

## NGTL System and Foothills Pipeline Customer Meeting


January 23, 2018

# 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 point is located on the plus-15 level of 5<sup>th</sup> Avenue Place (425 1<sup>st</sup> Street SW)

## Participating through WebEx:

- Please sign-in through WebEx application including your full name and company
- In response to customer requests to reduce background noise and improve audio quality, all WebEx participants will be placed on mute 
- Prior to commenting or asking a question, please remember to take yourself off mute and identify yourself

*Information provided herein 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.*

# Safety Moment – Distracted Driving



Apple iOS 11 new distracted driving feature



# Agenda

## **Dec/Jan Cold Snap Overview**

- Receipts, Deliveries, Linepack
- NGTL Operational Events

## **2018 Operational Outlook**

- Outage Overview
- Expansion Facility Review

## **NGTL Linepack Management**

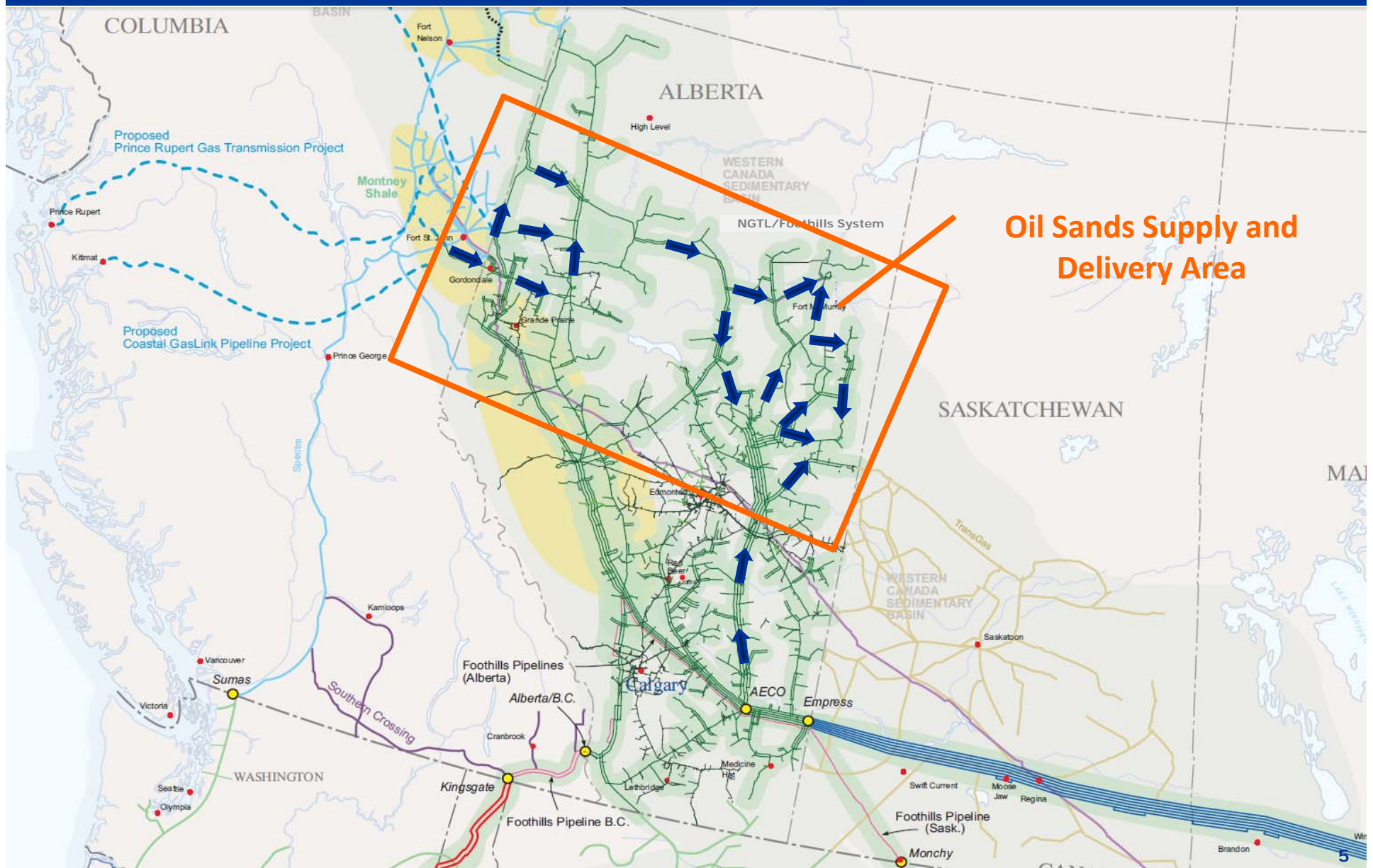
- System Linepack and Capability
- Daily Operational Supply Demand Balancing

## **General**

- Operational Storage Assessment
- Outage Reporting Enhancements
- 2019 Outage Planning



# Illustrative NGTL System Flow Paths



# Unplanned Event Management

1. Dispatch personnel to site (typically 1-4 hours)
2. Immediate pressure management if required
3. Equipment diagnosis and prognosis – ETA to return to service (time to assess is situational – may take many hours and specialized knowledge and equipment)
4. Review service restriction area and allowable should equipment not return to service
5. If return to service is not imminent (same day) and reasonable operating pressures cannot be sustained, NGTL will implement a service restriction
  - Cannot determine if a restriction is required without knowing if equipment will return to service
  - As soon as status of equipment is determined, a service restriction will be triggered through NrG Highway notice (effective next available nomination window)

# NEDA Restriction (Dec 2017)

- Goodfish unavailable Dec 27 to Jan 1
- Meikle River D unavailable Dec 28 to 31
- Saddle Hills M unavailable Dec 29 to Jan 1

