

A Different Kind of  
**ENERGY COMPANY**



# TGP Operations/Maintenance Update

## April 2019



# Agenda

*Brian Merchant*  
*Director, Engineering Gas Control*

*Cathy Soape Hutton*  
*Manager, Trans and Storage Svc*

*Gina Mabry*  
*Director, Trans and Storage Svc*

*Coralie Carter Sculley*  
*Director, Marketing*

**TGP Gas Control Organizational Structure**

**TGP System/Operations Overview**

**Dart Update**

**Summer Operations/Maintenance Update**

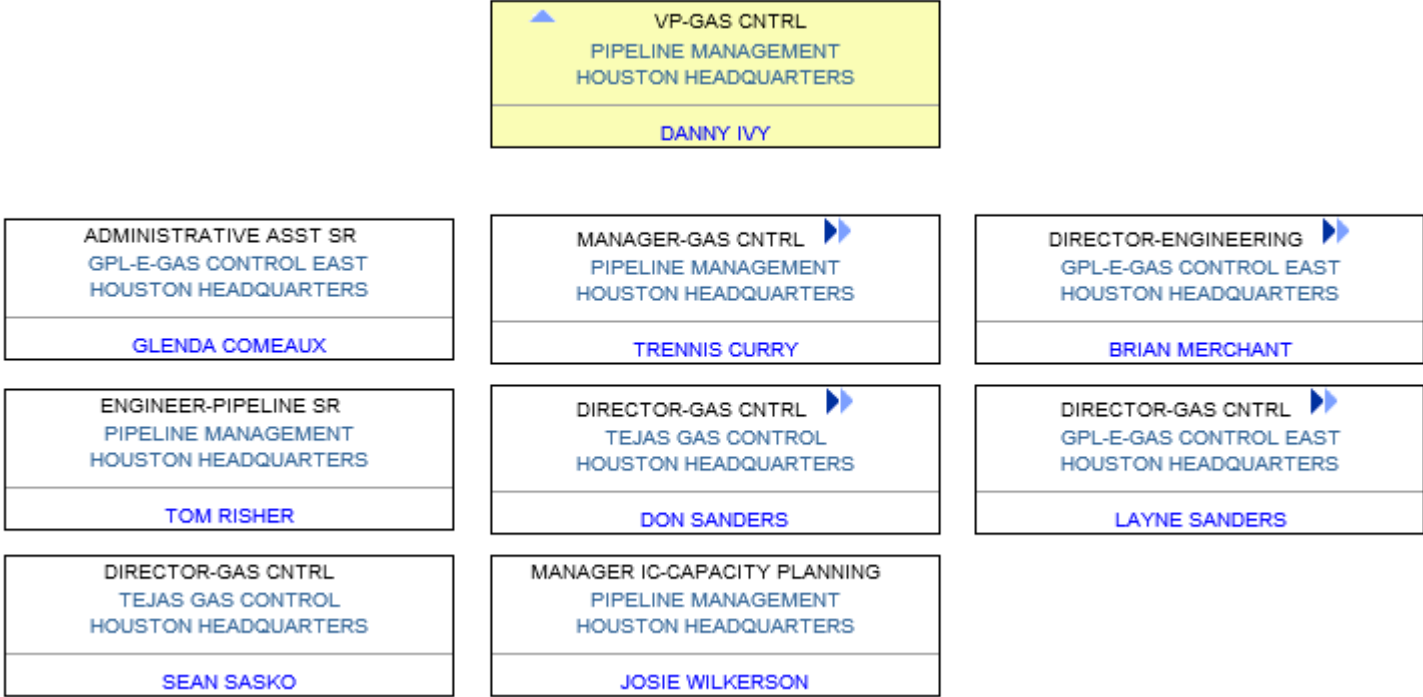
**Commercial Update**



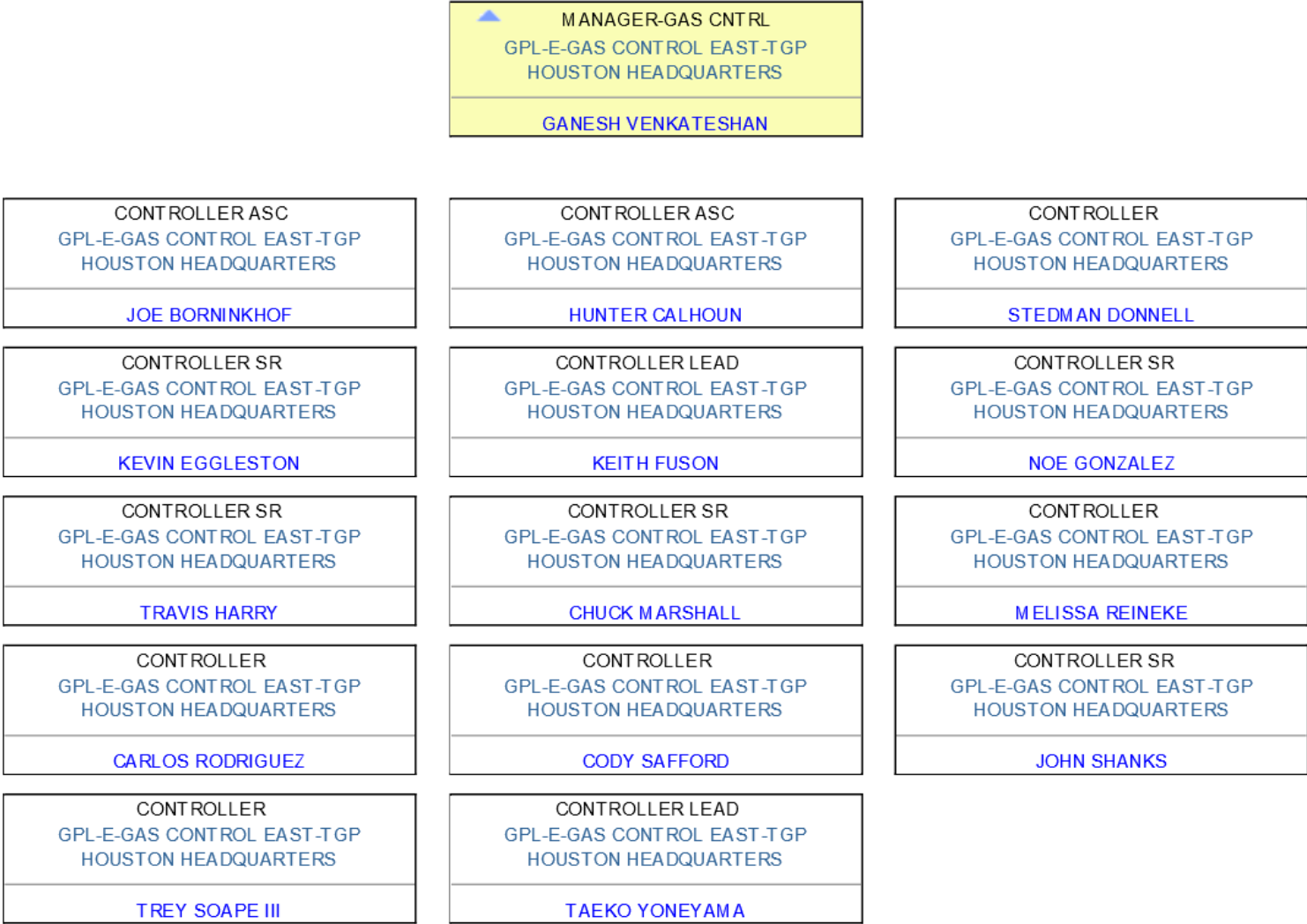
# TGP Gas Control Organizational Structure



