
-  ORBIT is being released using a phased agile methodology:
 - First release was last month
 - Continued releases through the rest of the year

Background Example

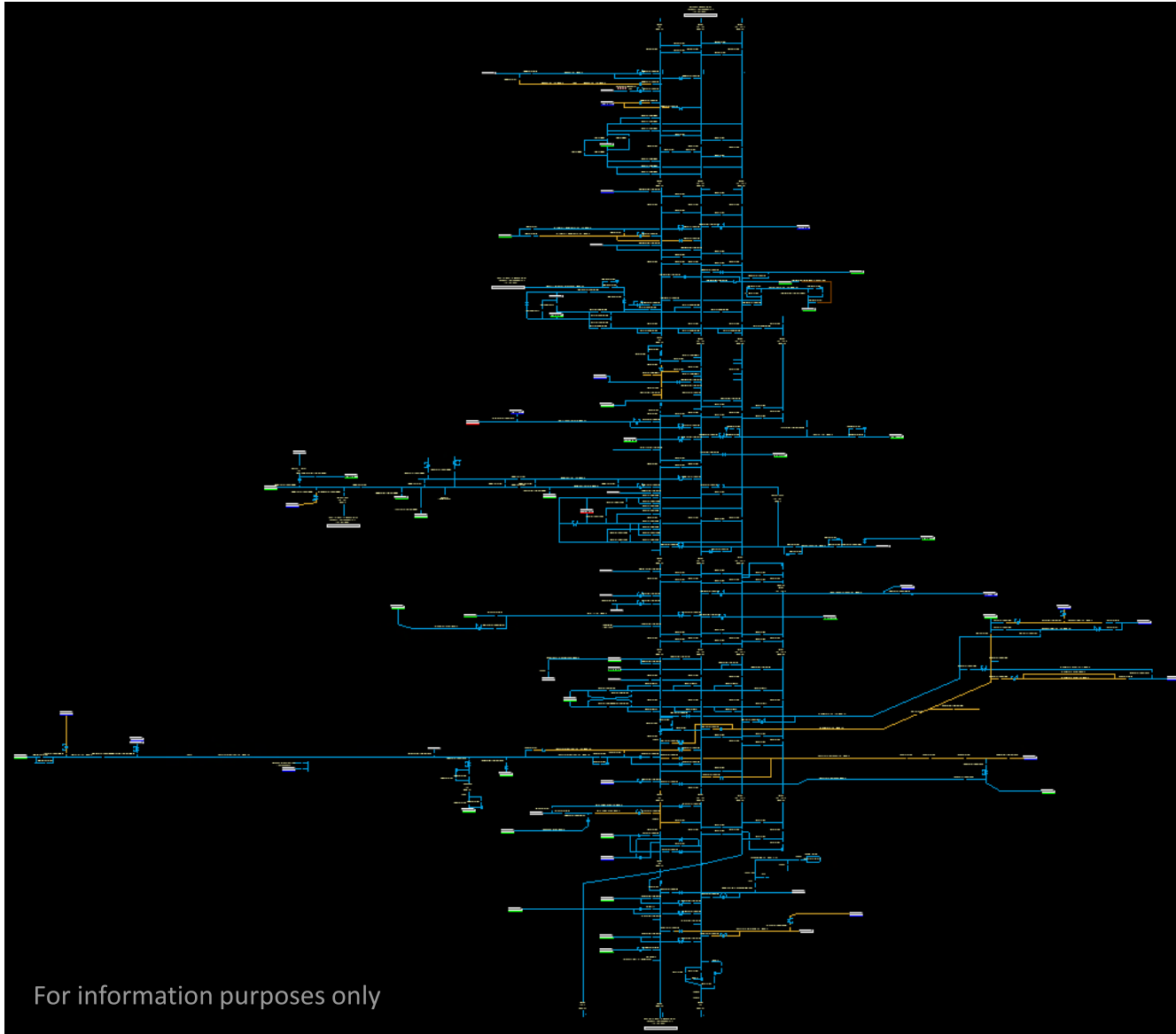


Unexpectedly low Northeast Alberta pressures

- ✓ North Central Corridor (NCC) Path
 - Always maximized and optimized
- ⚠ North Lateral (NLAT) Path
 - Difficult to detect anomalies until peaking
 - Peaks only during demand periods
 - Difficult to pinpoint