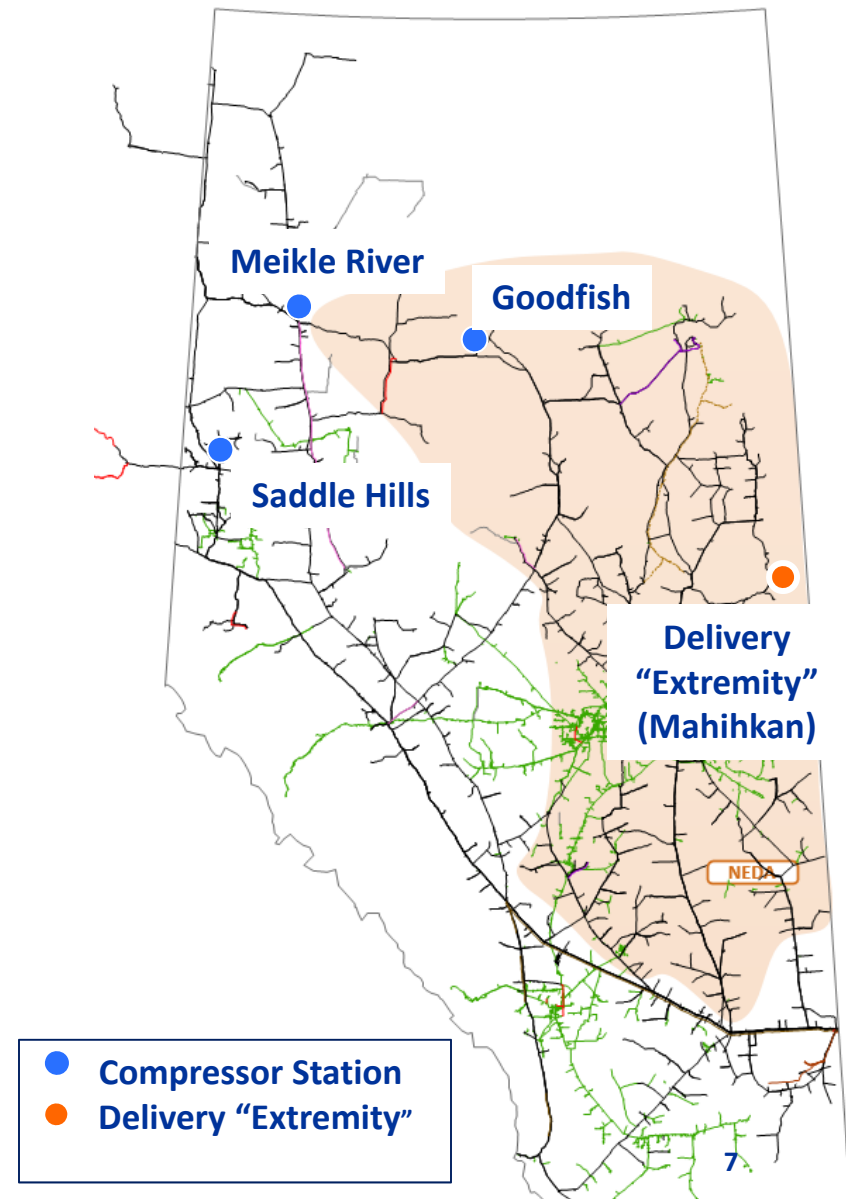
- **NEDA Service Restriction**

- Full segments: 6,10-15,17,23

Partial segments: 9, 16

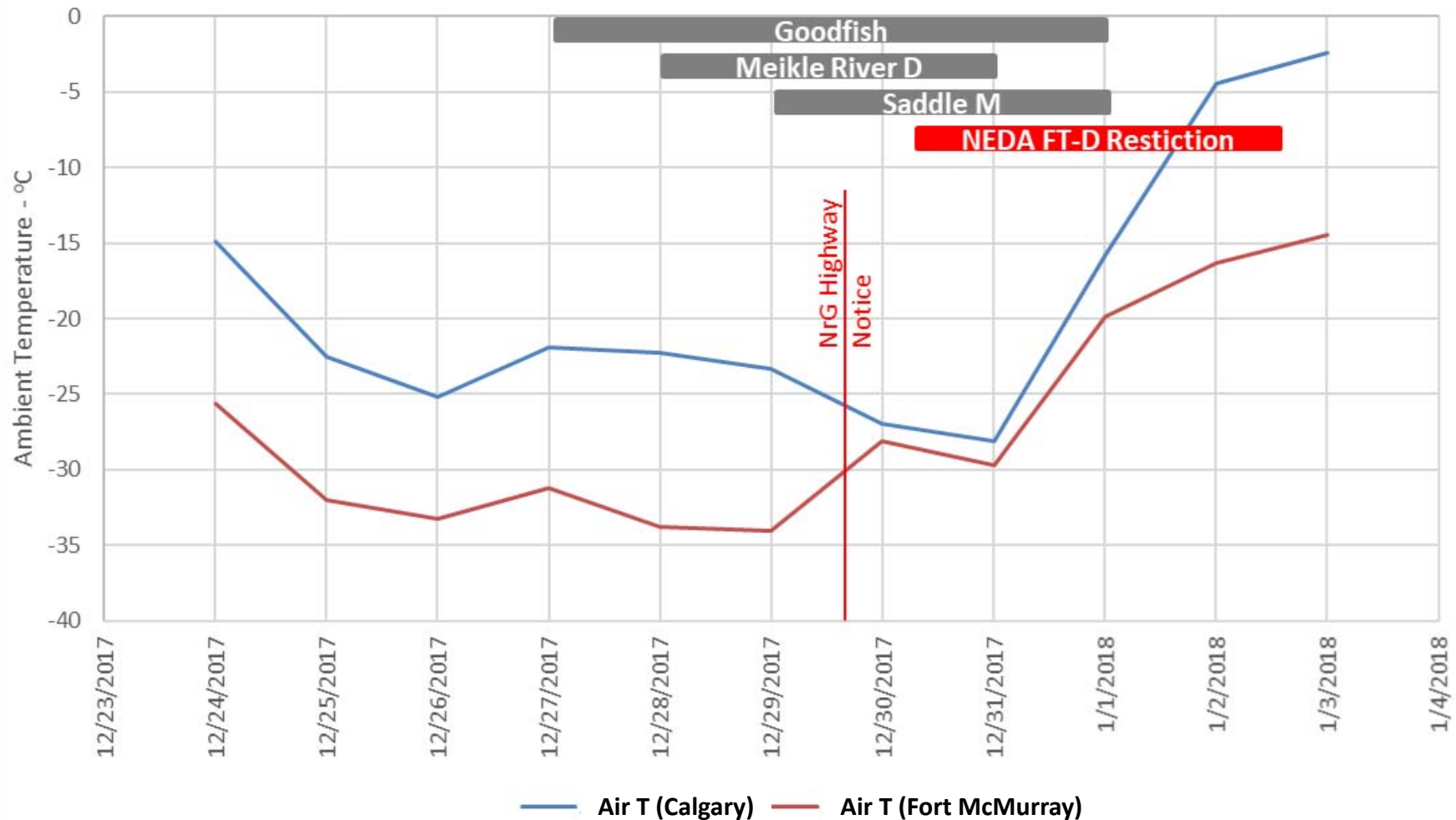
80% FT-D Dec 30, 08:00 MST

100% IT-D Jan 2, 13:00 MST



# December 2017 Sequence of Events

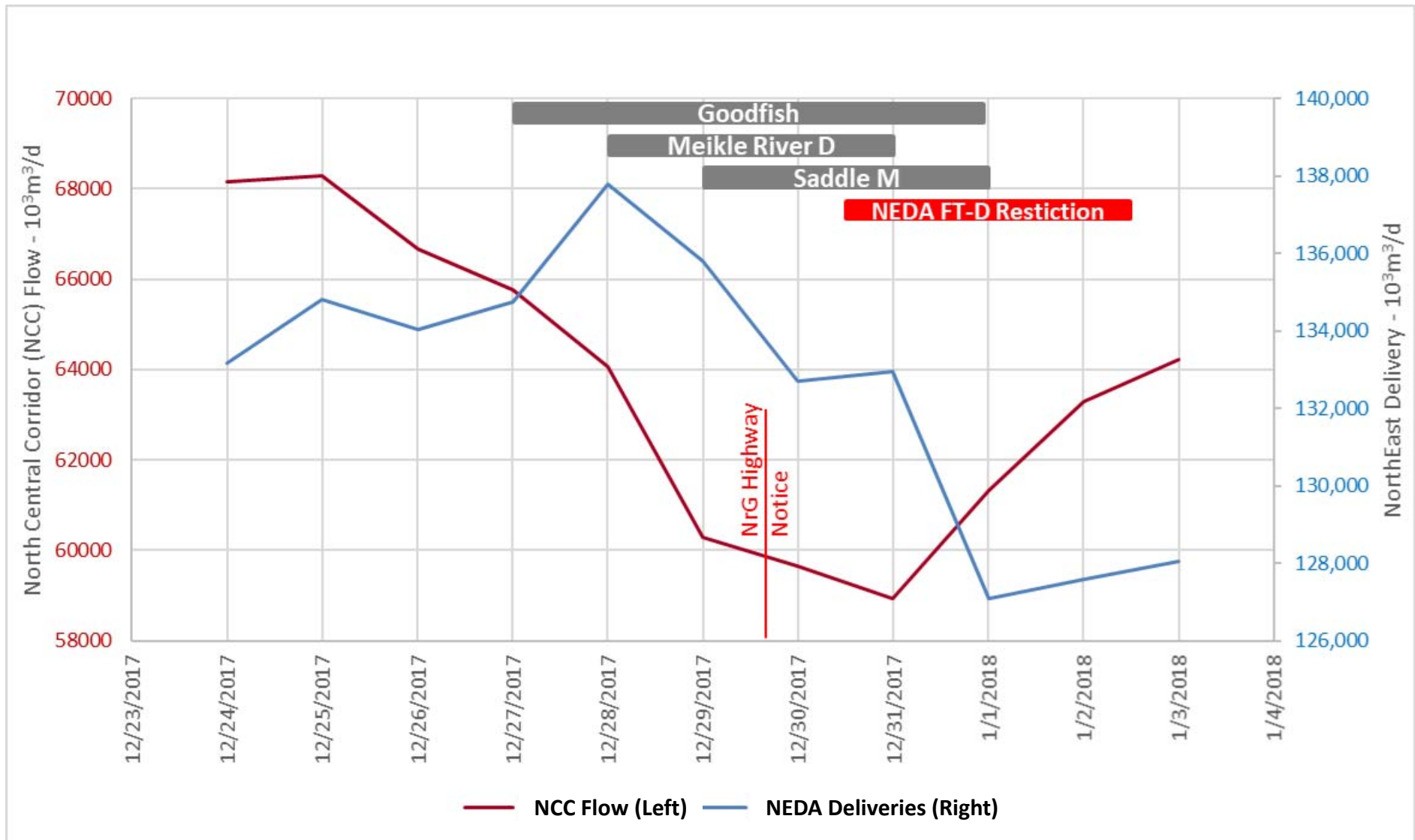
## Ambient Temperature





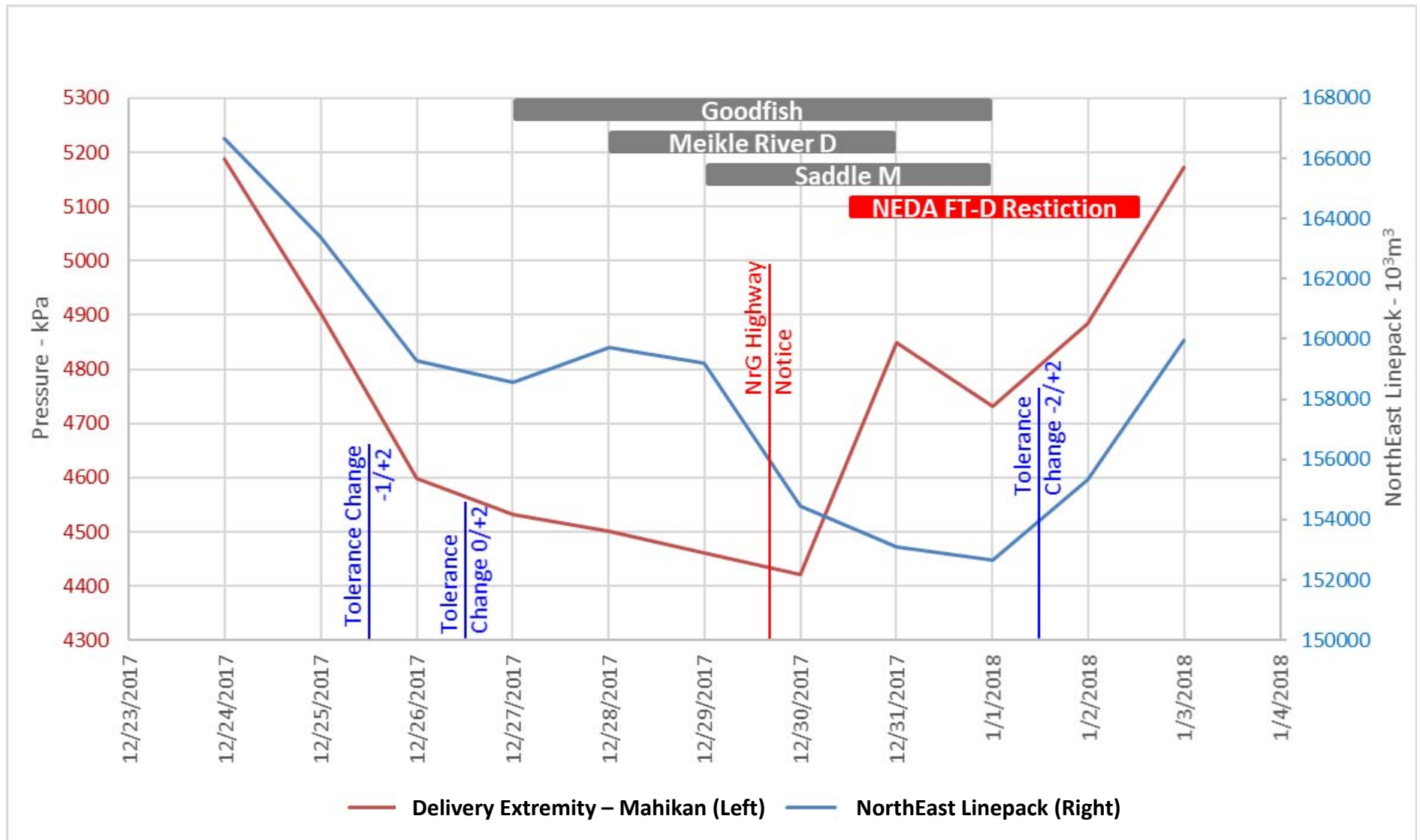
# December 2017 Sequence of Events

## NCC and NEDA Flow



# December 2017 Sequence of Events

## NEDA Delivery Pressure



# NEDA Restriction (Jan 2018)

- Oakland unavailable Jan 5 to Jan 21
- Alces River unavailable Jan 11 to Jan 17
- NEDA Service Restriction