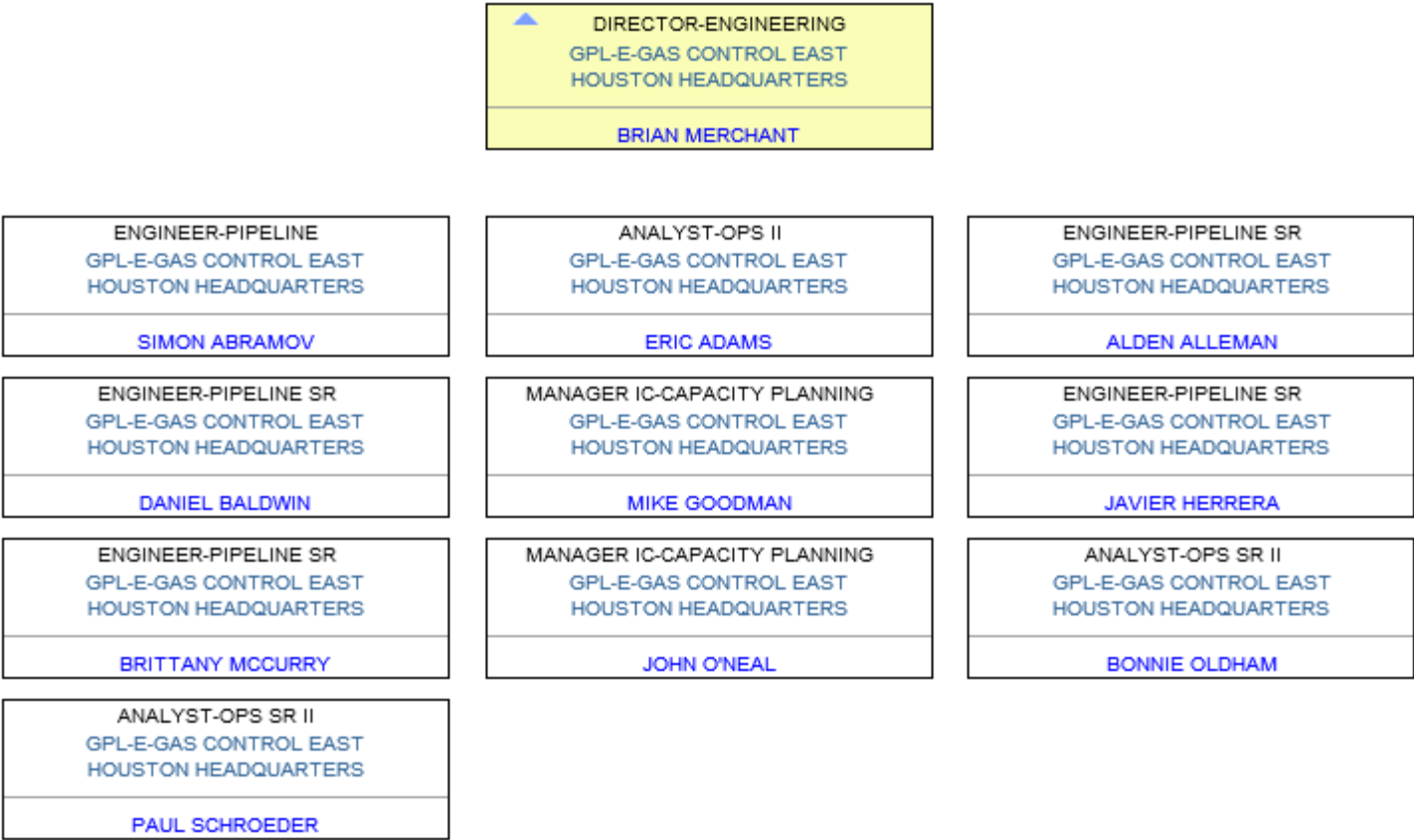
# GAS CONTROL ORGANIZATIONAL STRUCTURE



# GAS CONTROL ORGANIZATIONAL STRUCTURE



# GAS CONTROL ENGINEERING ORGANIZATIONAL STRUCTURE

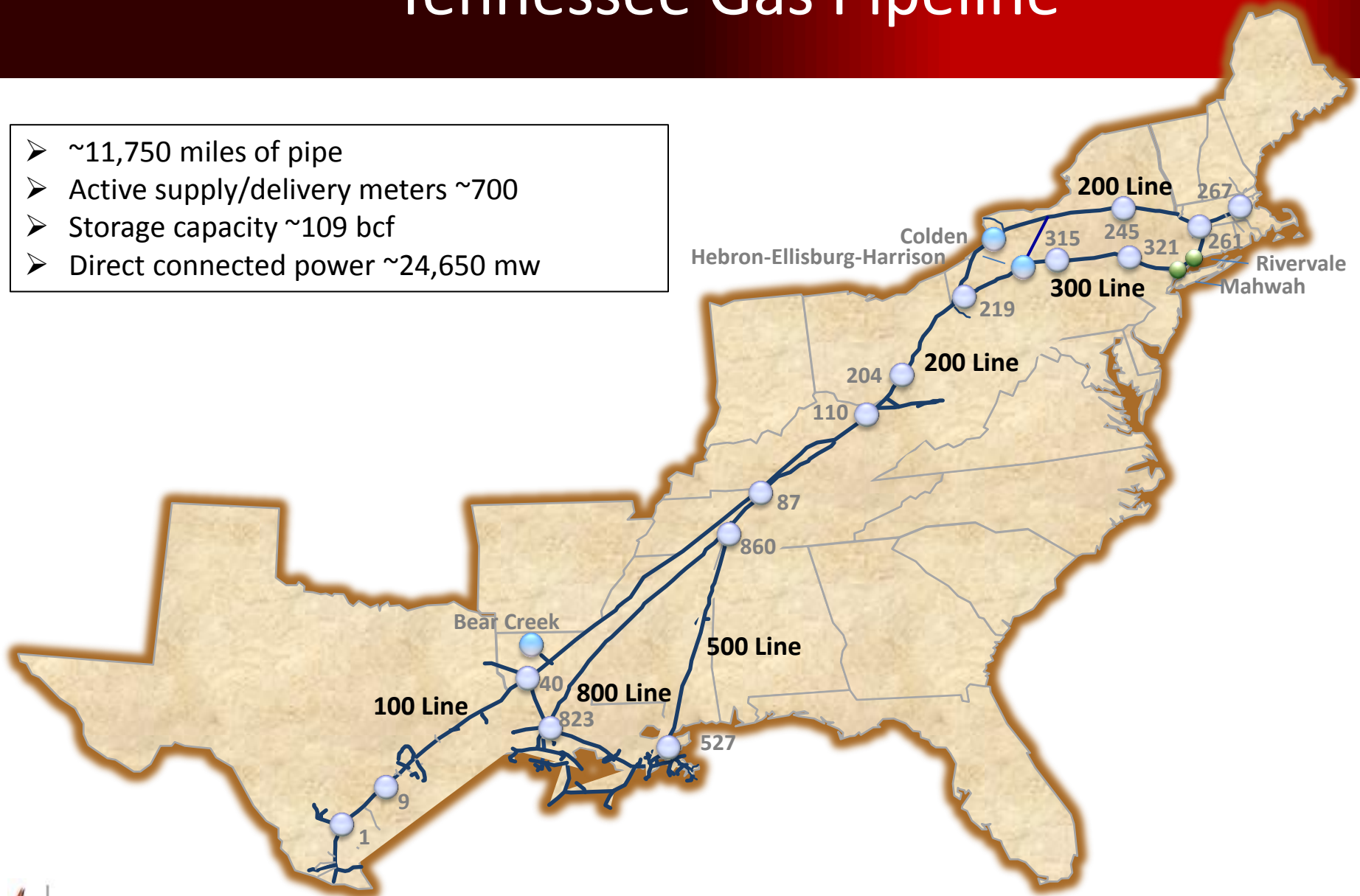


# System Operations Overview



# Tennessee Gas Pipeline

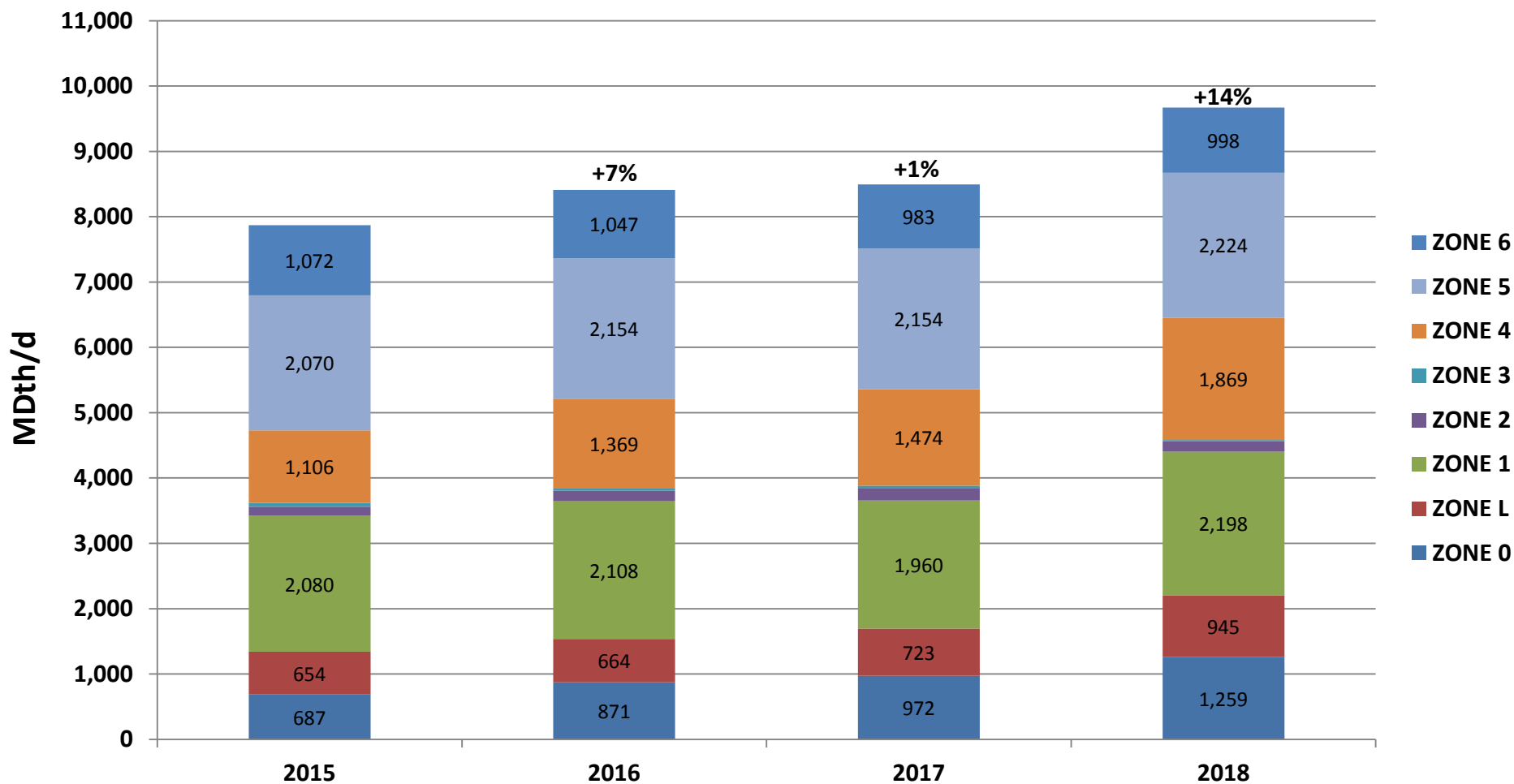
- ~11,750 miles of pipe
- Active supply/delivery meters ~700
- Storage capacity ~109 bcf
- Direct connected power ~24,650 mw