1. Hydraulic analysis on NLAT operations
 - Detecting patterns in the data that may not align
 - Requires extensive time and experience to complete
2. Identify location of performance loss
3. Rectify performance loss

Significant Interpretation and Analysis



Data
88,000+ SCADA points



Interpretation
Performance Loss

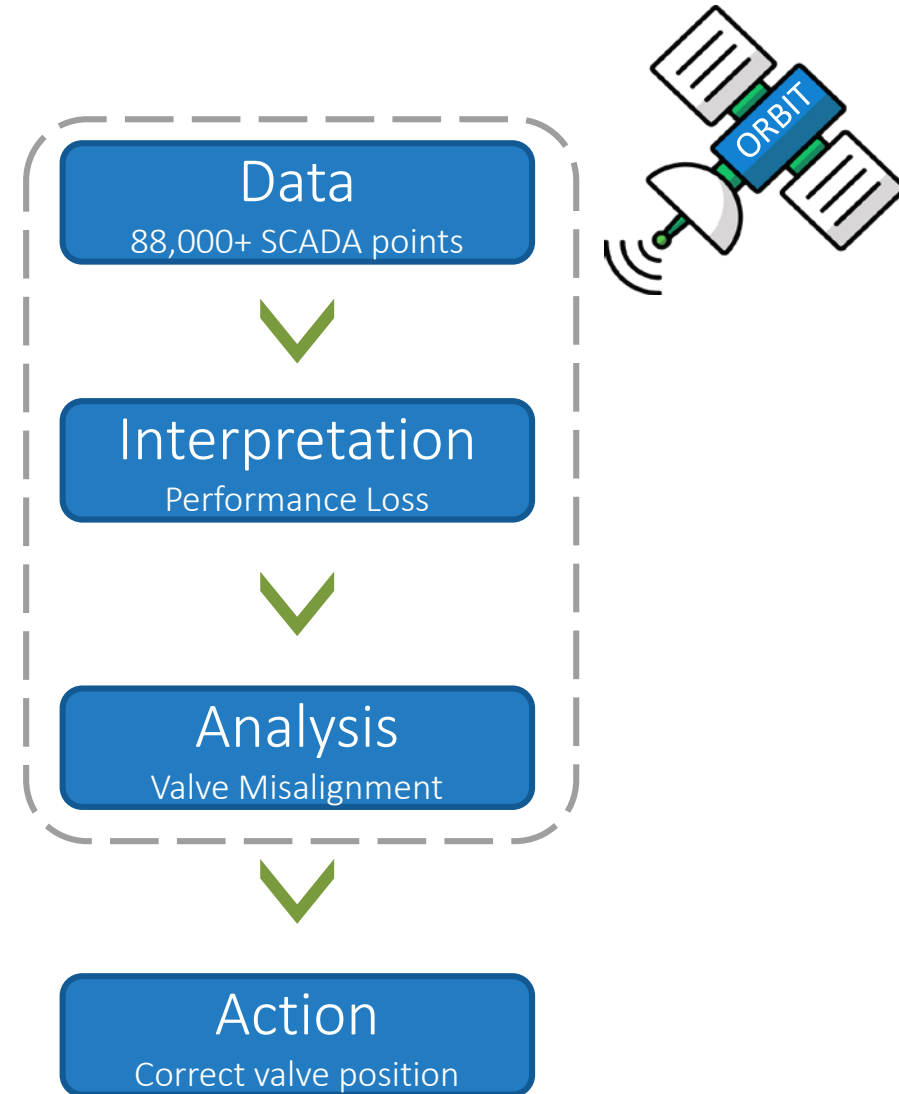
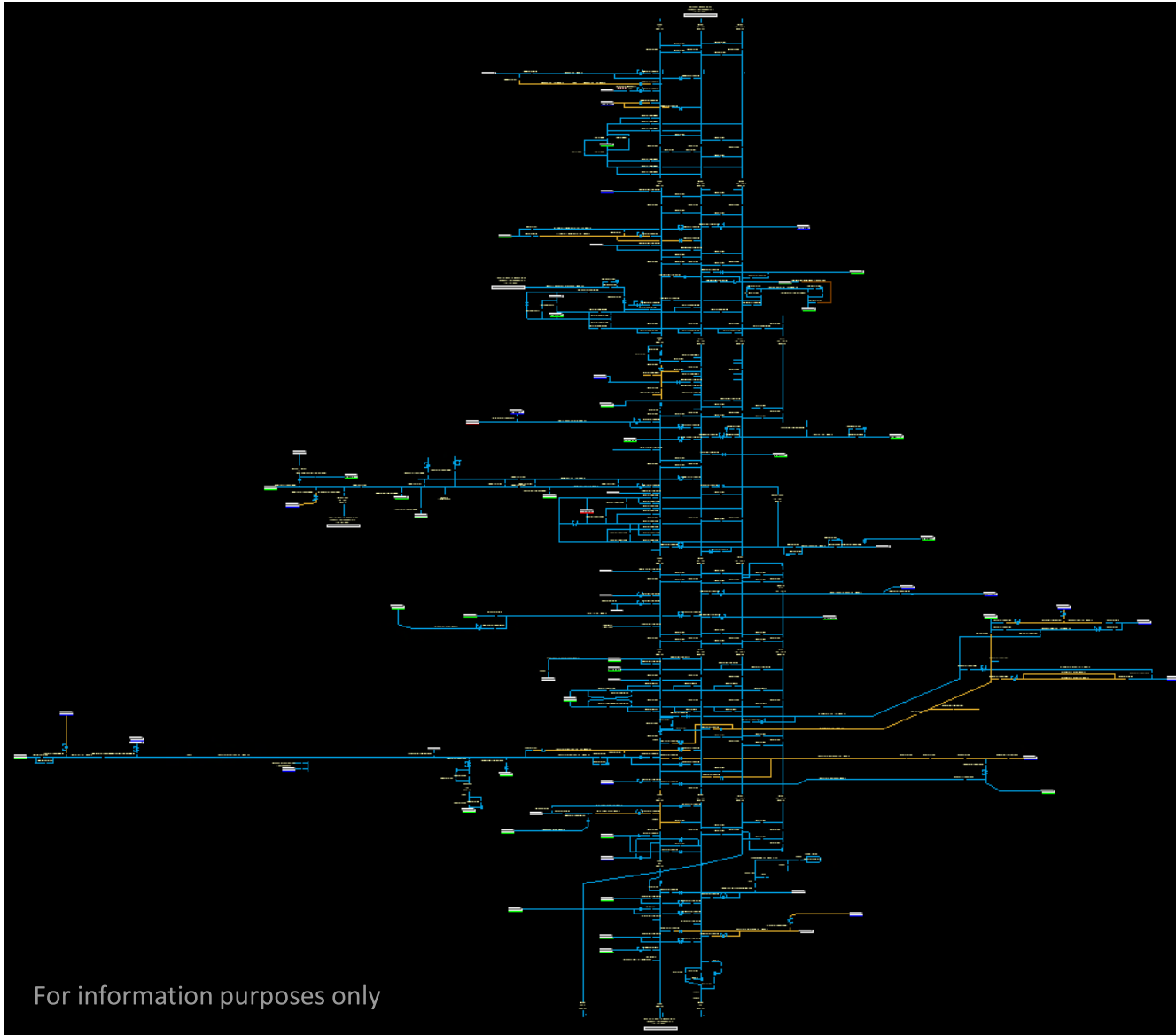


Analysis
Valve Misalignment









Action
Correct valve position

Significant Interpretation and Analysis



ORBIT - Targeted Benefits

-  Increase service availability and reliability
-  Reduce fuel, emissions, and greenhouse gas costs
-  Operations and maintenance cost avoidance
-  Increase knowledge retention
-  Reduce time to evaluate total system operations
-  Reduce business continuity risk

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