- Full segments: 6,10-15,17,23,28

Partial segments: 9, 16

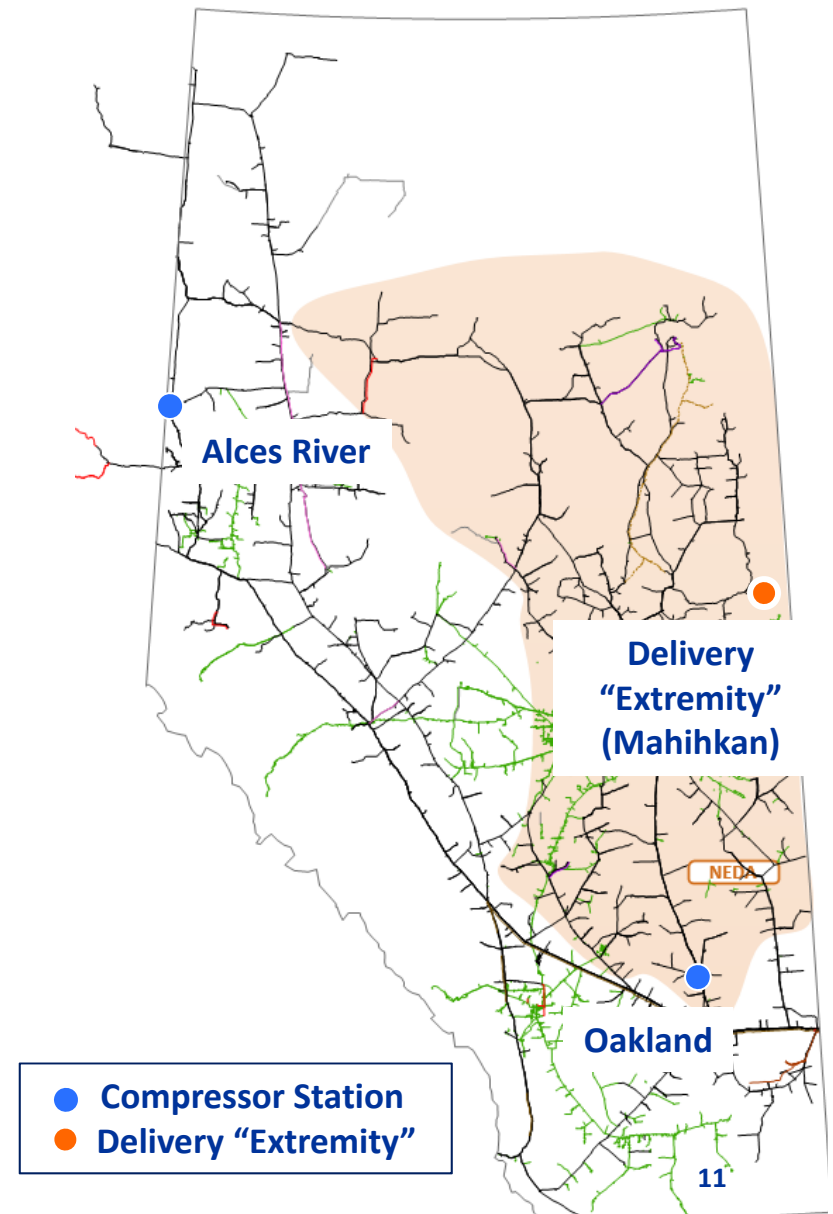
70% FT-D Jan 12, 13:00 MST

80% FT-D Jan 14, 13:00 MST

85% FT-D Jan 16, 13:00 MST

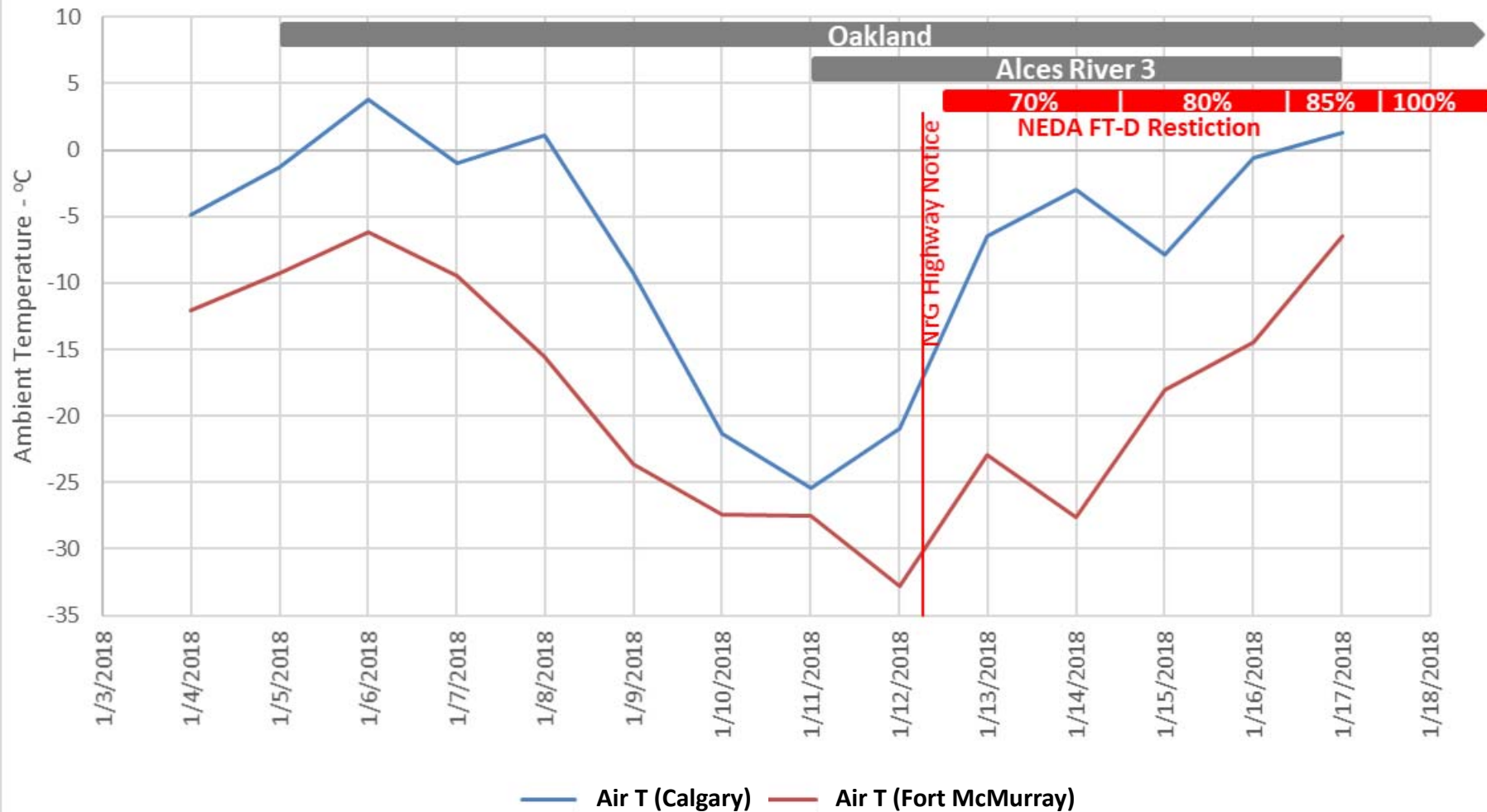
100% FT-D Jan 17, 13:00 MST

100% IT-D Jan 18, 13:00 MST



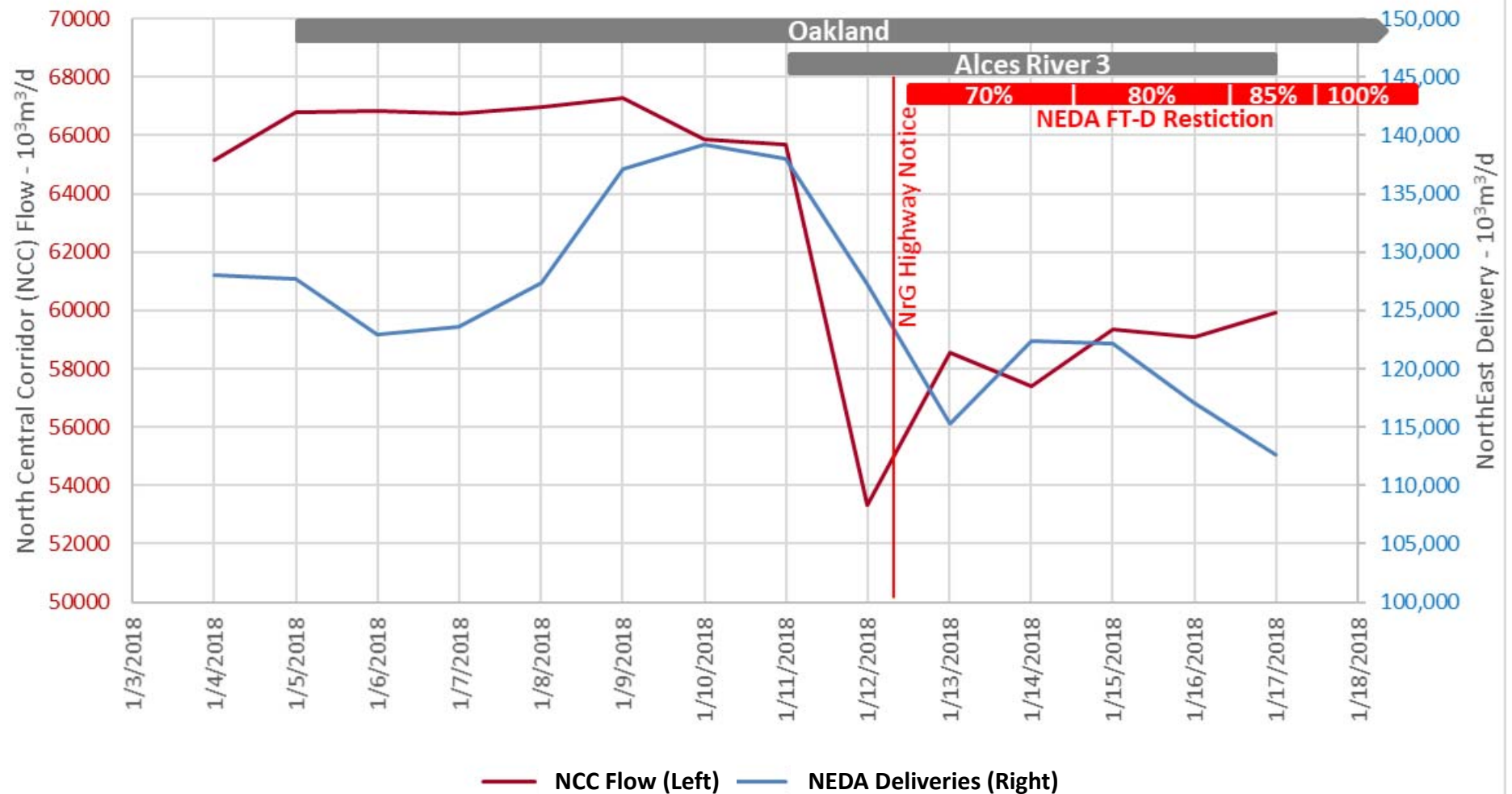
# January 2018 Sequence of Events

## Ambient Temperature



# January 2018 Sequence of Events

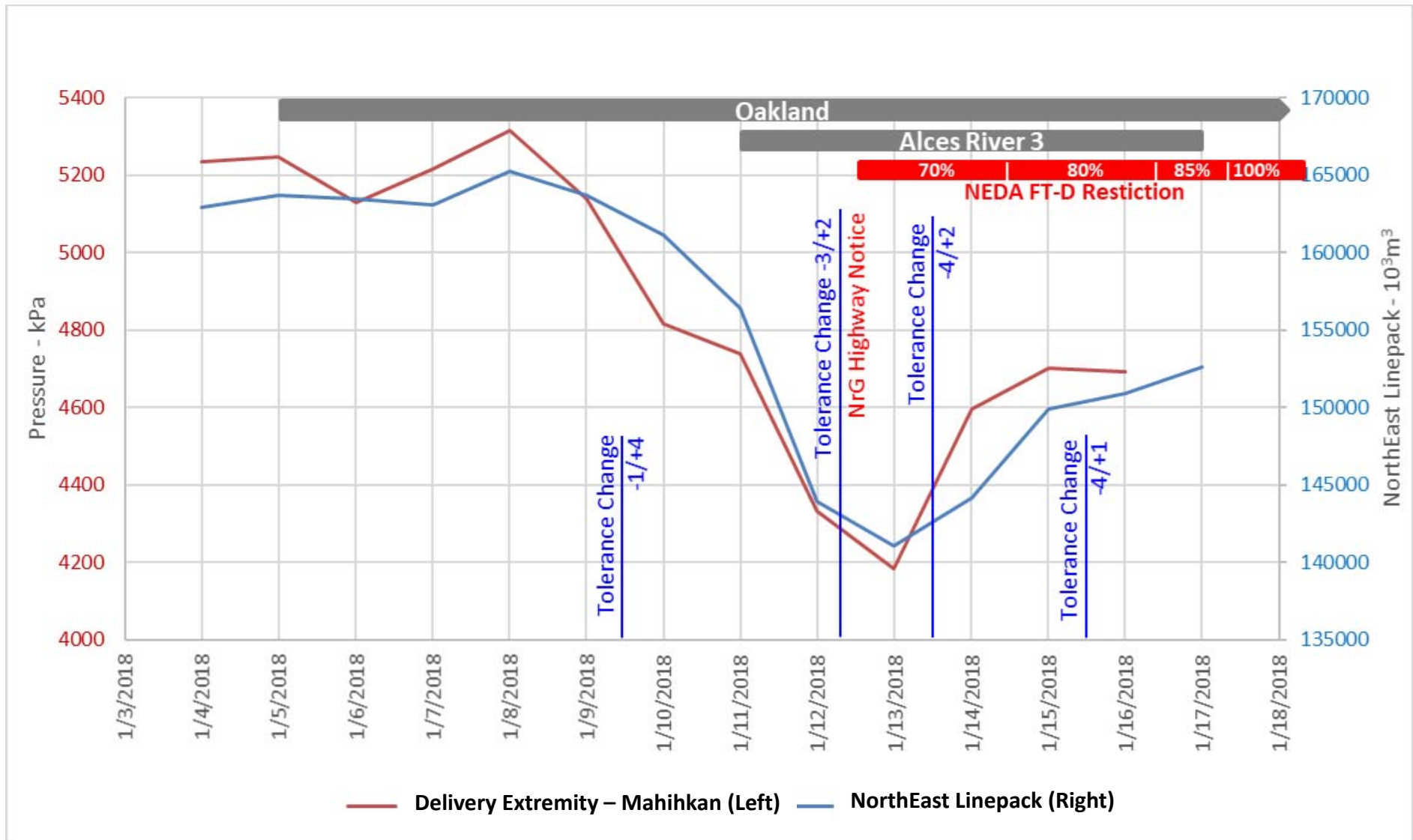
## NCC and NEDA Flow





# January 2018 Sequence of Events

## NEDA Delivery Pressure



# Summary of Unplanned Events

- Cold weather related – some common factors
  - Goodfish, Meikle River D, Saddle Hills Mobile

*Technical review underway to identify and address factors affecting future reliability*

- Mechanical related
  - Oakland, Alces River B3

*Factors resulting in the unplanned outages have been addressed through the repairs*

# Questions?



# Agenda

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## **2018 Operational Outlook**

- Outage Overview
- Expansion Facility Review

## **NGTL Linepack Management**

- System Linepack and Capability
- Daily Operational Supply Demand Balancing

## **General**

- Operational Storage Assessment
- Outage Reporting Enhancements
- 2019 Outage Planning

# Outage Planning Process

## 2018 Program Timeline:



***Currently starting 2018 outage execution with continual focus on integrating all work, bundling activities, and optimizing the overall program***



# 2018 Significant Outage Highlights

- **The following is our current set of known 2018 outages**
  - Information given is for outages that are planned and have a certain level of confidence in proceeding
  - Plant Turnaround alignment opportunities
- **Planning, preliminary hydraulic analysis and bundling activities complete**
  - Subject to change
- **Significant 2018 outages and applicable information is available on DOP**

# Daily Operating Plan Review

- All outage information is contained in a single report
- DOP is published at the end of each business day
- Information is available in .html and .csv format
- **Receipt, Delivery and Local Report/Tables**
  - “Potential IT/FT restriction”
  - “Partial FT restriction”
  - Associated upstream or downstream “Zero IT restriction”
- **Capability and Historical Flow Charts**
  - Target release is one per month, on a mid month cycle
  - Base operational capability, no outages with known & expected operational constraints
  - Outage specific capabilities updated on charts post outage

# DOP Receipt, Delivery and Local Report/Tables

## Receipt: Upstream James River Area (USJR)

Current USJR Base Operational Capability: 285,000 10<sup>3</sup>m<sup>3</sup>/d  
[USJR Capability and Historical Flow](#) (Last Updated: January 15, 2018)

Outage ID	Start	End	Capability/ Allowable (10 <sup>3</sup> m <sup>3</sup> /day)	Service Allowable Location/Area	Outage Description
13034443	FEB 13, 2018	FEB 14, 2018	275,000	Potential IT/FT Receipt Restriction USJR	Swartz Creek - Compressor Station Maintenance
12843248	MAR 26, 2018	MAR 30, 2018	276,000	Partial FT Receipt Restriction USJR	Meikle River D -Compressor Station Maintenance
12850118	APR 02, 2018	APR 05, 2018	285,000	Potential IT/FT Receipt Restriction USJR	Saddle Hills 2 - Unit Maintenance
13019318	APR 02, 2018	APR 11, 2018	283,000	Potential IT/FT Receipt Restriction USJR	NPS 36 Western Alberta System Mainline - Pipeline Maintenance

## Delivery: West Gate Delivery Area (WGAT)

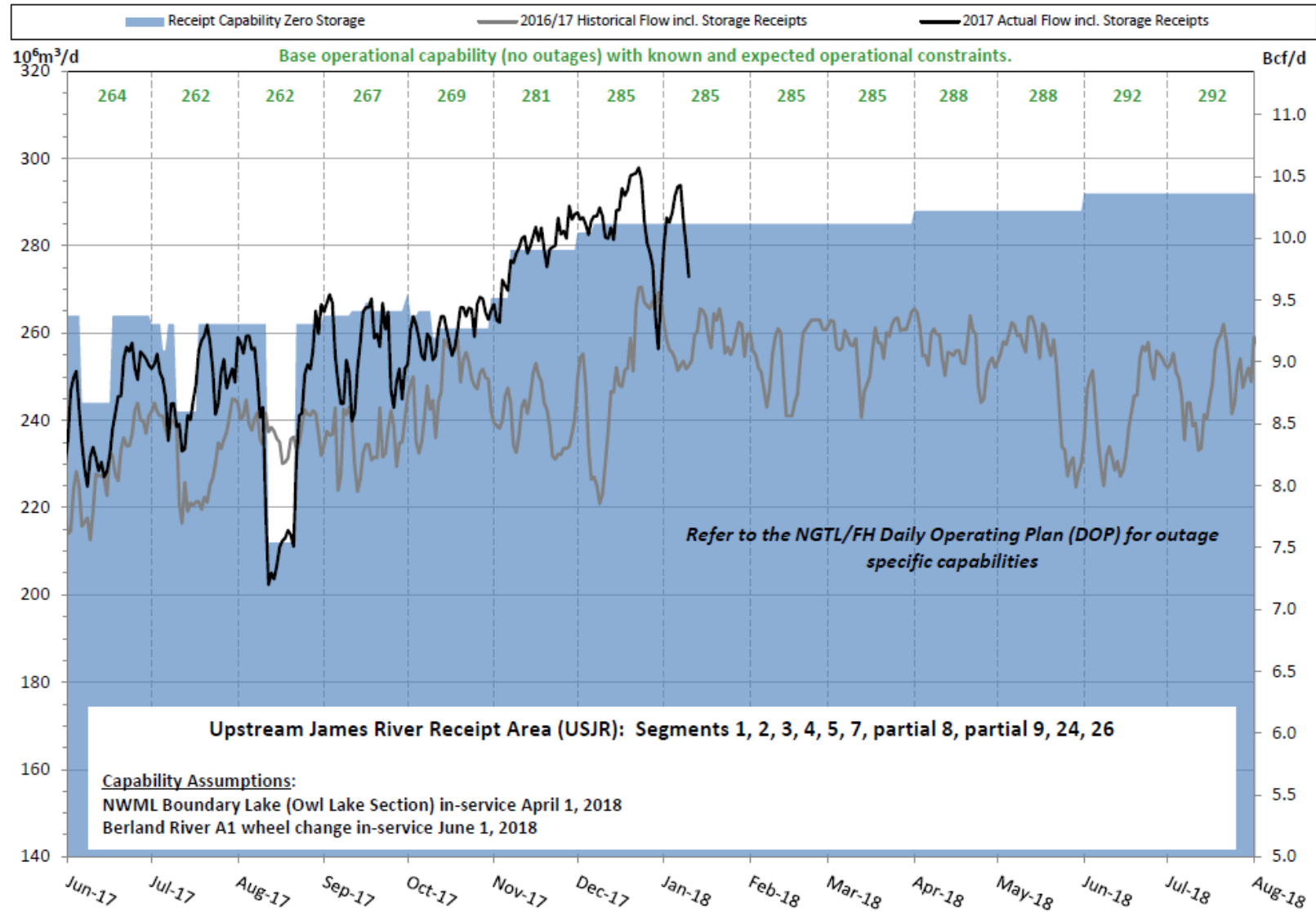
Current Alberta/BC Border Base Operational Capability: 69,000 10<sup>3</sup>m<sup>3</sup>/d  
[ABC Border Capability and Historical Flow](#) (Last Updated: January 19, 2018)