# TGP System Wide Throughput

## *Annually 2015-2018*



# Winter 2018/19 Look Back



# Winter 2018/19 Look Back

- **Overview**

- **Strong Winter Demand**
  - 8 out of the Top-10 All-time System Peak Delivery Days occurred this past winter
- **System-wide throughput increased 6% compared to previous winter**
- **Storage Inventories are slightly lower than last year's levels at this time**
- **System Wide Peak Day was ~11.72 Bcf/d on January 30, 2019**
- **Power Plant Peak Day was ~2.16 Bcf/d on January 30, 2019**
- **Exports to Mexico increased 7% compared to previous winter**

- **Supply**

- **Supply in Zone 4 down from previous Winters.(Other projects in-service; Nexus and Atlantic Sunrise)**
- **More supply coming from Dracut/Distrigas**

- **Operational Challenges**



# TGP Top Flow Dates

## System Wide Deliveries

Rank	Gas Day	MDth/d	Bcf/d
1	1/30/2019	12,127	11,715
2	1/2/2018	12,062	11,654
3	1/21/2019	12,007	11,605
4	1/10/2019	11,897	11,501
5	1/4/2018	11,754	11,358
6	1/29/2019	11,743	11,359
7	3/6/2019	11,742	11,382
8	1/14/2019	11,724	11,347
9	1/15/2019	11,686	11,322
10	3/5/2019	11,642	11,284

## Storage Withdrawals

Rank	Gas Day	MDth/d	Bcf/d
1	1/23/2014	1,809	1,762
2	1/22/2014	1,728	1,683
3	2/11/2014	1,707	1,661
4	2/10/2014	1,670	1,626
5	3/14/2017	1,661	1,612
17	1/21/2019	1,526	1,489

## Power Plants

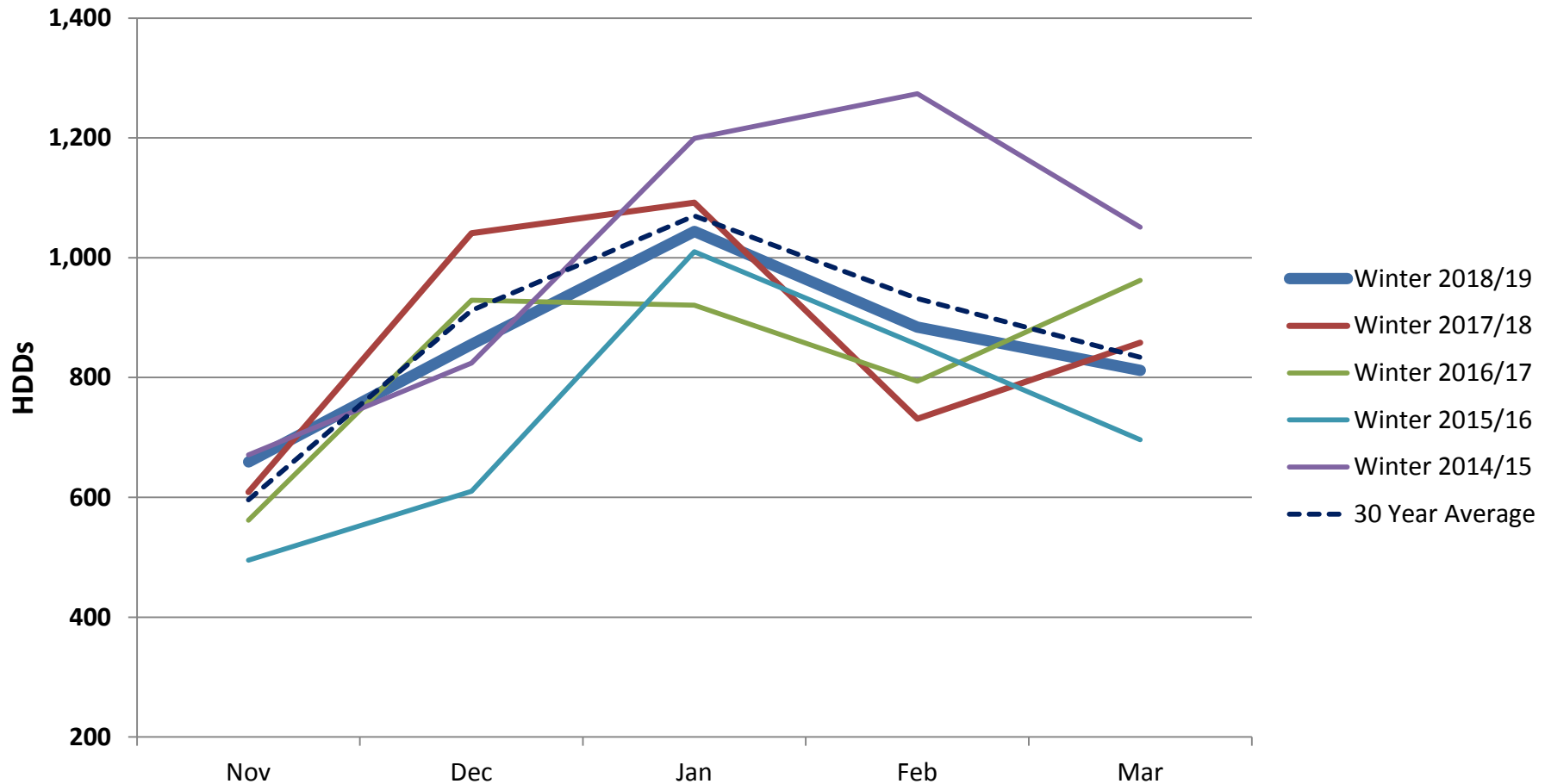
Rank	Gas Day	MDth/d	Bcf/d
1	1/17/2018	2,480	2,383
2	8/11/2016	2,402	2,304
3	8/28/2018	2,398	2,302
4	8/12/2016	2,300	2,210
5	1/16/2018	2,282	2,197
12	1/30/2019	2,239	2,155

# Winter System Wide Flows 2018/2019

	<u>2016-2017</u>	<u>2017-2018</u>	<u>2018-2019</u>	<u>Change</u>
LDC	1,724	1,880	2,120	+13%
Power	1,095	1,324	1,105	-17%
Pipeline Interconnects	5,170	5,372	5,729	+7%
Mexico	844	857	918	+7%
LNG	-	-	108	-
Other	301	305	319	+4%
<b>TOTAL</b>	<b>9,134</b>	<b>9,738</b>	<b>10,299</b>	<b>+6%</b>

• All volumes are MDth/d

# Winter 2018/19 Northeast Temperatures



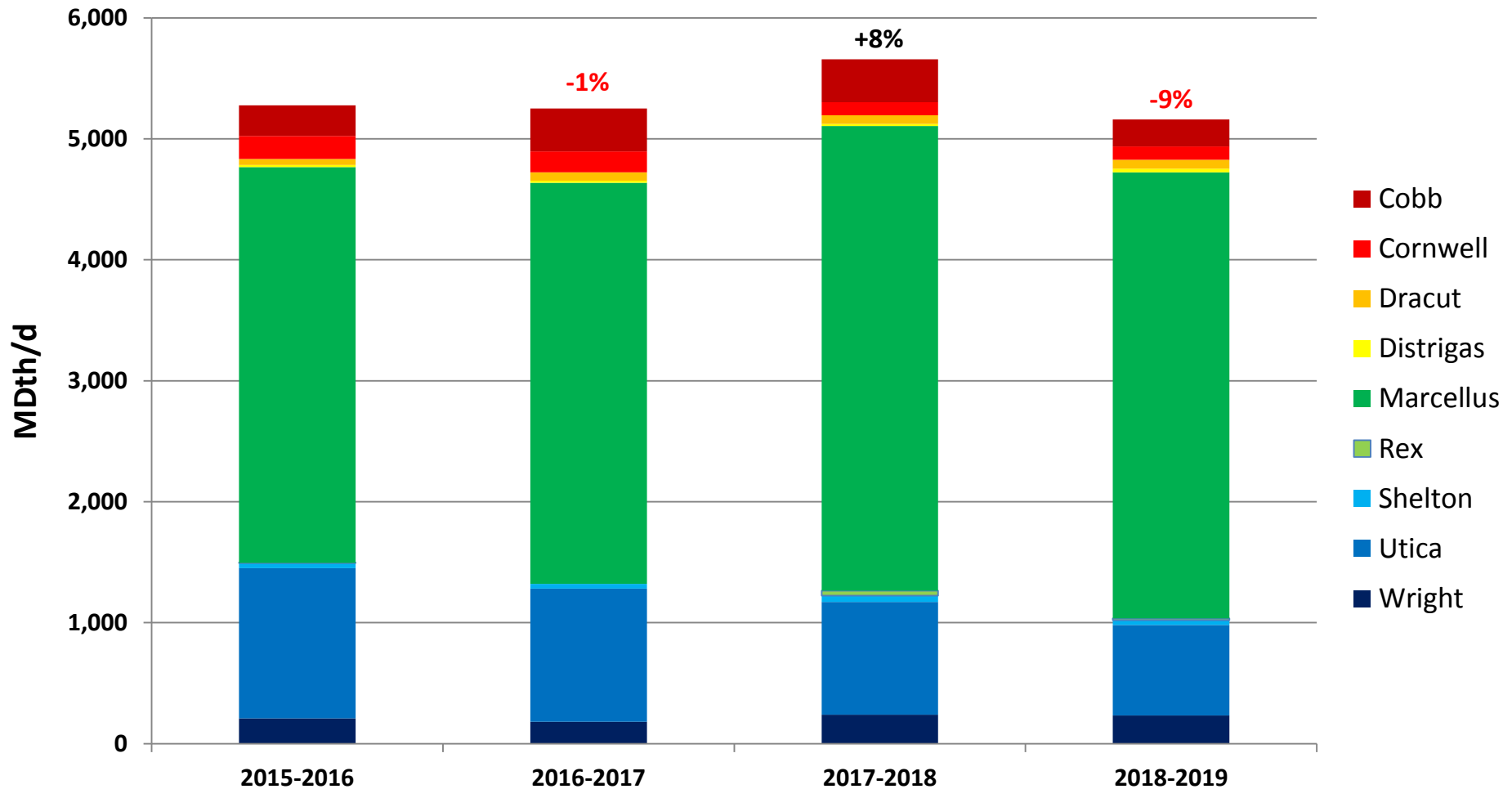
Boston weather data: NOAA and Custom Weather Inc.

