

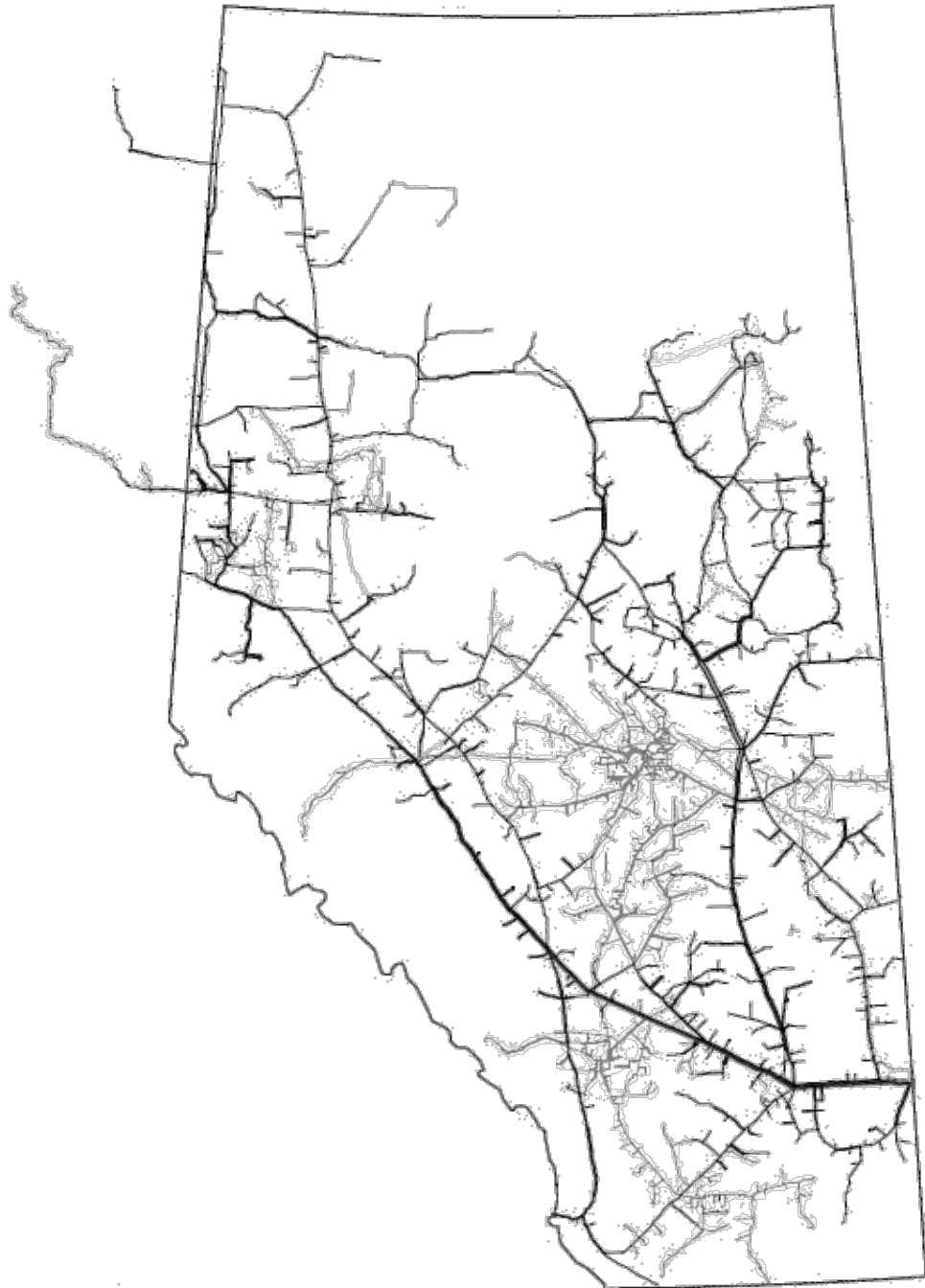


NGTL Linepack 101

Educational Material



TC Energy



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

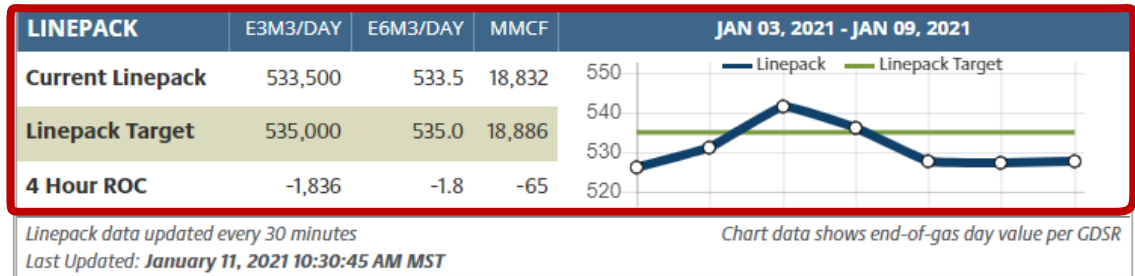
Low Linepack

- 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



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	

Current System Report
(current linepack & other operational values)