Outage ID	Start	End	Capability/ Allowable (10 <sup>3</sup> m <sup>3</sup> /day)	Service Allowable Location/Area	Outage Description
13034582	JAN 30, 2018	JAN 30, 2018	60,000	Potential FT Delivery Restriction Alberta/BC Border Segments 22 and partial 21	Winchell Lake - Compressor Station Maintenance
13034443	FEB 13, 2018	FEB 14, 2018	62,000	Potential IT Delivery Restriction Alberta/BC Border Segments 22 and partial 21	Swartz Creek - Compressor Station Maintenance
12843248	MAR 26, 2018	MAR 30, 2018	62,000	Zero IT Delivery Restriction Alberta/BC Border Segments 22 and partial 21	Meikle River D - Compressor Station Maintenance
13019318	APR 02, 2018	APR 11, 2018	69,000	Potential IT Delivery Restriction Alberta/BC Border Segments 22 and partial 21	NPS 36 Western Alberta System Mainline - Pipeline Maintenance

**West Gate Delivery Area (WGAT):** Alberta B.C. and Alberta Montana interconnects (Delivery locations in partial Segment 21 and Segment 22 may or may not be included depending on season)

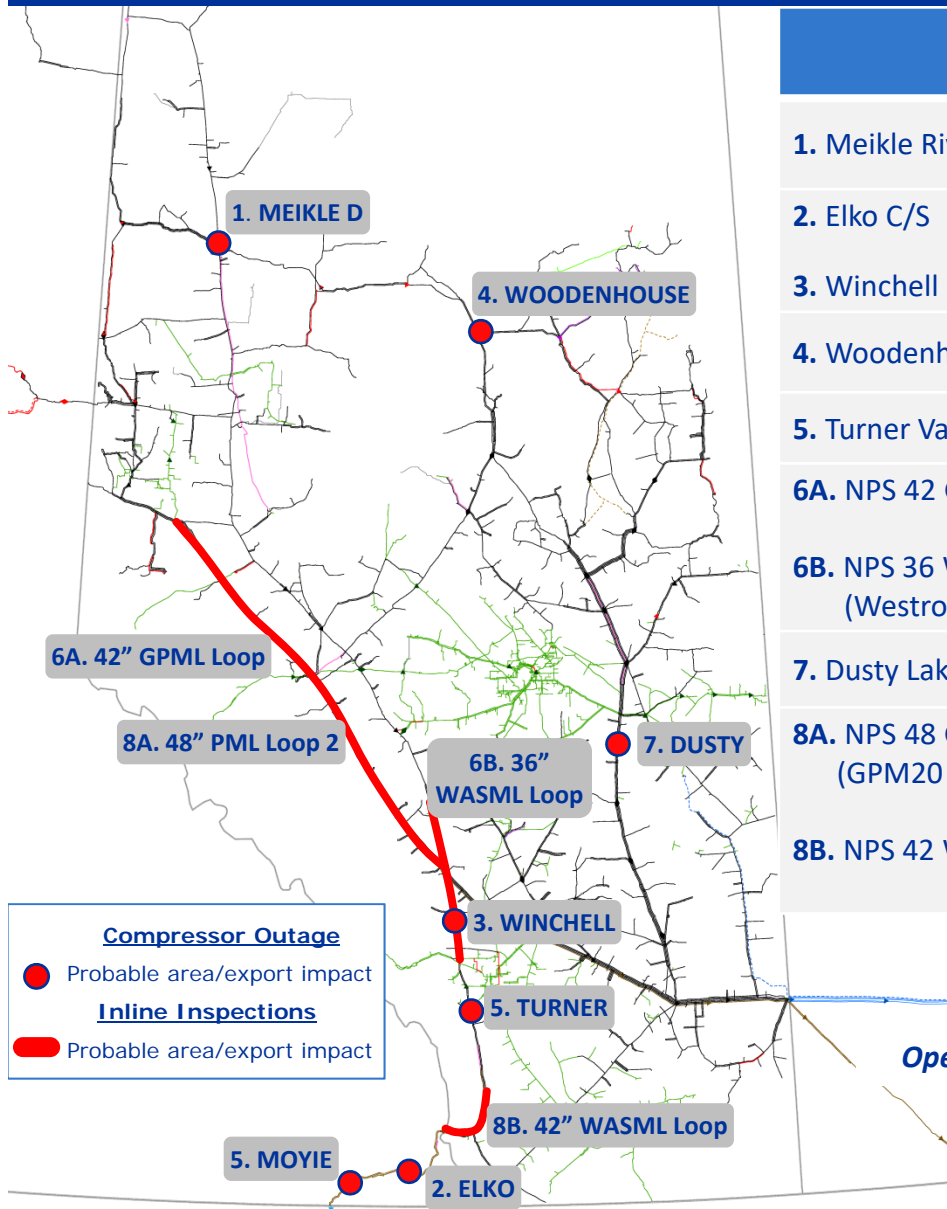
Capability/Allowable for Alberta/BC Border entries is reflective of only Alberta/BC flow and does not include flow to deliveries in segments 22 and partial 21. Where the Location/Area description includes segments in addition to Alberta/BC Border, delivery locations in those segments will receive the same percent allowable as Alberta/BC Border.

# DOP Capability and Historical Flow Charts



Last Updated: January 15, 2018

# 2018 Known Significant Outage Overview

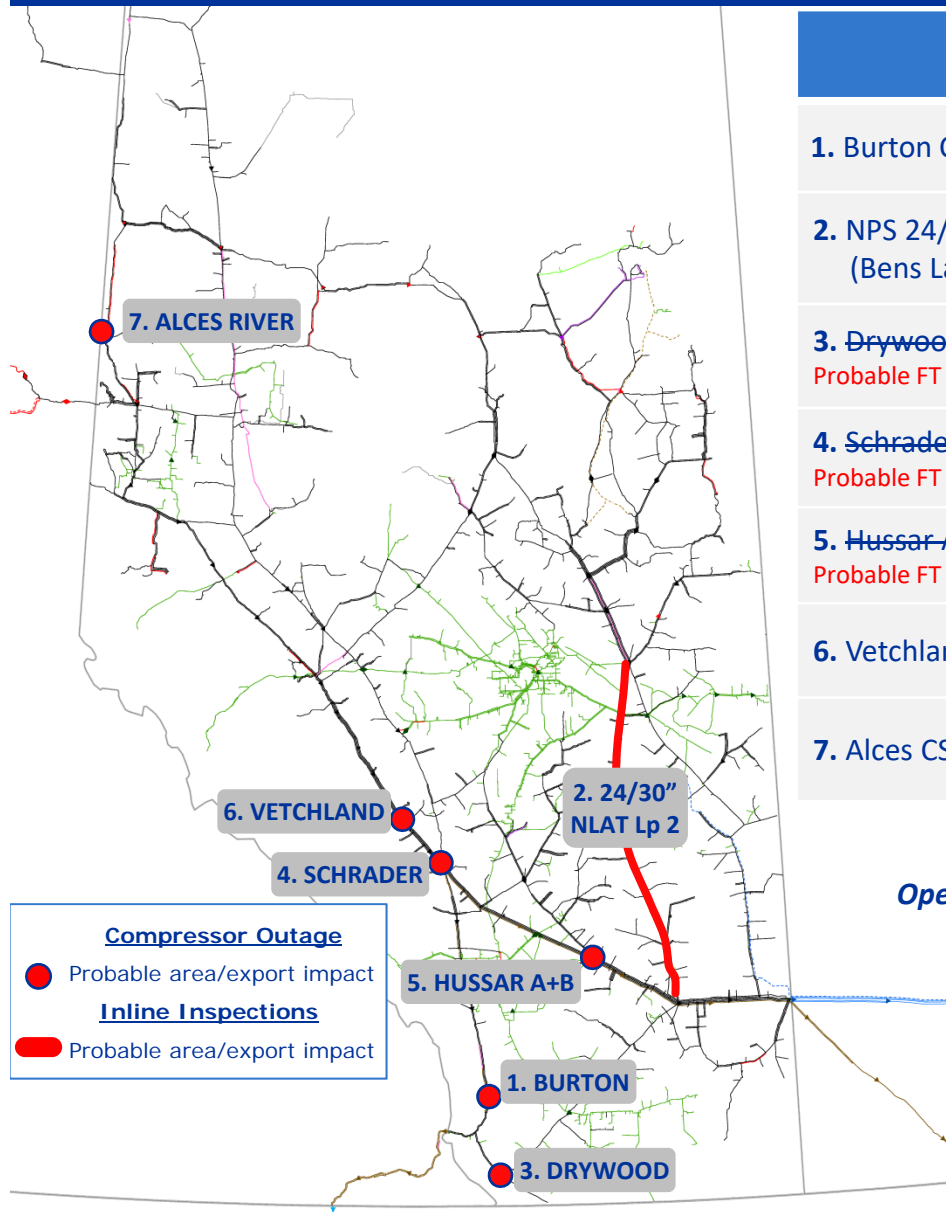


Facility Outage	Start Date	Duration (days)	Area
1. Meikle River D CS	03-25-18	6	USJR, EGAT, WGAT
2. Elko C/S	04-30-18	5	FHZ8
3. Winchell Lake C/S			WGAT
4. Woodenhouse B2 CS	05-14-18	5	USJR, EGAT
5. Turner Valley CS	05-15-18	3	WGAT
6A. NPS 42 GPML Loop (Gold to Edson)	05-22-18	11	USJR
6B. NPS 36 WASML Loop (Westrose to Sundre)	05-23-18	10	WGAT
7. Dusty Lake CS	05-28-18	4	NEDA
8A. NPS 48 GPML Loop 2, EDSML Loop 3 (GPM20 to Schrader Creek)	06-02-18	12	USJR
8B. NPS 42 WASML Loop (WAS60 to ABC)	06-04-18	9	WGAT

*Operational capability, timing and impacts are provided in DOP tables*



# 2018 Known Significant Outage Overview (con't)



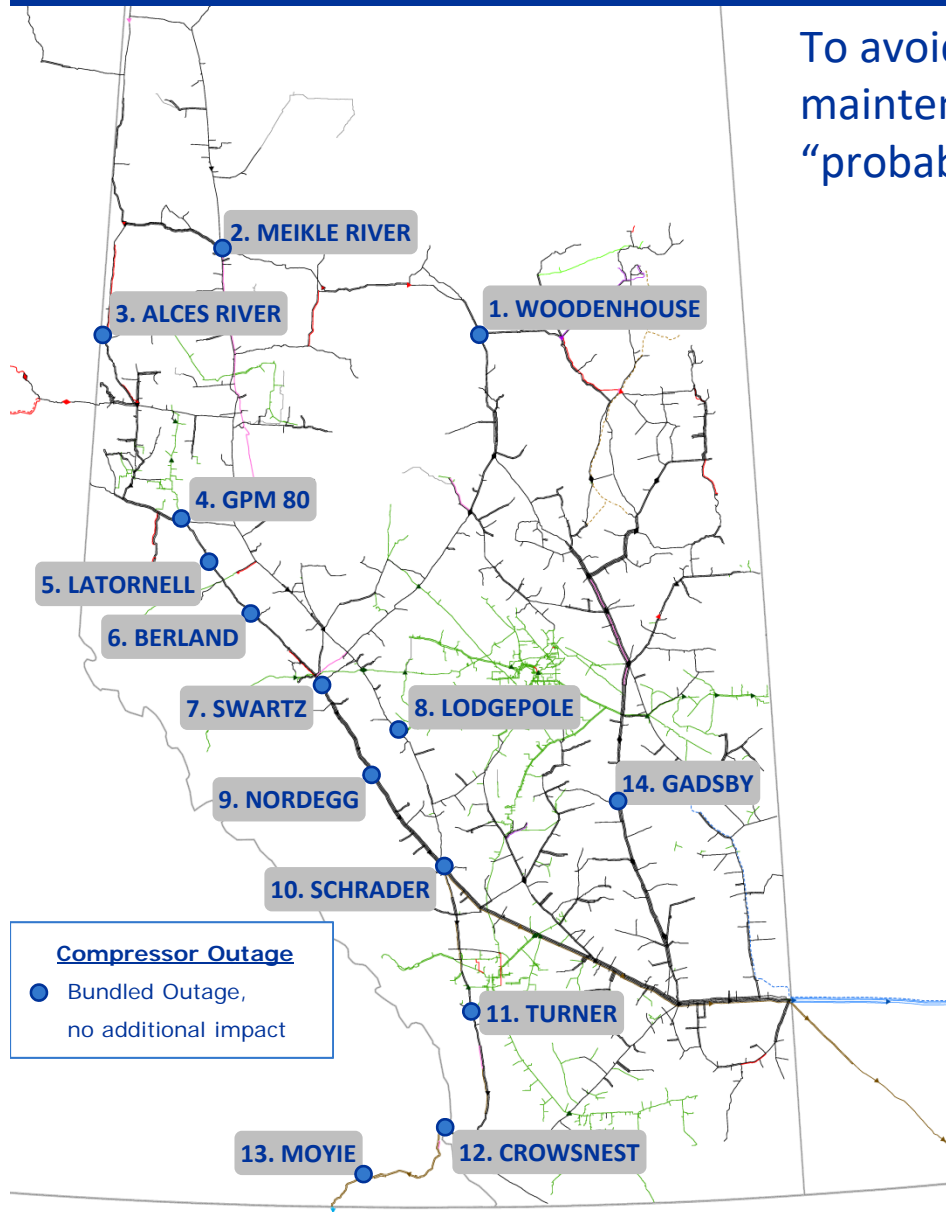
Facility Outage	Start Date	Duration (days)	Area
1. Burton Creek CS	07-16-18	4	WGAT
2. NPS 24/30 NLAT Loop 2 (Bens Lake to Princess)	07-09-18	9	NEDA
3. <del>Drywood CS</del> Probable FT impact is no longer expected.	<del>08-13-18</del>	5	<del>ALTMT</del>
4. <del>Schrader Creek E+W CS</del> Probable FT impact is no longer expected.	<del>08-20-18</del>	12	<del>EGAT</del>
5. <del>Hussar A+B CS</del> Probable FT impact is no longer expected.	<del>09-11-18</del>	3	<del>EGAT</del>
6. Vetchland CS	10-10-18	3	USJR
7. Alces CS unit 3	10-15-18	4	USJR