# Winter Northeast Market Flows

	<u>2016-2017</u>	<u>2017-2018</u>	<u>2018-2019</u>	<u>Change</u>
LDC	1,284	1,376	1,582	+15%
Power	266	246	247	+0.5%
Pipeline Interconnects	1,488	1,560	1,524	-2%
TOTAL	3,038	3,181	3,353	+5%

• All volumes are MDth/d

# Winter Northeast Supply Analysis

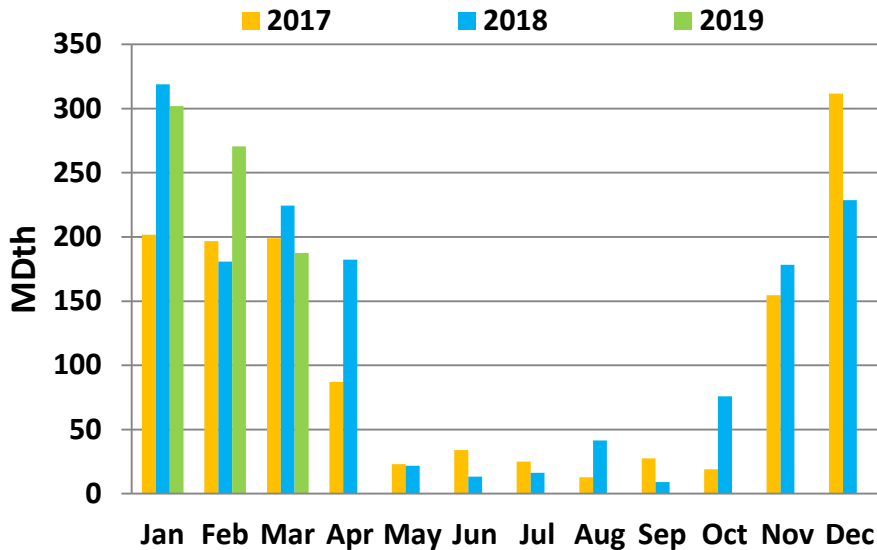




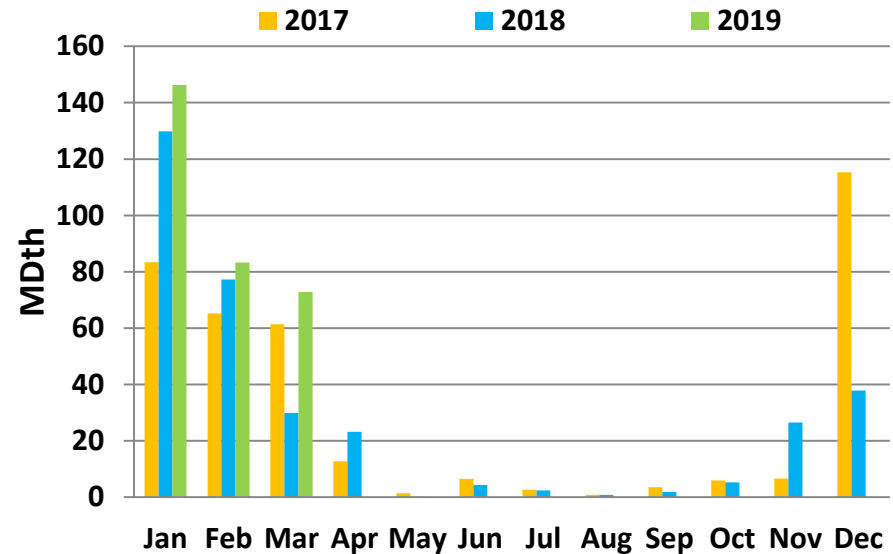
# TGP Monthly Average Flow

## Wright, Dracut and Distrigas

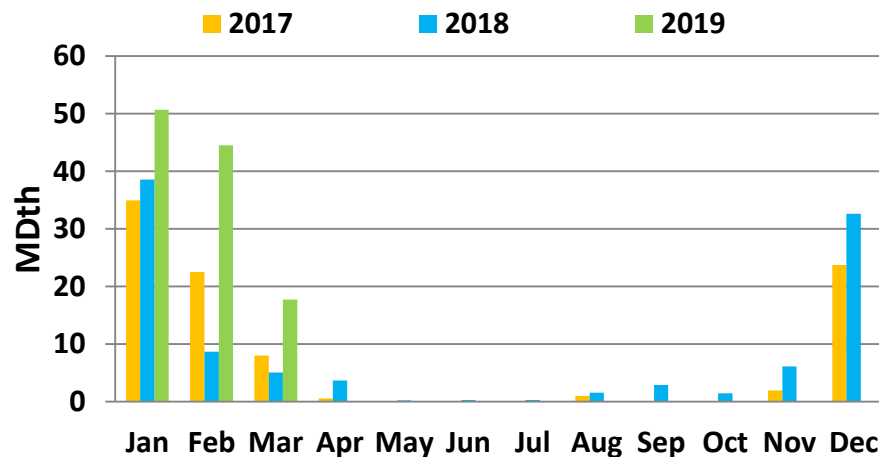
Iroquois Wright



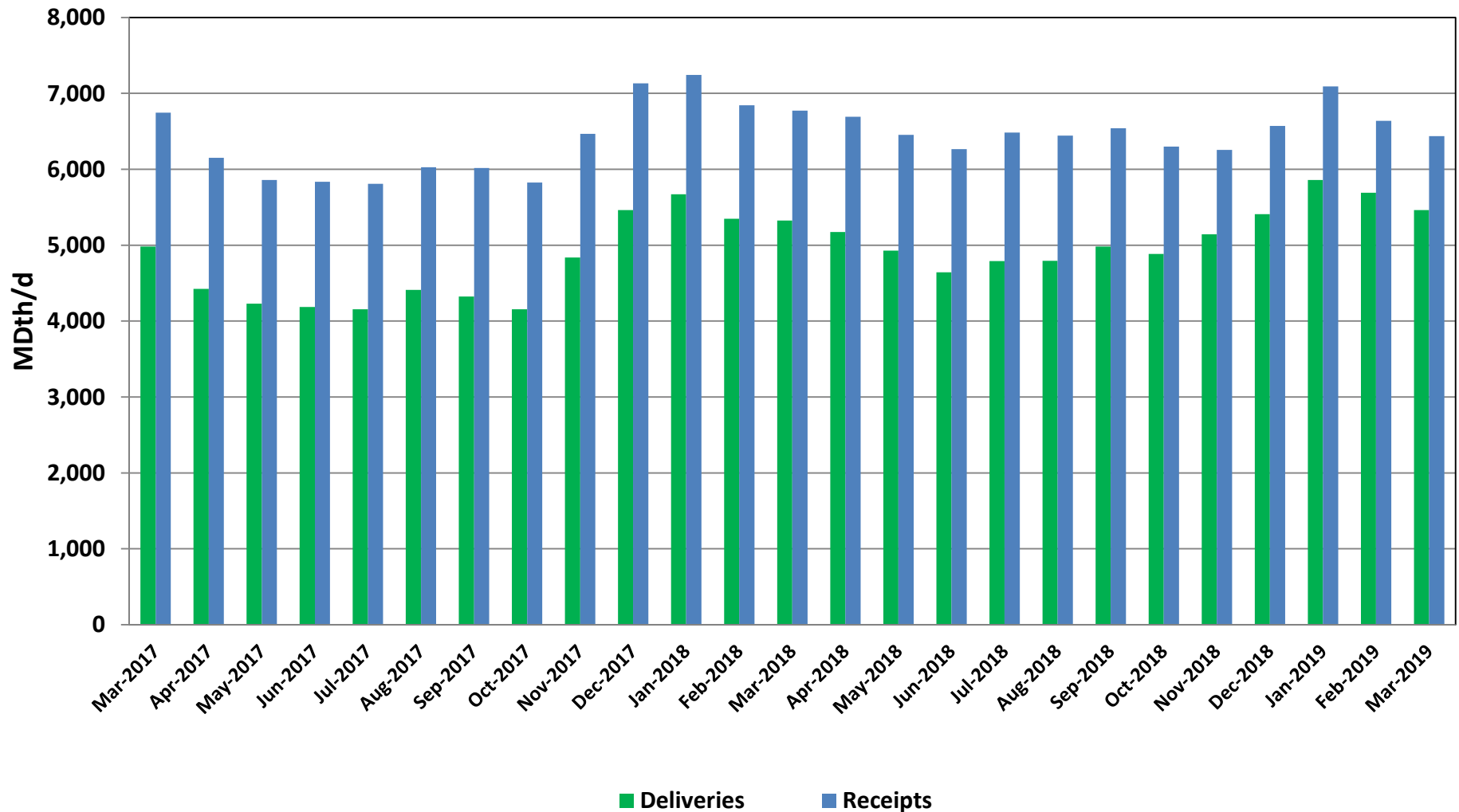
Dracut



Distrigas



# Average Daily Receipts and Deliveries in Zones 4, 5 and 6



## Winter Restrictions - Percentage Days Restricted (November - March)

Restriction Point Highly Utilized TGP Paths	Percentage Days Restricted (November - March)	Percentage Days Restricted (November - March)	Percentage Days Restricted (November - March)	Percentage Days Restricted (November - March)	Percentage Days Restricted (November - March)
	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
<b>Sta. 200/204</b>	22.52%	64.47%	68.87%	68.21%	0.00%
<b>Sta. 245</b>	100%	100.00%	99.33%	100.00%	100.00%
<b>Sta. 261</b>	32.45%	68.42%	27.81%	81.46%	87.07%
<b>Sta. 267</b>	5.29%	30.92%	55.63%	67.55%	2.04%
<b>MLV 268</b>	0.00%	0.00%	0.00%	38.41%	8.84%
<b>MLV 273</b>	0.00%	0.00%	17.22%	76.16%	99.32%
<b>Sta. 315 BH</b>	100%	76.32%	96.69%	89.40%	59.18%
<b>Sta. 321</b>	94.71%	86.18%	92.72%	92.05%	80.27%
<b>MLV 355 BH</b>	5.96%	9.21%	5.30%	14.57%	34.69%
<b>Sta. 1 BH</b>	11.26%	84.21%	0.00%	21.19%	52.38%
<b>Sta. 9 BH</b>	0.00%	0.00%	43.71%	90.37%	28.57%
<b>Mahwah</b>	64.24%	92.76%	88.08%	60.26%	97.96%
<b>Rivervale</b>	80.79%	66.45%	80.79%	99.34%	87.07%