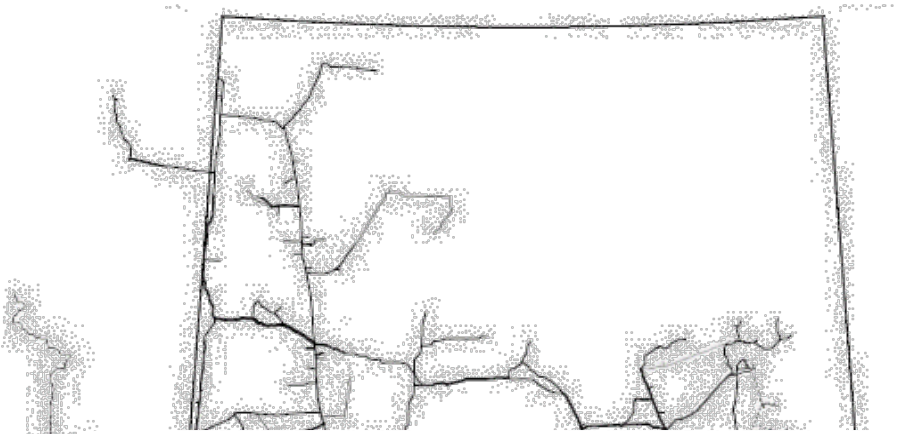
TC Customer Express > Pipelines > NGTL System > Current System Report

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

For informational purposes only

What factors affect linepack?



Lower Gas Temperature = More Linepack



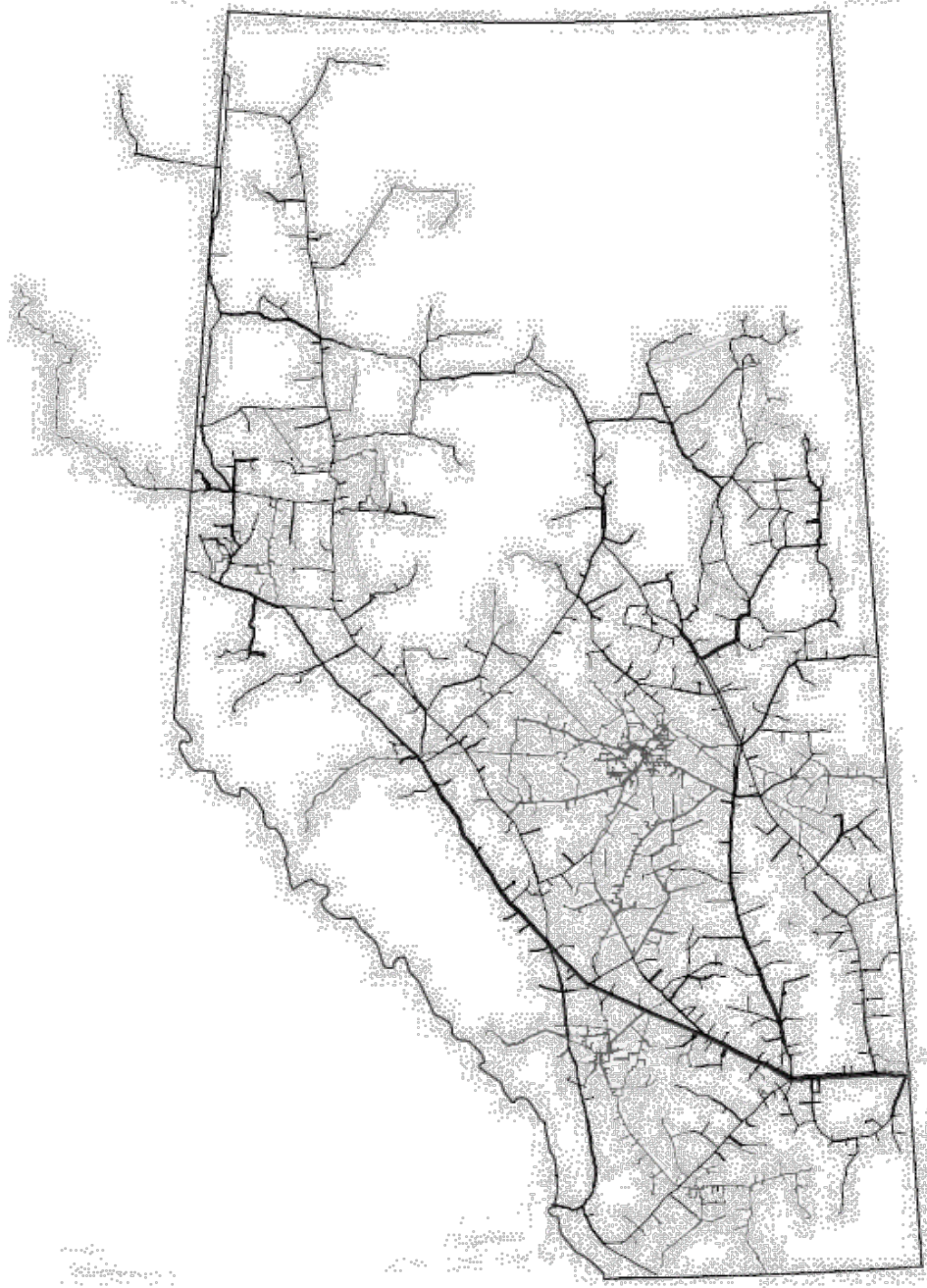
Lower Load Factor = More Linepack Flexibility



More Pipe = More 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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