*Operational capability, timing and impacts are provided in DOP tables*

# 2018 Known Bundled Outage Activity (as of 23-Jan-18)

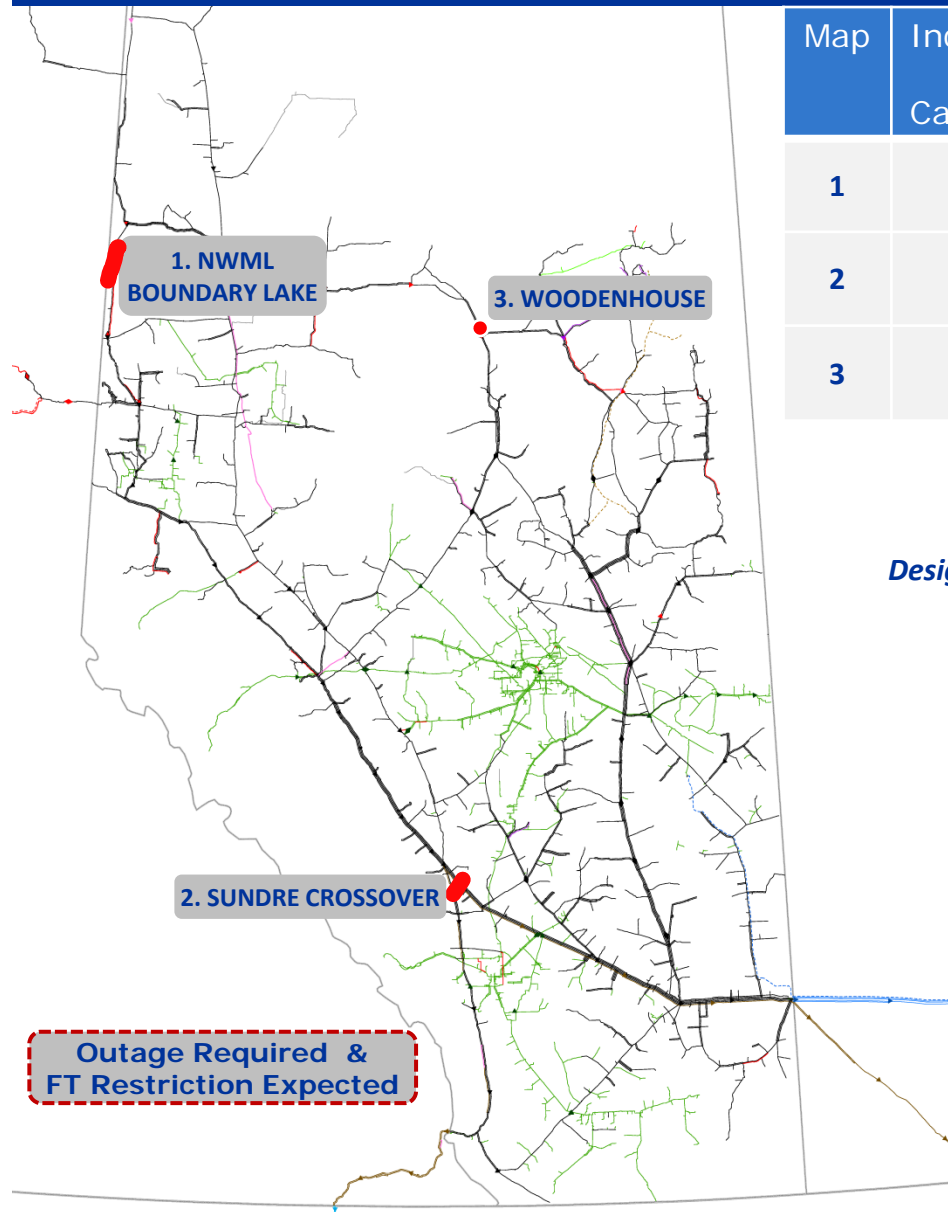
To avoid additional customer impact, the following maintenance activities have been bundled with “probable” area/export impacting outages:

1. Woodenhouse CS, unit A1
2. Meikle River B + C CS
3. Alces River B CS
4. Valve repairs at GPM 80
5. Latornell CS
6. Berland River CS, station and unit 1
7. Swartz Creek CS
8. Lodgepole CS
9. Nordegg CS
10. Schrader Creek West CS
11. Turner CS, unit 2
12. Crowsnest A & B CS
13. Moyie C CS
14. Gadsby A + B CS



*Operational capability, timing and impacts are provided in DOP tables*

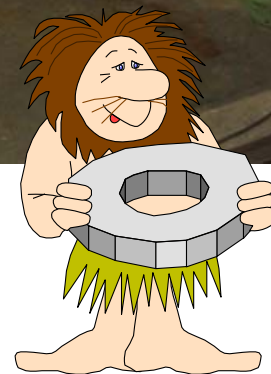
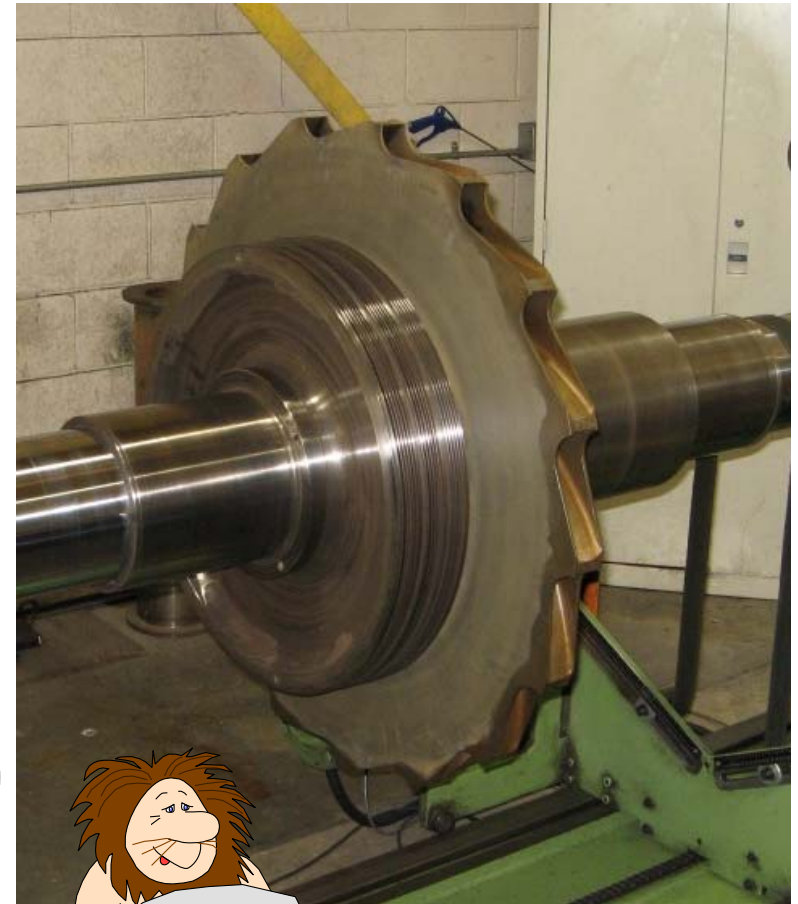
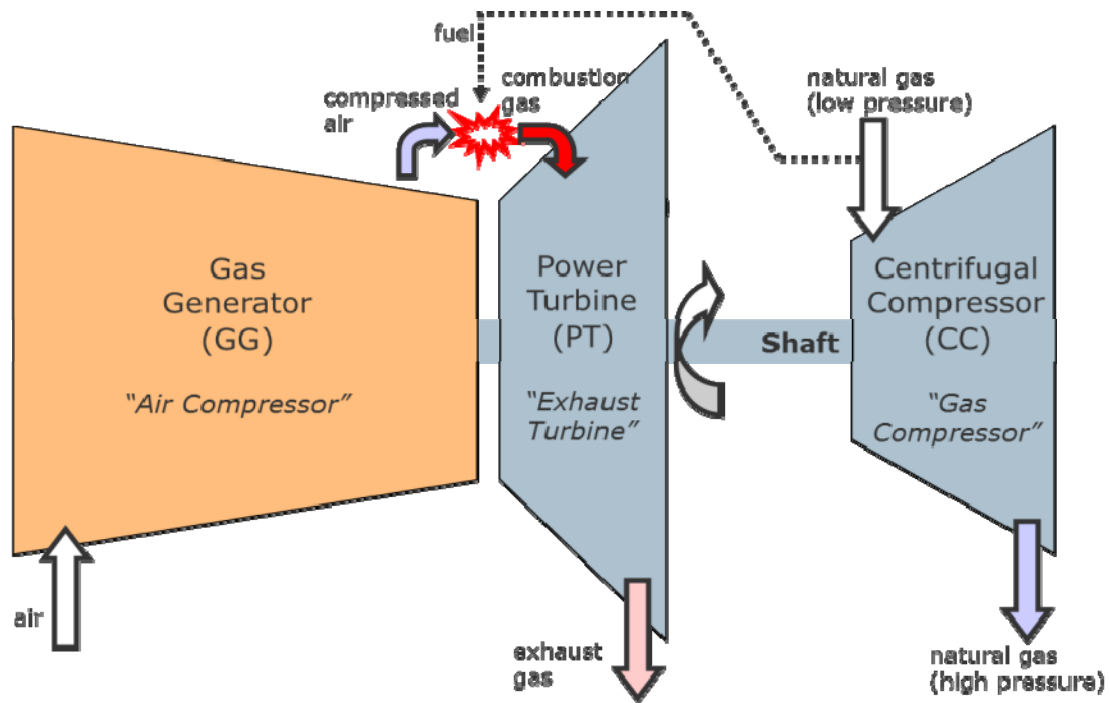
# 2018 Expansion Facility Review



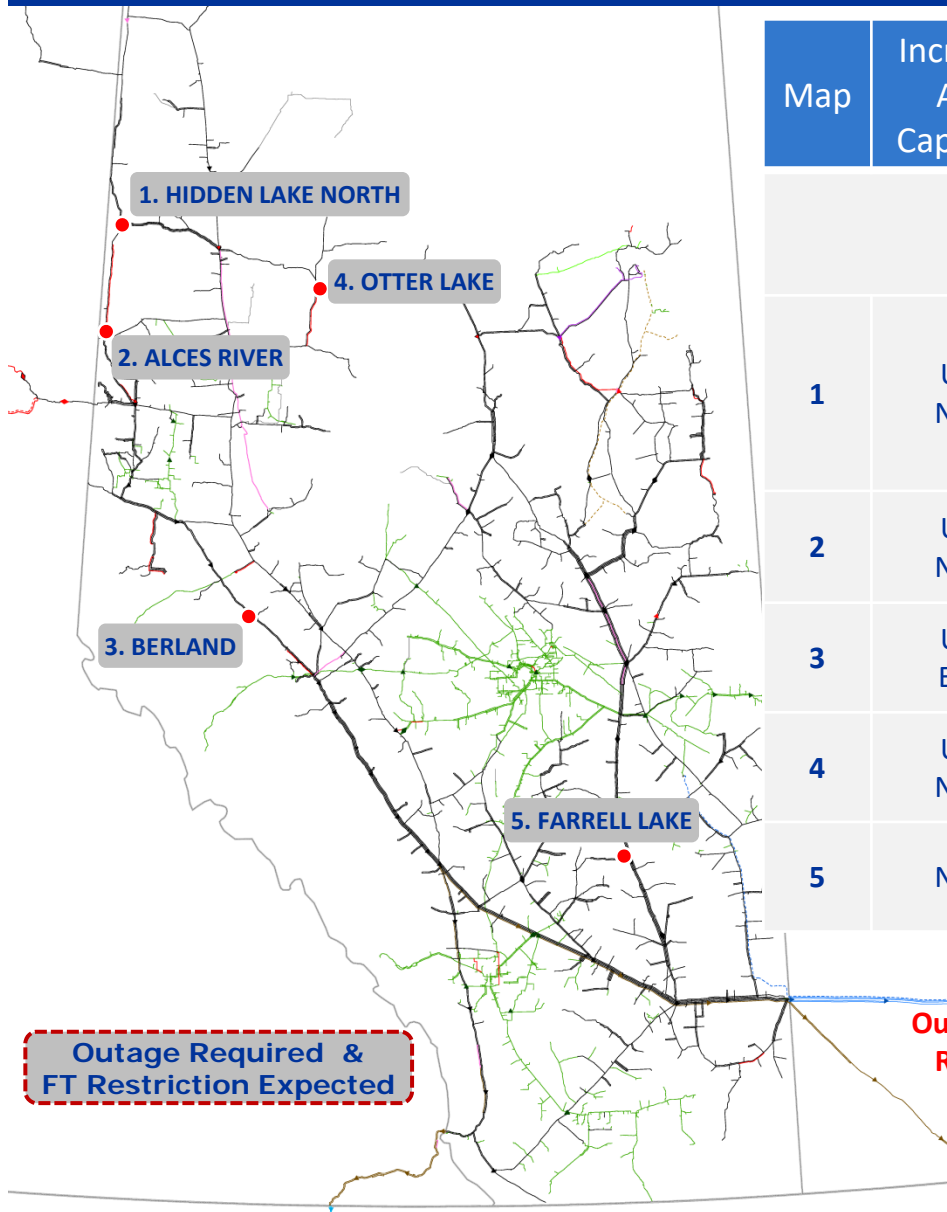
Map	Increased Area Capability	Facility Description	Timing
1	USJR NEDA	NWML Boundary Lake NW70 – NW80	Apr 2018
2	WGAT	Sundre Crossover	Apr 2018
3	USJR NEDA	Woodenhouse C/S Unit addition	Nov 2018

*Design capability increases are provided in the NGTL Annual Plan and operational capability increases are provided in DOP charts.*