# OFO Winter Count

## Nov - Mar

	2014/15	215/16	2016/17	2017/18	2018/19
Monthly	0	6	2	2	0
Action	3	3	2	1	0
CD1	6	10	10	31	29
CD2	0	0	0	0	0
Balancing	7	2	11	6	3
Hourly	0	0	0	0	0
Total	16	21	25	38	32

Months include carry over OFOs and expansions

# OFO Winter Count – Zones 5 & 6

## Nov - Mar

OFO Types	2015/16	Days in Effect	2016/17	Days in Effect	2017/18	Days in Effect	2018/19	Days in Effect
Monthly	0	0	0	0	0	0	0	0
Action	0	0	4	29	1	3	0	0
CD1	28	59	10	25	16	58	22	56
CD2	0	0	0	0	0	0	0	0
Balancing	5	5	5	6	0	0	1	2
Hourly	0	0	0	0	0	0	0	0
Total	33	64	19	60	17	57	23	56

Months include carry over OFOs and expansions

# Winter 2018 – 19 Operational Flow Orders Issued on Tennessee Gas Pipeline

Notice Type	Nov	# of Days	Dec	# of Days	Jan	# of Days	Feb	# of Days	Mar	# of Days
AA	0	0	0	0	0	0	0	0	0	0
CD1	5	20	3	15	14	36	5	13	2	7
CD2	0	0	0	0	0	0	0	0	0	0
BA	1	1	0	0	1	2	0	0	1	4

Months include carry over OFOs and expansions



Tennessee Gas Pipeline  
Company, L.L.C.  
a Kinder Morgan company

# DART SCHEDULING TOOLS

- No delivery nominations allowed to Dracut
- No receipt nominations allowed at delivery meters (Mendon) until ID1 (compared to EPSQ volumes)
- No delivery nominations allowed at receipt meters (Wright/Shelton) until ID1 (compared to EPSQ volumes)
- Invalid nominations not allowed
- Limitations of Storage Services/Linepack Services
- No meter bounces allowed at power plants downstream (may be invoked)
- EPSQ invoked on meters as needed
- New restriction locations added as needed
- Imbalance Warnings
- Monthly OFOs
- Daily OFOs
- Hourly OFOs – new screens coming



# Dart Updates





# DART OAC Modifications

## Segment Names

### Old OAC Naming – Segment Capacity

### New OAC Naming – Segment Capacity

#### SEGMENT CAPACITY



#### SEGMENT CAPACITY



TSP Name: TENNESSEE GAS PIPELINE TSP: 1939164  
 Eff Gas Day: 3/29/2019 Eff Time: 09:00 CCT  
 Cycle Selection: EVENING Cycle Desc: EVENING Post Date: 03/29/2019  
 Loc Purp Desc / Loc/QTI Desc: Pipeline segment defined by 1 Location/Segment(s) quantity Meas Basis Desc: Million BTU's (displayed as Dth)

TSP Name: TENNESSEE GAS PIPELINE TSP: 1939164  
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View Point(s) Capacity	Loc (Segment)	Loc Name (Segment)	Loc Zn	Design Capacity	Operating Capacity	Total Scheduled Quantity
	▽	▽	▽	▽	▽	▽
<a href="#">View</a>	101	STA 1 to STA 9	00	712,920	712,920	0
<a href="#">View</a>	101	STA 1 to STA 9	00	288,304	235,000	230,088
<a href="#">View</a>	268	FITCHBURG LAT TO GLOUCESTER		288,304	235,000	230,088

View Point(s) Capacity	Loc (Segment)	Loc Name (Segment)	Loc Zn	Design Capacity	Operating Capacity	Total Scheduled Quantity
	▽	▽	▽	▽	▽	▽
<a href="#">View</a>	101	STA 1	00	712,920	712,920	0
<a href="#">View</a>	101	STA 1	00	288,304	235,000	230,088
<a href="#">View</a>	268	STA 267 EAST	06	288,304	235,000	230,088

Location where actual restriction occurs



Tennessee Gas Pipeline  
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 a Kinder Morgan company

# Summer Operations Preview



# Summer Preview

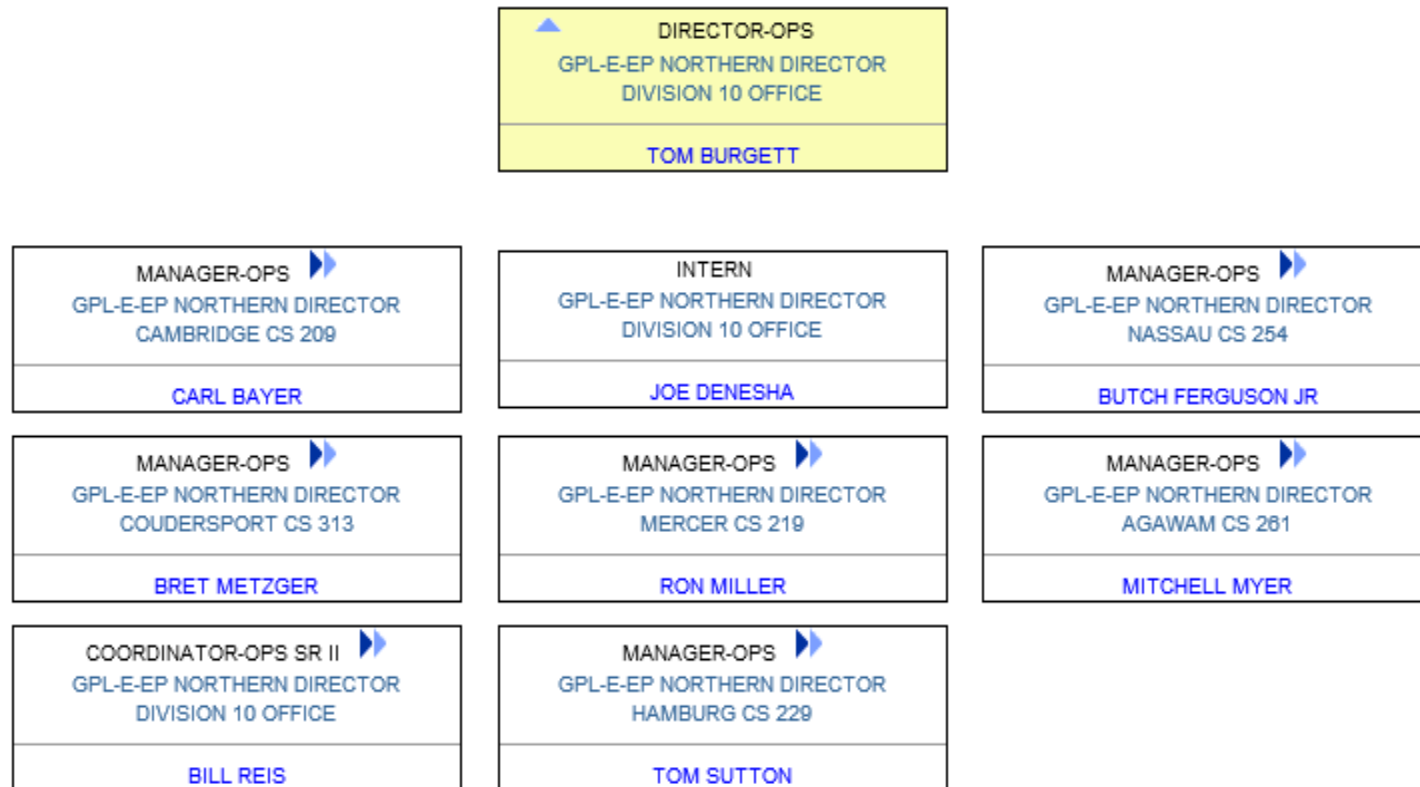
- Demand to remain strong across the system
- Capacity Utilization on the 200/300 Line in Northeast should remain high
- Marcellus and Utica Production on TGP should remain high
- Southbound Flows
  - Anticipate Volumes through Station 87 in the 1.2 – 1.6 Bcf/d range, which is lower than the previous summer of 1.75 – 2.0 Bcf/d
- Exports to Mexico and Canada to remain strong
- Storage Field Levels
  - Northern Storage levels slightly down from last year; better able to manage maintenance activities and handle market area swings
  - Bear Creek Storage levels slightly down from last year; better able to manage maintenance activities and handle market area swings
  - Storage Refill remains a high priority
- High level of system maintenance and repair
- GETTING READY FOR WINTER