# Re-aero / Wheel Change Basics



# 2018 Facility Modification Review

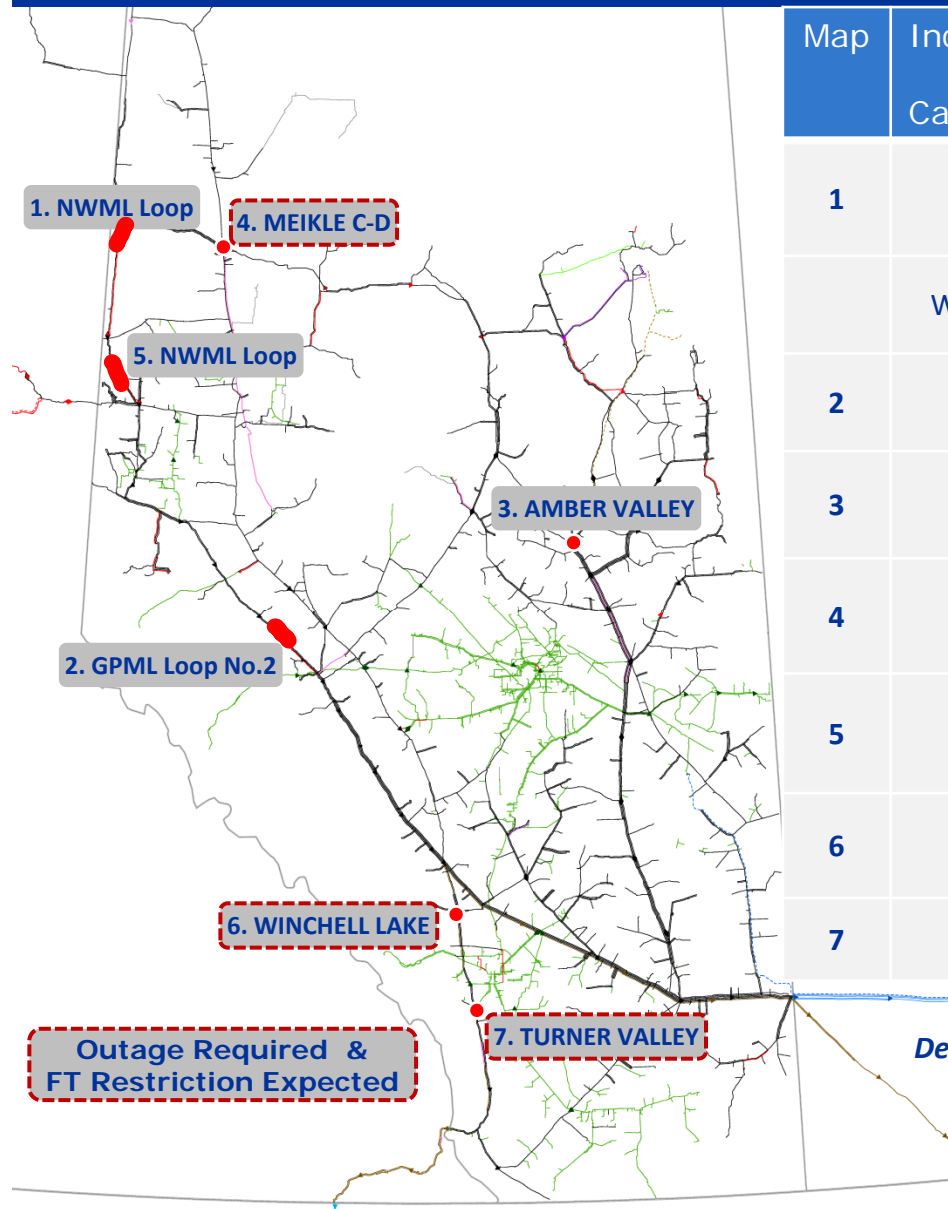


Map	Increased Area Capability	Facility Description	Timing
<b>Wheel Changes &amp; Modifications</b>			
1	USJR NEDA	Hidden Lake North C/S Hidden Lake North C/S modifications	Mar 2018 Apr 2018
2	USJR NEDA	Alces River C/S, unit 2	Apr 2018
3	USJR EGAT	Berland River C/S, unit 1	May 2018
4	USJR NEDA	Otter Lake CS, unit 1	Oct 2018
5	NEDA	Farrell Lake C/S modifications	Nov 2018

Outages are required for the above wheel changes and modifications.  
Required outages are not expected to drive FT service restrictions.



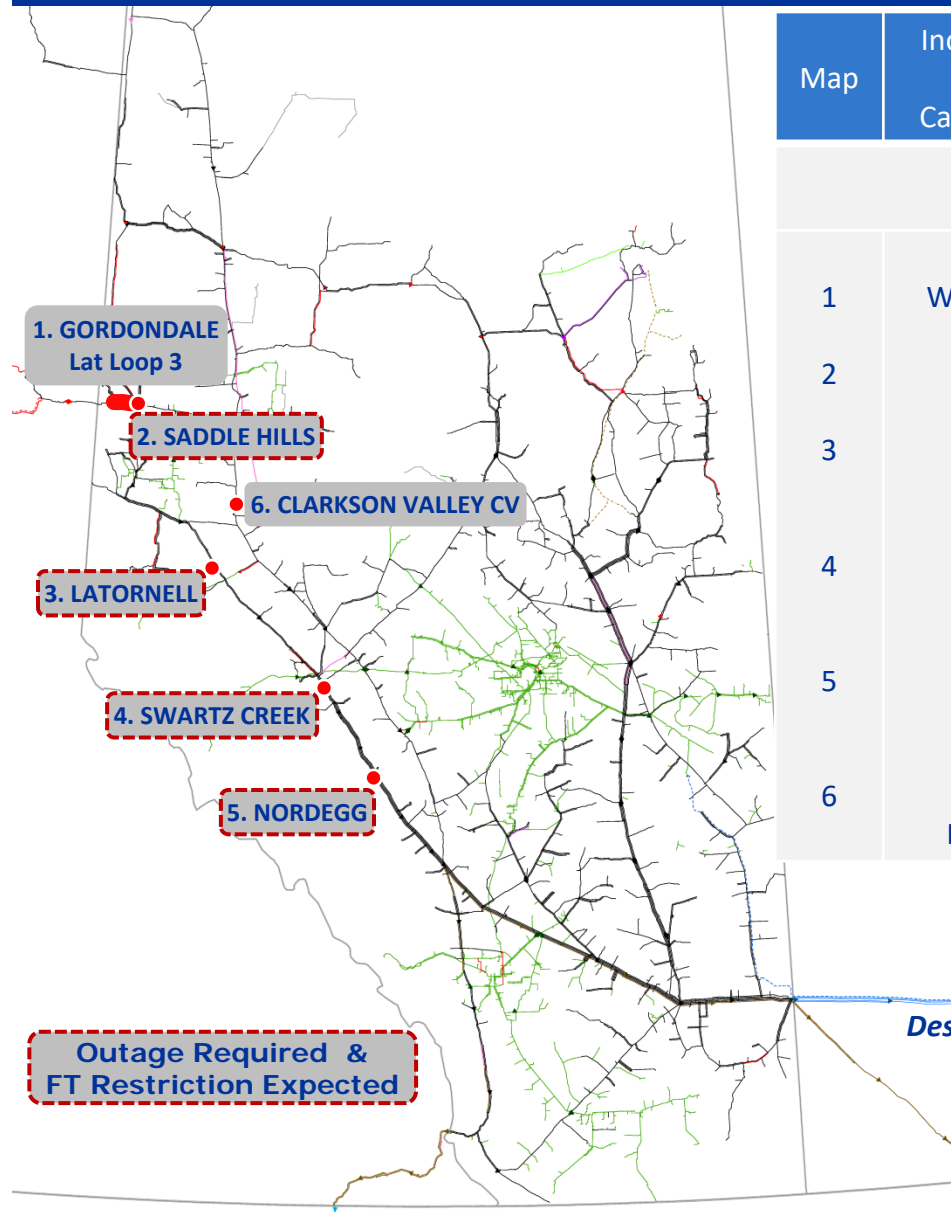
# 2019 Expansion Facility Review



Map	Increased Area Capability	Facility Description	Timing
1	USJR NEDA	NWML Loop – Boundary Lake North	Apr 2019
	WSADHL	North Montney Mainline Expansion	Apr 2019
2	USJR EGAT	GPML Loop No.2 – McLeod River North	Nov 2019
3	USJR NEDA	Amber Valley C/S Unit addition	Nov 2019
4	USJR NEDA	Meikle River C-D C/S Modifications	Nov 2019
5	USJR NEDA	NWML Loop – Bear Canyon North NWML Loop – Peace River Crossing	Nov 2019
6	WGAT	Winchell Lake Unit addition	Nov 2019
7	WGAT	Turner Valley C/S Cooler addition	Nov 2019

*Design capability increases are provided in the NGTL Annual Plan and operational capability increases are provided in DOP charts.*

# 2019 Saddle West Expansion Review



Map	Increased Area Capability	Facility Description	Timing
<b>SADDLE WEST EXPANSION</b>			
1	WSADHL	Gordondale Lateral Lp 3	Jun 2019
2	USJR	Saddle Hills C/S Unit addition	Jun 2019
3	USJR EGAT	Latornell C/S Unit and Cooler addition	Jun 2019
4	USJR EGAT	Swartz Creek C/S Unit and Cooler addition	Jun 2019
5	USJR EGAT	Nordegg C/S Unit and Cooler addition	Jun 2019
6	USJR NEDA	Clarkson Valley Control Valve	Jun 2019

*Design capability increases are provided in the NGTL Annual Plan and operational capability increases are provided in DOP charts.*

# Questions?



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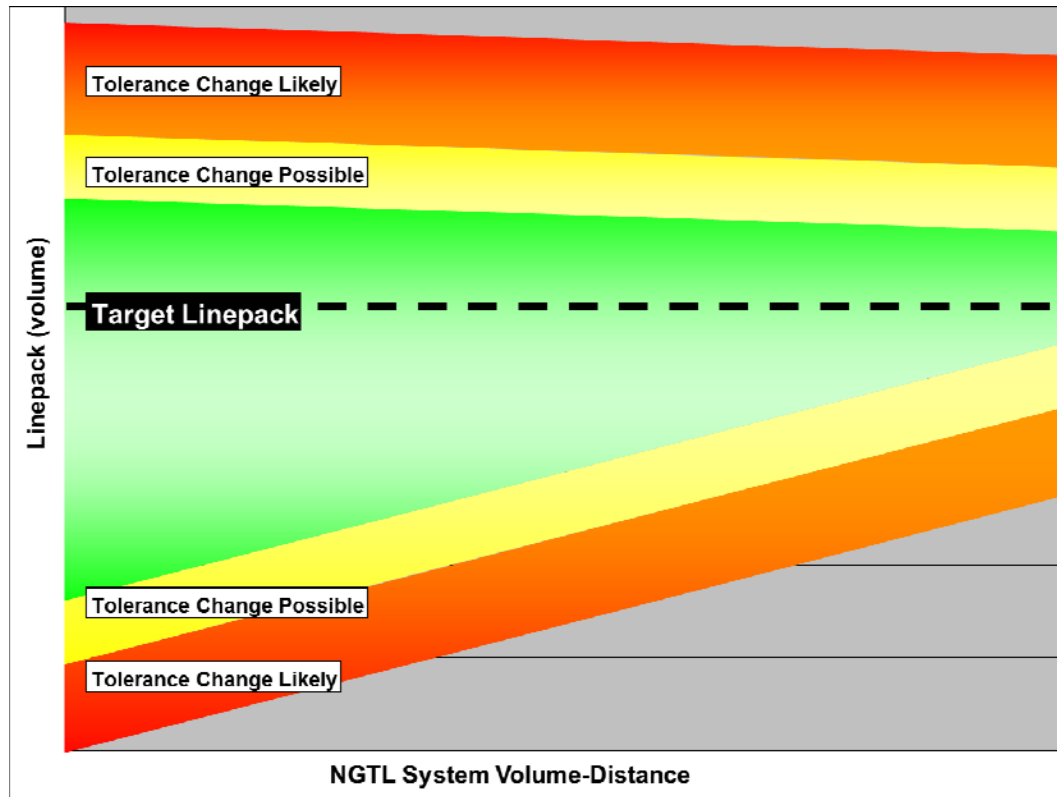
## **NGTL Linepack Management**

- System Linepack and Capability
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## **General**

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# System Linepack and Capability



Linepack: volume of gas within the system at any point in time

- Target linepack is a fixed volume (NGTL, Atco Pipelines, Foothills, TC Ventures)

Receipts > Deliveries = pack; Receipts < Deliveries = draft

- Customer SD accounts (T); balance zone adjustment
- Pipeline OBA accounts (Z); interconnect support
- System variance managed daily; daily fuel rate adjustment

# Linepack Management Tools

- **NGTL Linepack Target Adjustment**
  - Seasonal adjustment mechanism - purchase/sale through third party
  - Minimum 24 hour response to trigger a NIT transaction (physical response following day)
- **Customer Supply Demand Balance Zone Adjustment**
  - Day to day adjustment mechanism – tolerance change
  - Linepack Alert by 08:00; Balance Zone Change by 12:00
  - Proactive use to avoid 0/+4 (supply discretion cap)
  - Maximize balance zone range
- **A copy of the Supply/Demand Balancing Procedures can be found at the following link:**  
[http://www.tccustomerexpress.com/docs/ab\\_regulatory\\_tariff/APP-D\\_2010-06-09.pdf](http://www.tccustomerexpress.com/docs/ab_regulatory_tariff/APP-D_2010-06-09.pdf)

*Receipt and Delivery capability is dependent on optimal linepack.  
High system load factor results in reduced linepack flexibility and increased incidence of supply demand balance zone change.*

# Factors Affecting Linepack Capability

## Maximum Linepack

1. Pipeline MOP Derates
2. High Receipt area load factors
3. Supply Demand variability
4. Supply Demand Distribution

*As linepack approaches maximum*

- *Impact of outages escalates*
- *Gas/Oil producers are impacted*

## Minimum Linepack

1. Delivery Pressure Requirements
2. High Delivery area load factors
3. Supply Demand variability
4. Supply Demand Distribution