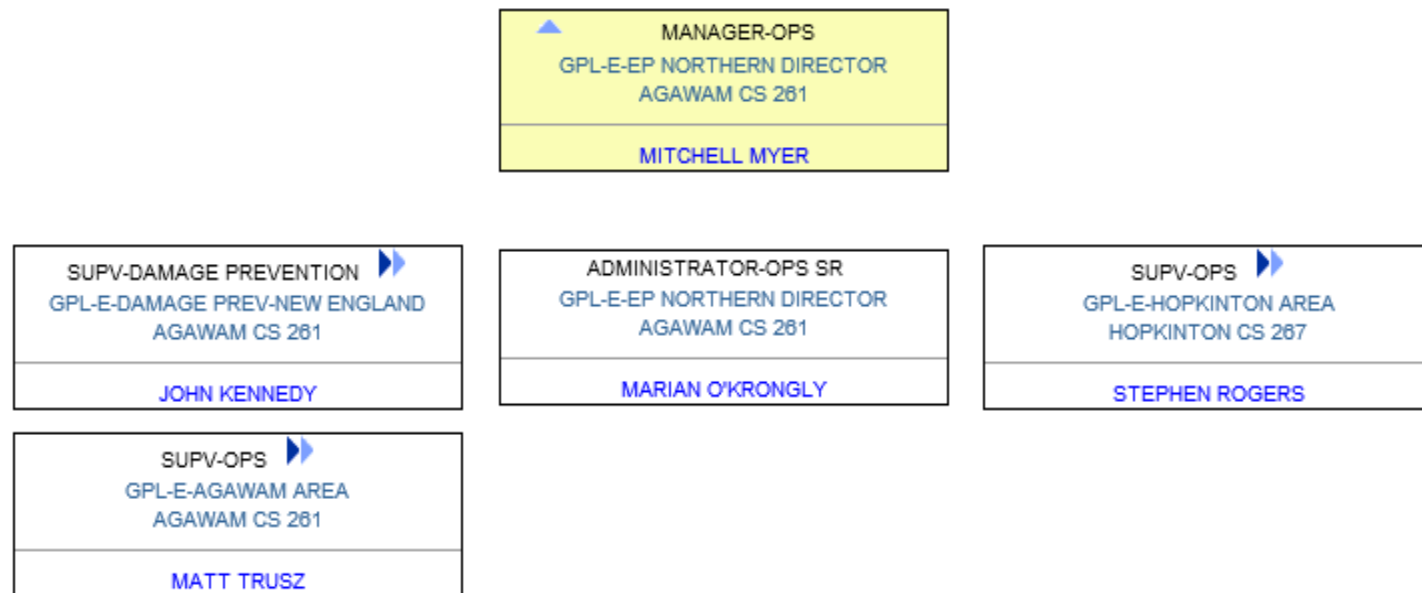
# Operations Overview



# TGP DIVISION 10 OPERATIONS ORGANIZATIONAL STRUCTURE




# TGP DIVISION 10 OPERATIONS ORGANIZATIONAL STRUCTURE



# Maintenance Update



# EBB Website



Tennessee Gas Pipeline Company, L.L.C.  
a Kinder Morgan company

IMBALANCE WARNING FOR ZONE 0 SOUTH OF STATION 1

Interstate Pipelines

Midstream Pipelines

Informational Postings

Customer Information

Contact Us

DART Login

Legacy PASKEY Portal

Recent Notices

OFO

Apr 30 Imbalance Warning Zone 0 South Of Sta 1

Planned Service Outage

May 08 Scheduled Maintenance Webex

May 08 Updated Ttp Scheduled Outages

Page: [1] 2 3

Capacity Constraints/FMJ

Other Critical

Jun 17 Secondary In The Path Filing Update #3

Jun 01 Secondary In The Path Filing Update #2

Page: [1] 2 3

Non-Critical Notices

May 12 Cashout Data Estimate- April, 2014

May 12 Supply Net Pipeline Position Notice

Page: [1] 2 3

Open Seasons

May 09 Successful Bidder Open Season #925

May 09 Successful Bidder Open Season #924

May 05 Res. Of Cap. For Future Expansion

Page: [1] 2 3 4 5 6 7

Open Season Documents

Service Programs

No Service Programs

Other Postings

All Notices

Critical Notices

Non-Critical Notices

Operating Information

Outage Impact Report

Maintenance Outages (Excel)

Other Information

System Constraints (mouse over the map hotspots to view data)

Highlight Locations

Locs At/Near Capacity

Current Gas Day

Tomorrow's Gas Day

LEGEND

Location

Constraint

≤2% Available

No Data

ID 1 - May 12 - Final

Map showing pipeline routes and constraints across the Eastern US, including locations like Donna Lateral, Hartford, Buffalo, Boston, and Niagara Spur.


DISCLAIMER: The summary information contained in this graphical display is a sampling of points for informational purposes only. This display should not be relied on by shippers in making or confirming commercial transactions. For a listing of available capacity, please go to the capacity link under Informational Postings.

Weather Forecast (data from weather.gov)

Boston	May 12:	81/52°F	Chance Rain Showers
	May 13:	55/46°F	Mostly Cloudy
Buffalo	May 12:	70/59°F	Rain Showers Likely
	May 13:	71/52°F	Chance Thunderstorms
Hartford	May 12:	83/56°F	Chance Rain Showers
	May 13:	65/48°F	Slight Chance Rain Showers
New York	May 12:	82/62°F	Chance Rain Showers
	May 13:	68/52°F	Slight Chance Rain

On Call Assistance

Scheduling Hotline	(713) 420-4999
Weekend Contacts	
Gas Control Hotline	(800) 231-2800
Contract Mgmt. Hotline	(713) 420-3434
DART Non-Security Issues	(713) 420-4999
DART Security Support	



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a Kinder Morgan company

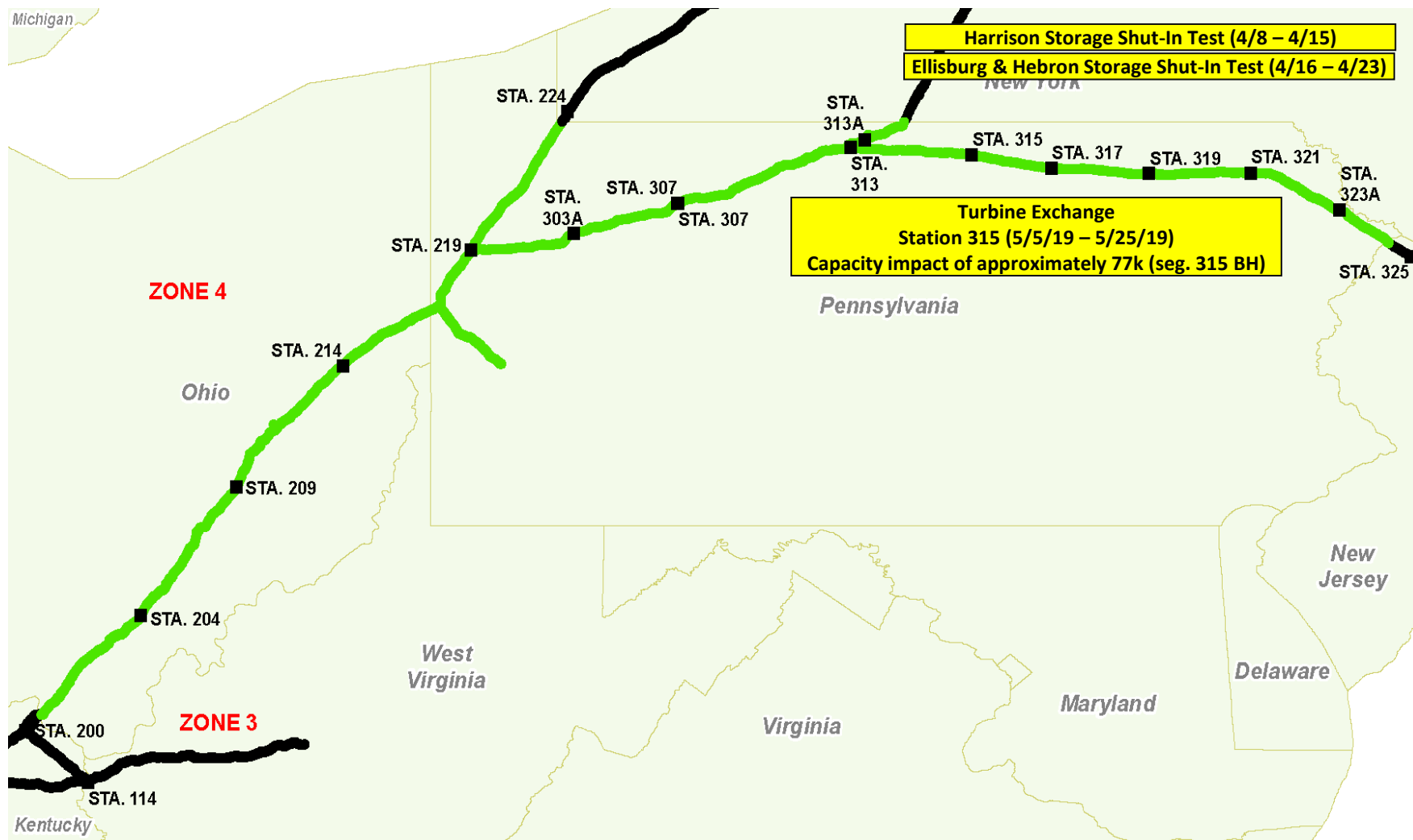


# Pipeline Maintenance Reporting on EBB

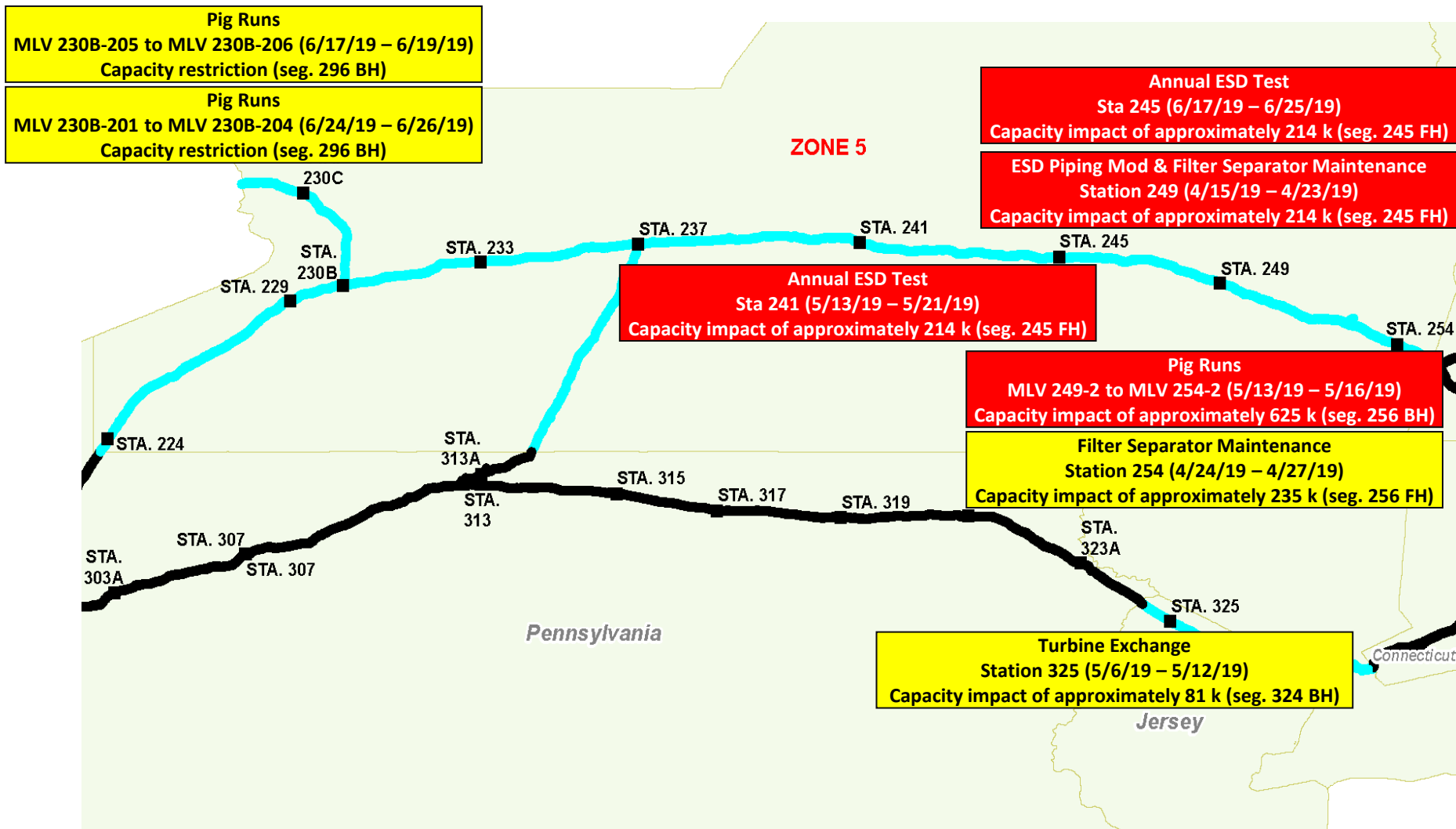
- Updated TGP Scheduled Outages Report (Word Document)
  - Posted under Planned Service Outages
  - Lists All Planned Scheduled Outages that may impact segment and/or meter capacity
  - Updated Weekly
- Maintenance Outages (Excel Document)
  - Posted under Operating Information
  - Same information that is noted in the Updated TGP Scheduled Outages Report
  - Located at the bottom of the EBB Main Page under Operating Information
  - Updated Weekly
- TGP Outage Impact Report
  - Posted under Planned Service Outages and Operating Information
  - Provides 7-Day Outlook and a 2/3-Month Weekly Outlook
    - Anticipated Segment Capacity due to Maintenance
    - Potential Restriction Levels due to Maintenance
  - Updated Weekly



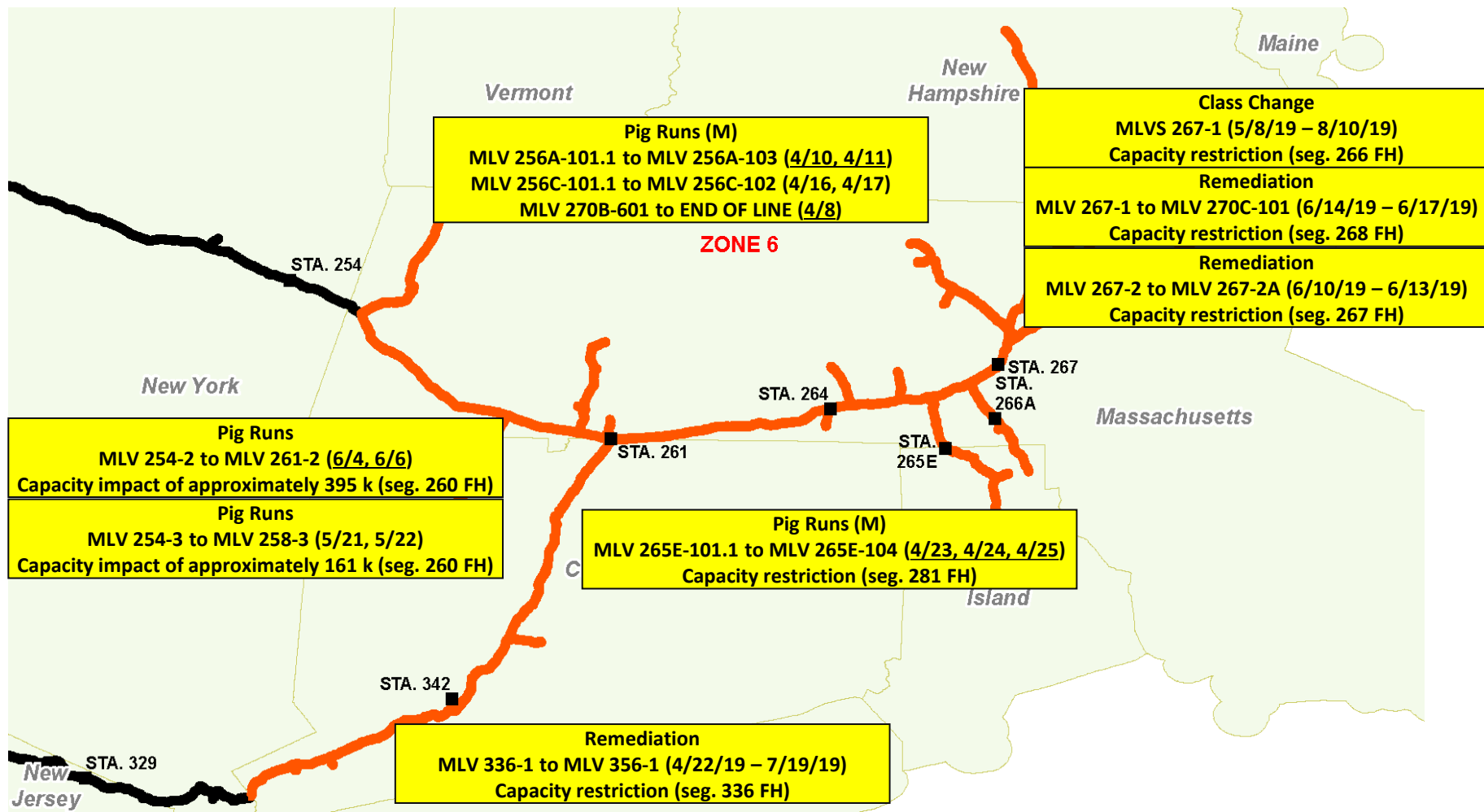
# Zone 4 (April – June)