*As linepack approaches minimum*

- *Impact of outages escalates*
- *Oil/Power producers are impacted*

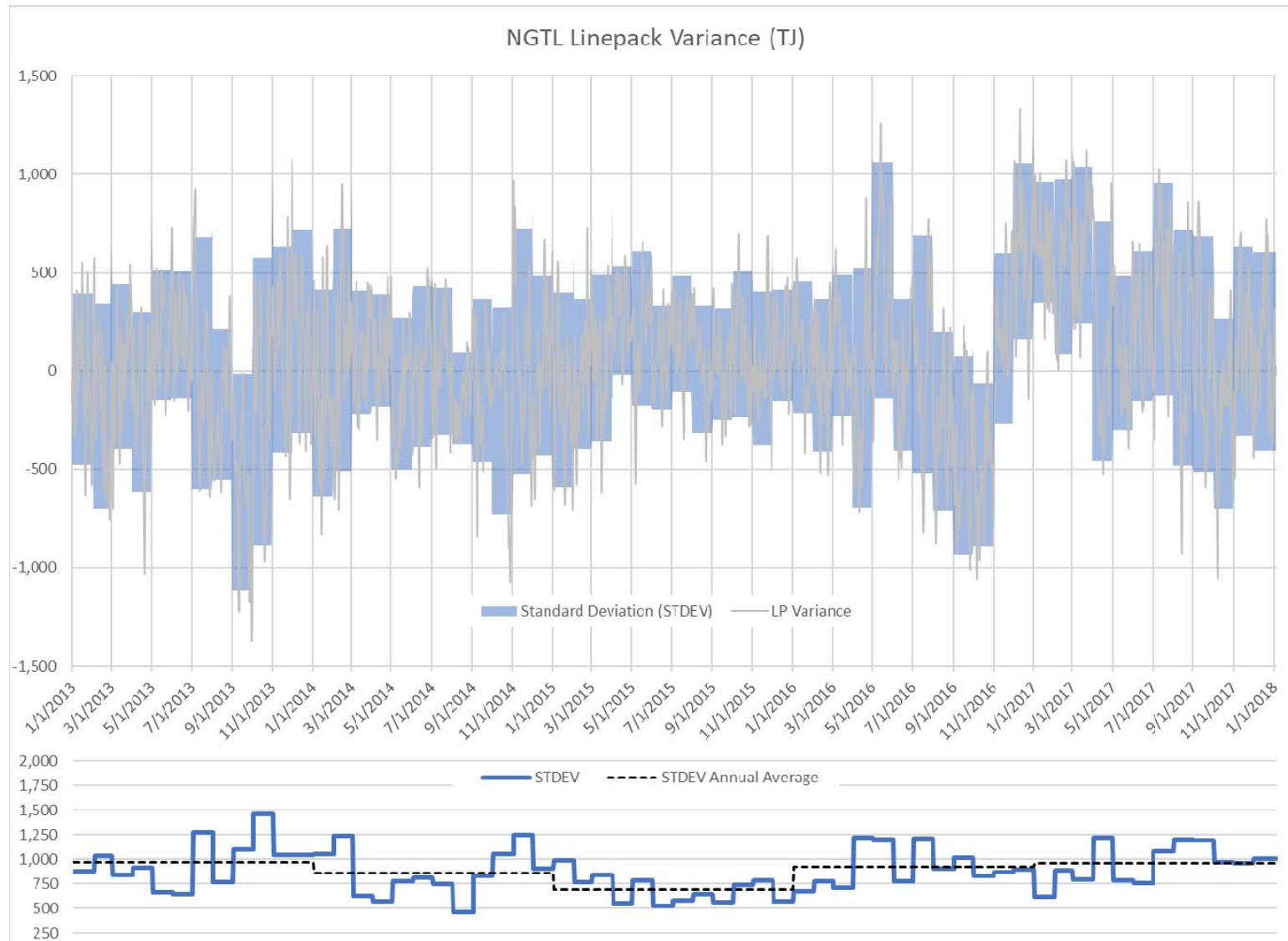


## SD Balance Zone - Daily Decision

1. Is projected operating pressure undesirably low or undesirably high?
  - Decision based not on the current situation, but on the expected pressure over the next 24h. High degree of uncertainty.
2. If yes. Is undesirable pressure a result of undesirable system linepack?
  - Undesirable pressure could be caused by a throughput constraint or outage which is addressed by service restriction not linepack management.
3. If yes. Is undesirable linepack a result (at least in part) of customer SD imbalance, T accounts?
  - If there is no inventory in customer T accounts there is no benefit associated with revising the supply demand balance zone.
4. If yes. Revise the supply demand balance zone (SDBZ).
  - Our guiding principle is to provide as much SDBZ range as possible while avoiding direct receipt/delivery impact due to high/low operating pressure.

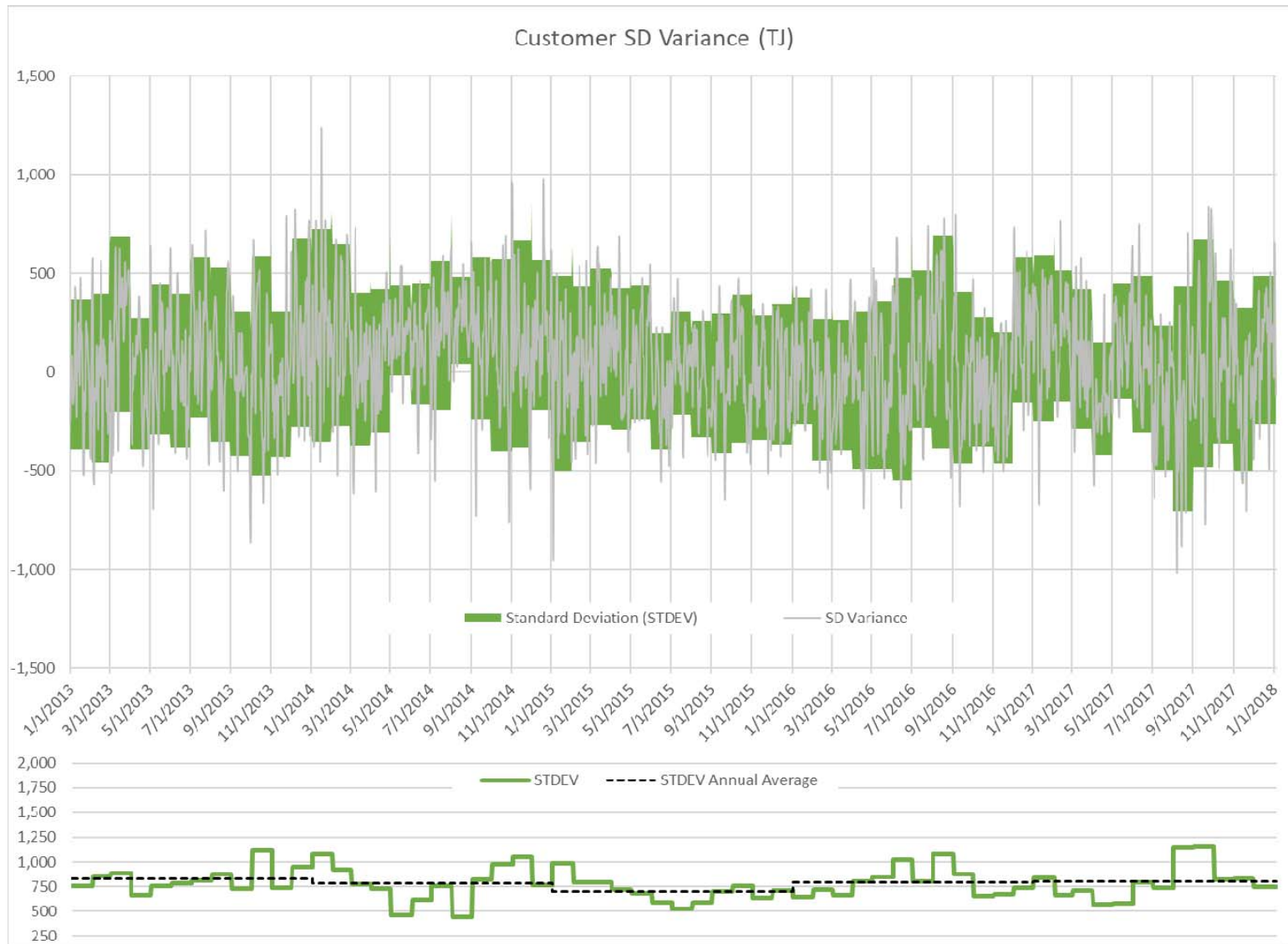
*Increased requirement for proactive and tighter management of balance zone in order to maximize firm service availability.*

# NGTL System Linepack Variability



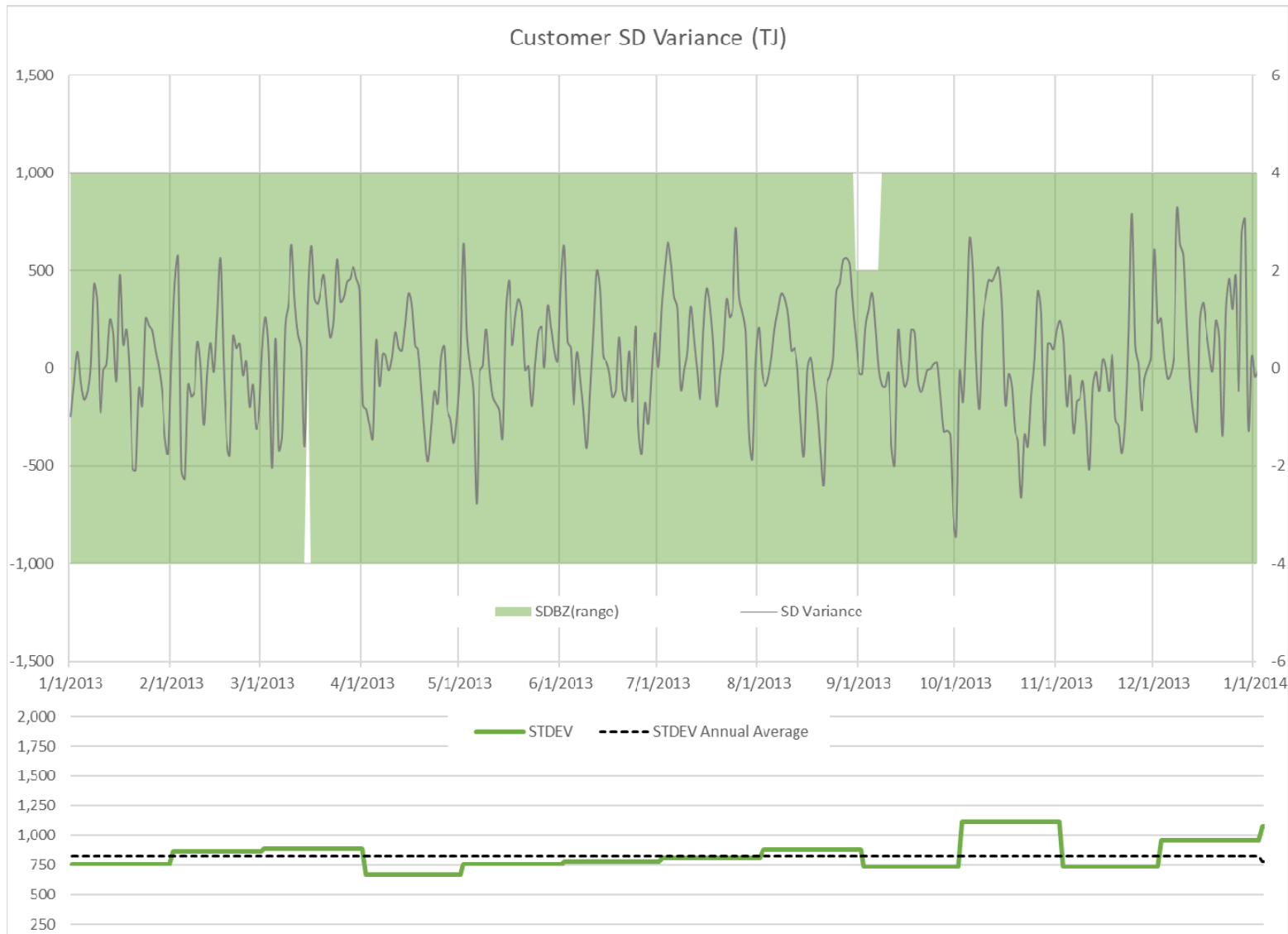
*Linepack variability (flexibility) in 2017 comparable to 2016 and 2013*

# Customer SD Variability, T Accounts



*Customer SD variability consistent prior to June 2017*

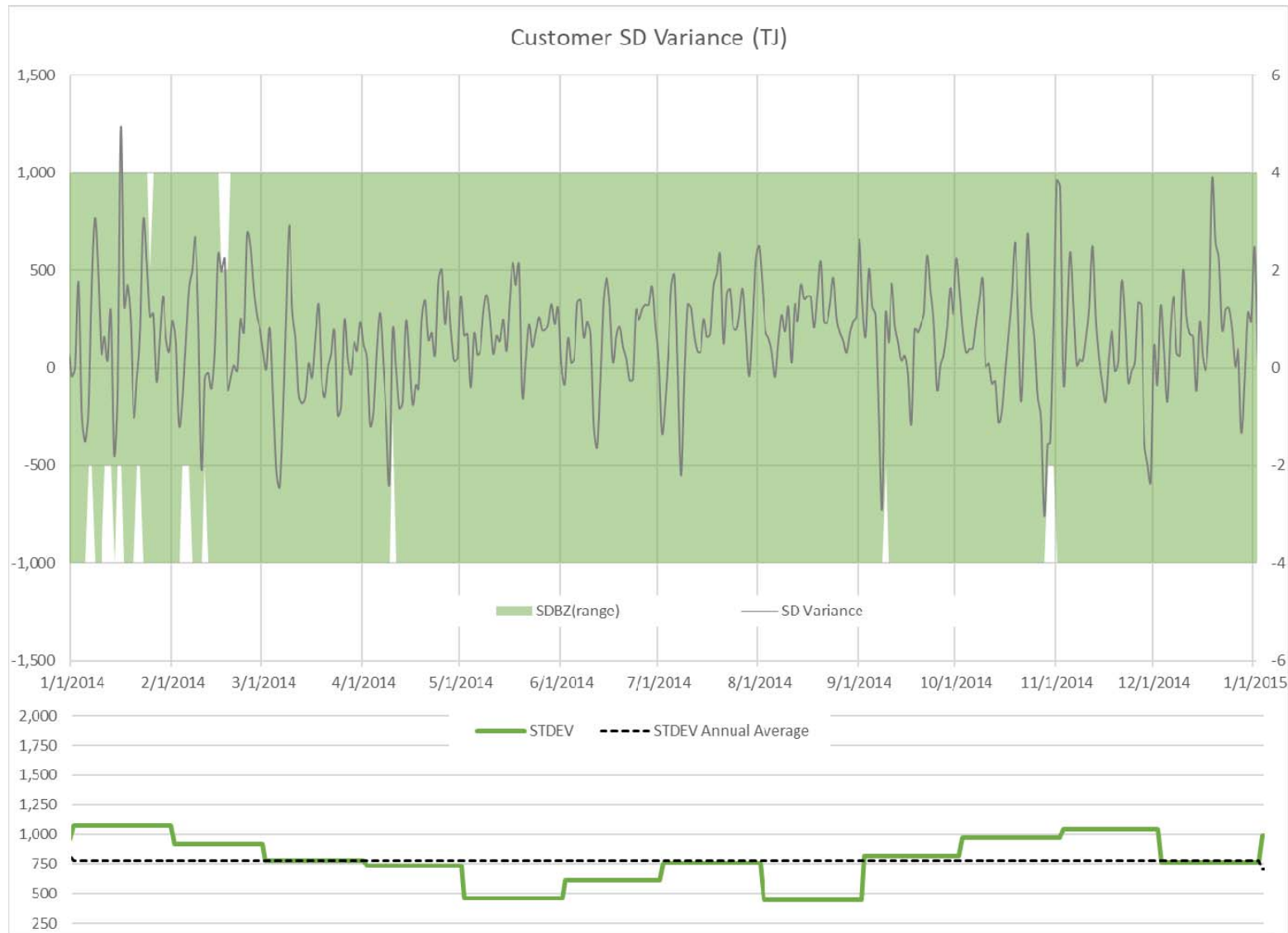
# 2013 SD Balance Zone Range



2013 days	
356	-4/+4
1	0/+4
8	-4/+2
9	<> -4/+4

*Customer SD variability consistent in 2013*

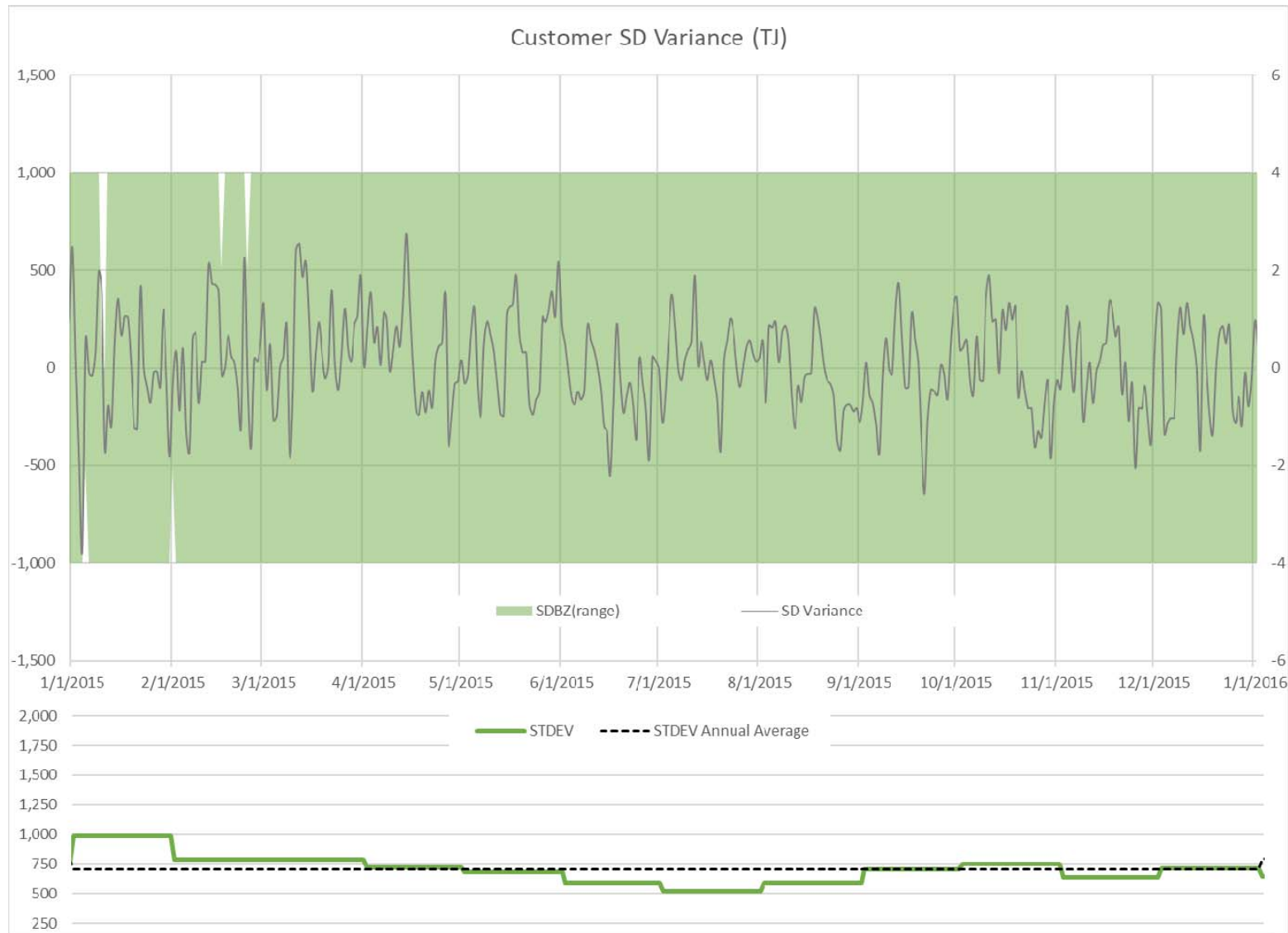
# 2014 SD Balance Zone Range



2014 days	
343	-4/+4
17	-2/+4
4	-4/+2
1	-1/+4
22	<> -4/+4

*Customer SD variability consistent in 2014*

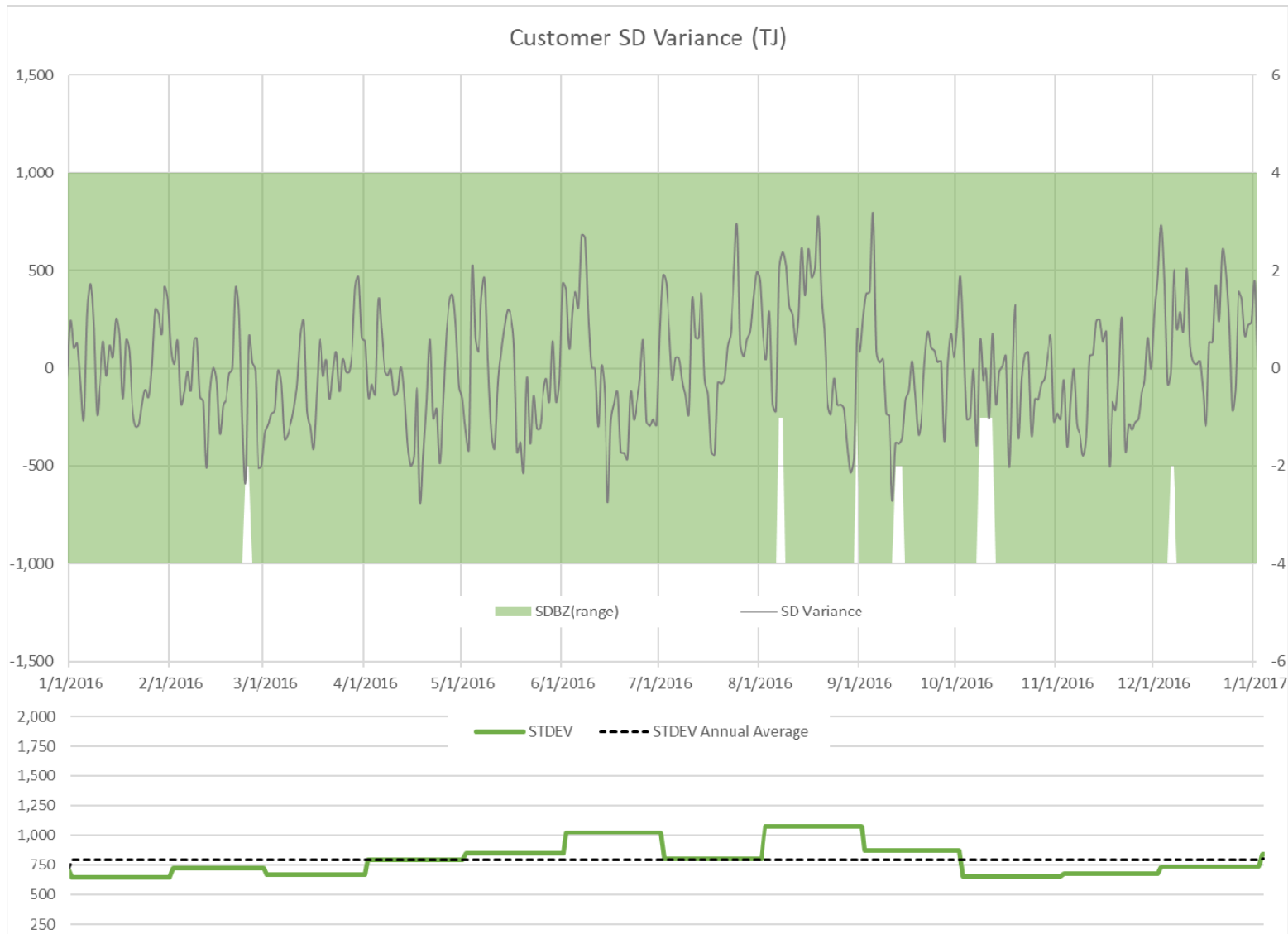
# 2015 SD Balance Zone Range



2015 days	
359	-4/+4
2	-4/0
2	-2/+4
2	-4/+2
6	<> -4/+4

*Customer SD variability consistent in 2015*

# 2016 SD Balance Zone Range

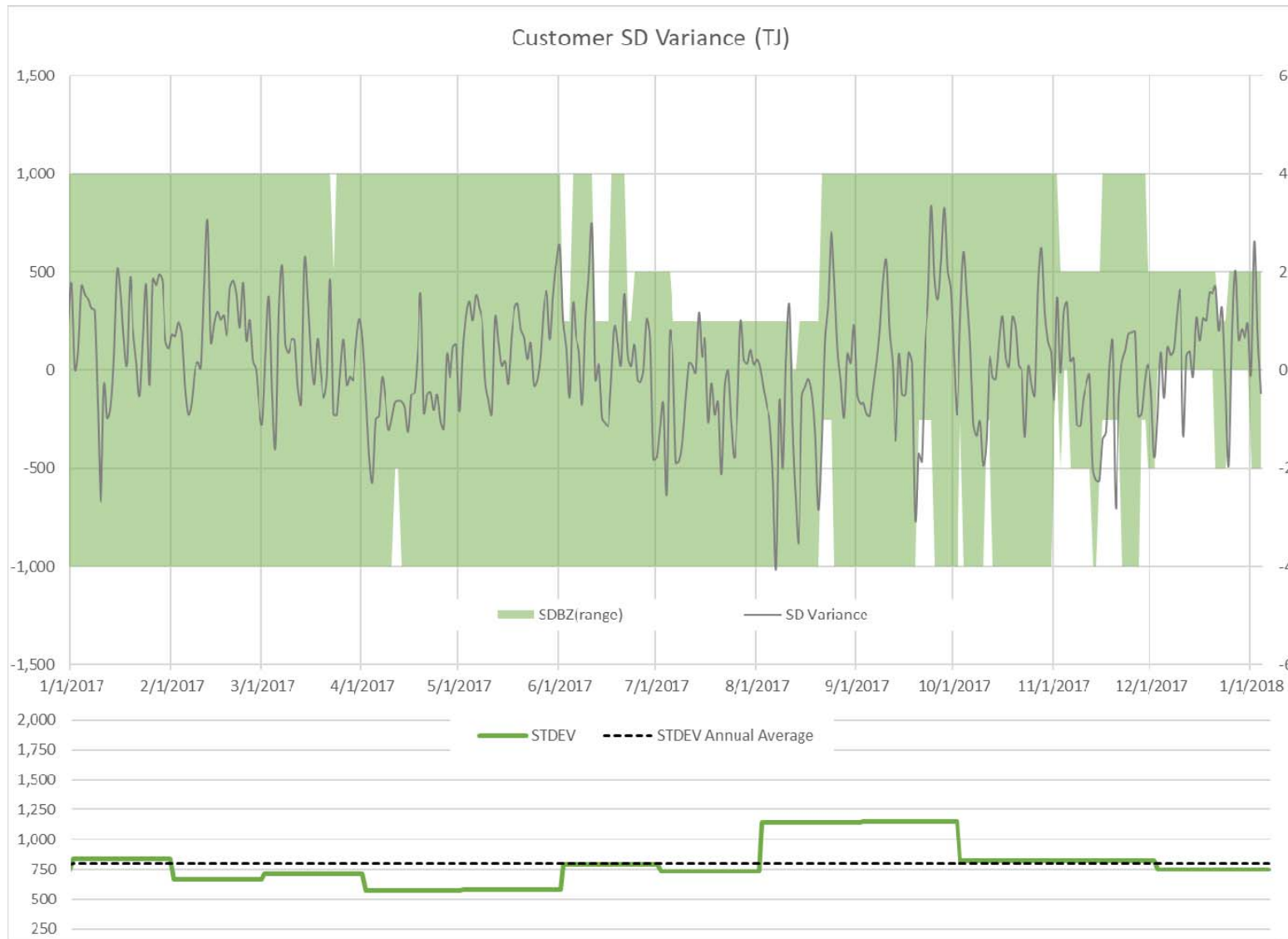


2016 days	
351	-4/+4
7	-2/+4
8	-1/+4
15	<> -4/+4

*Customer SD variability consistent in 2016*



# 2017 SD Balance Zone Range



2017 days	
228	-4/+4
13	-2/+2
1	0/+4
26	0/+2
0	-2/0
2	-4/0
2	-2/+4
15	-4/+2
21	-1/+4
1	-1/+2
3	-2/+1
54	-4/+1
138	<> -4/+4

Customer SD variability increased since Jun 2017?

# Linepack Management Tools

- **NGTL Linepack Target Adjustment**
  - Seasonal adjustment mechanism - purchase/sale through third party
  - Minimum 24 hour response to trigger a NIT transaction  
(physical response following day)
- **Customer Supply Demand Balance Zone Adjustment**
  - Day to day adjustment mechanism – tolerance change
  - Linepack Alert by 08:00; Balance Zone Change by 12:00
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*Receipt and Delivery capability is dependent on optimal linepack.*

*High system load factor results in reduced linepack flexibility and increased incidence of supply demand balance zone change.*

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