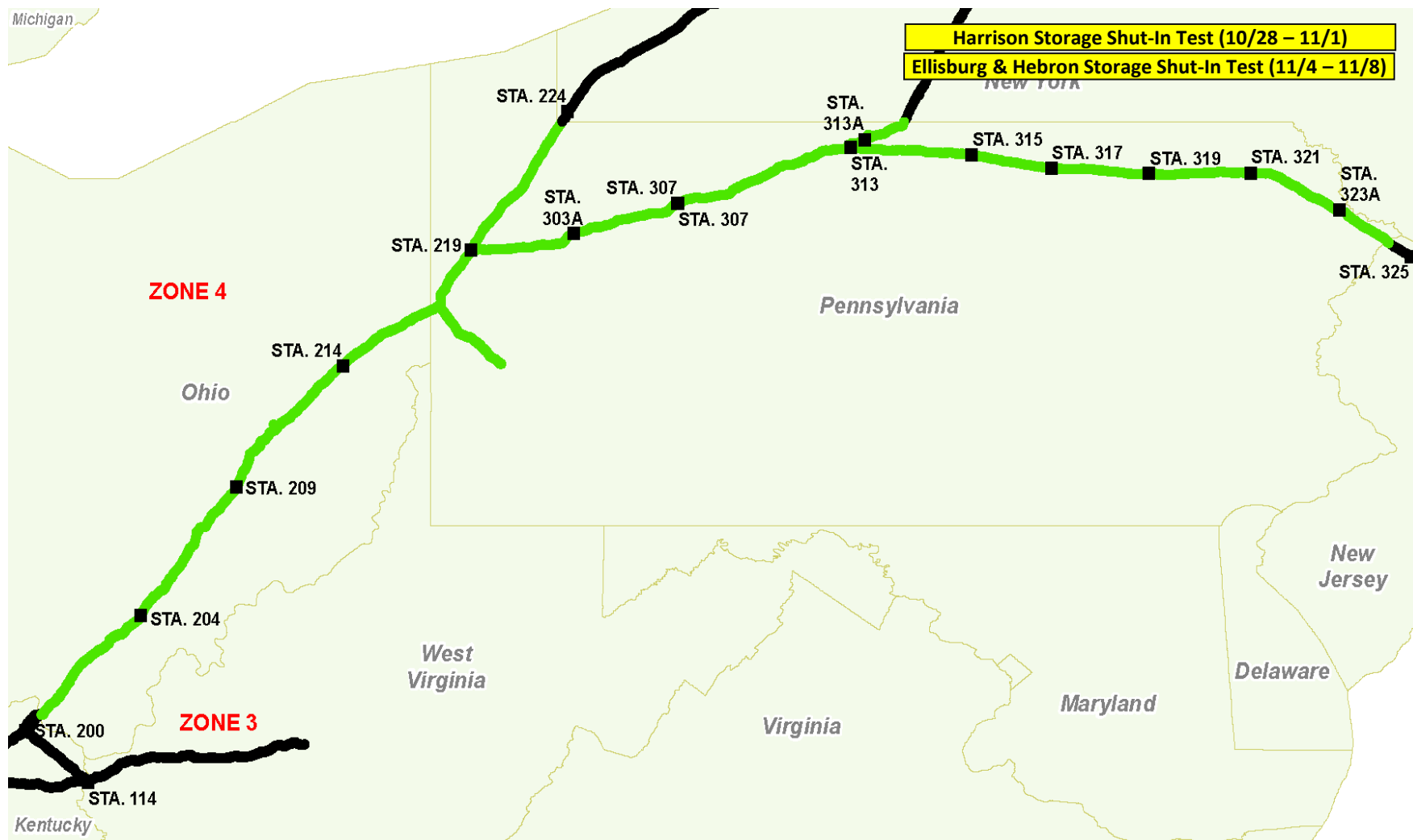
# Zone 5 (April - June)



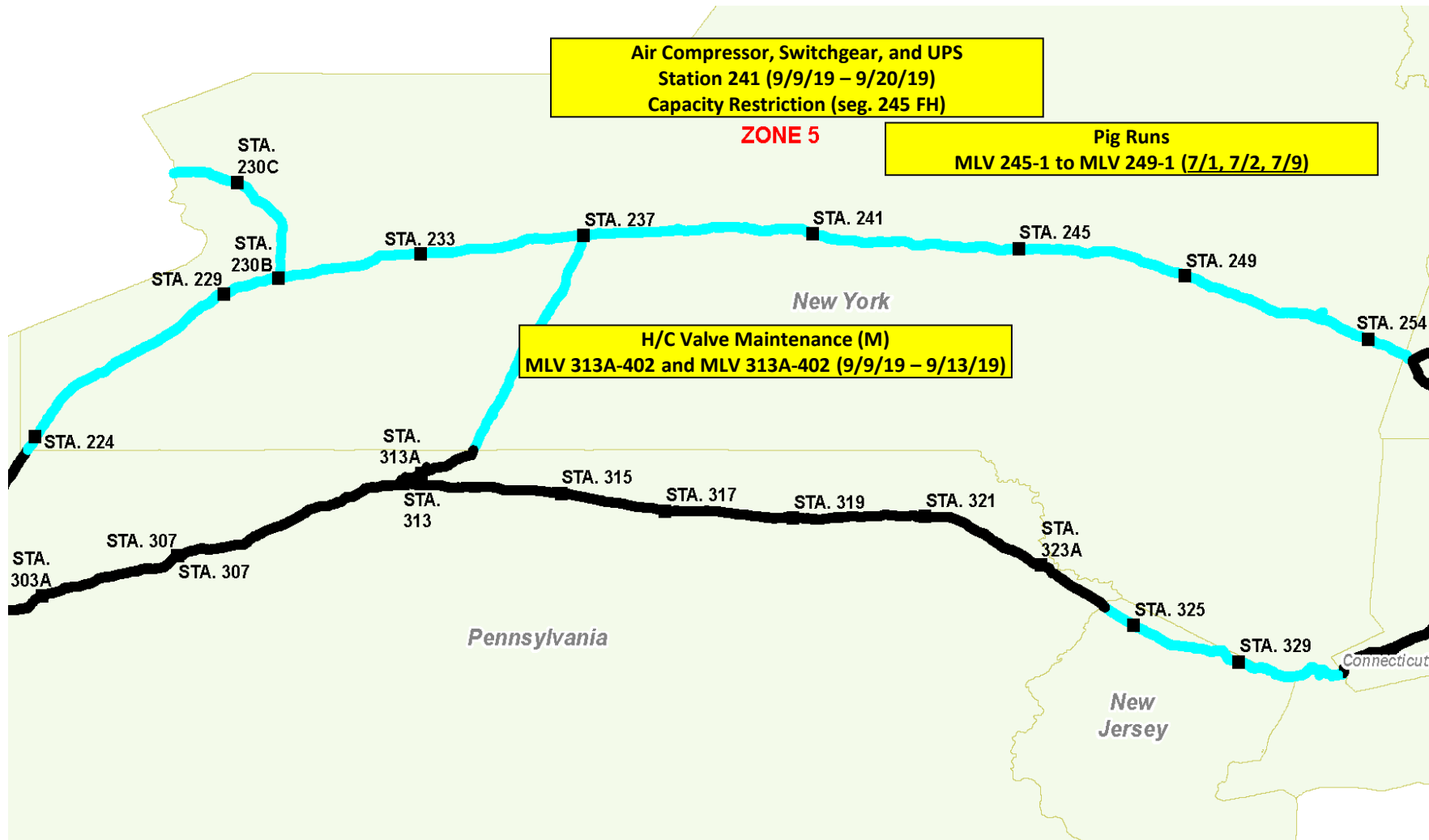
# Zone 6 (April - June)



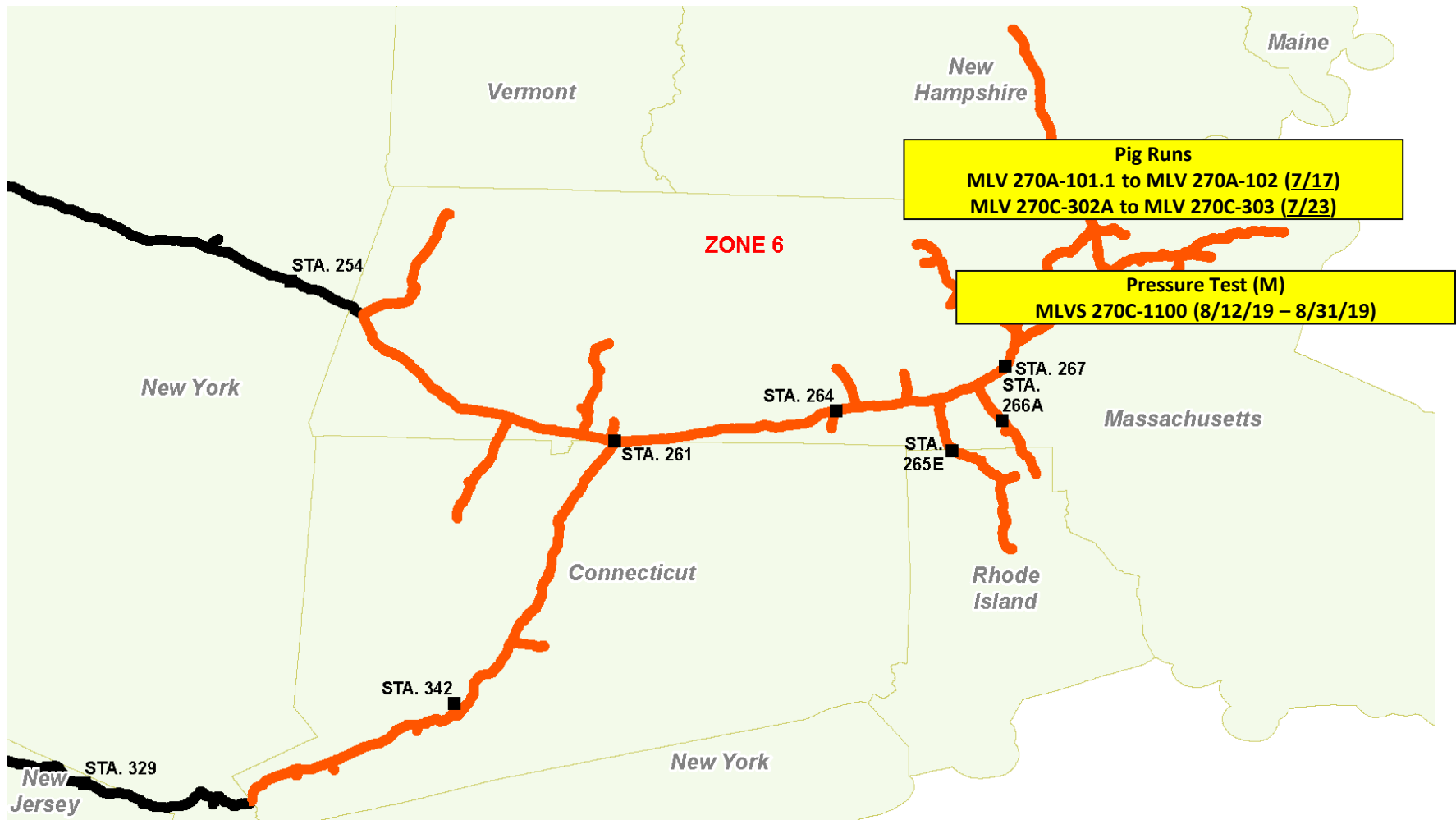
# Zone 4 (Future Outages)



# Zone 5 (Future Outages)



# Zone 6 (Future Outages)



# Commercial Update






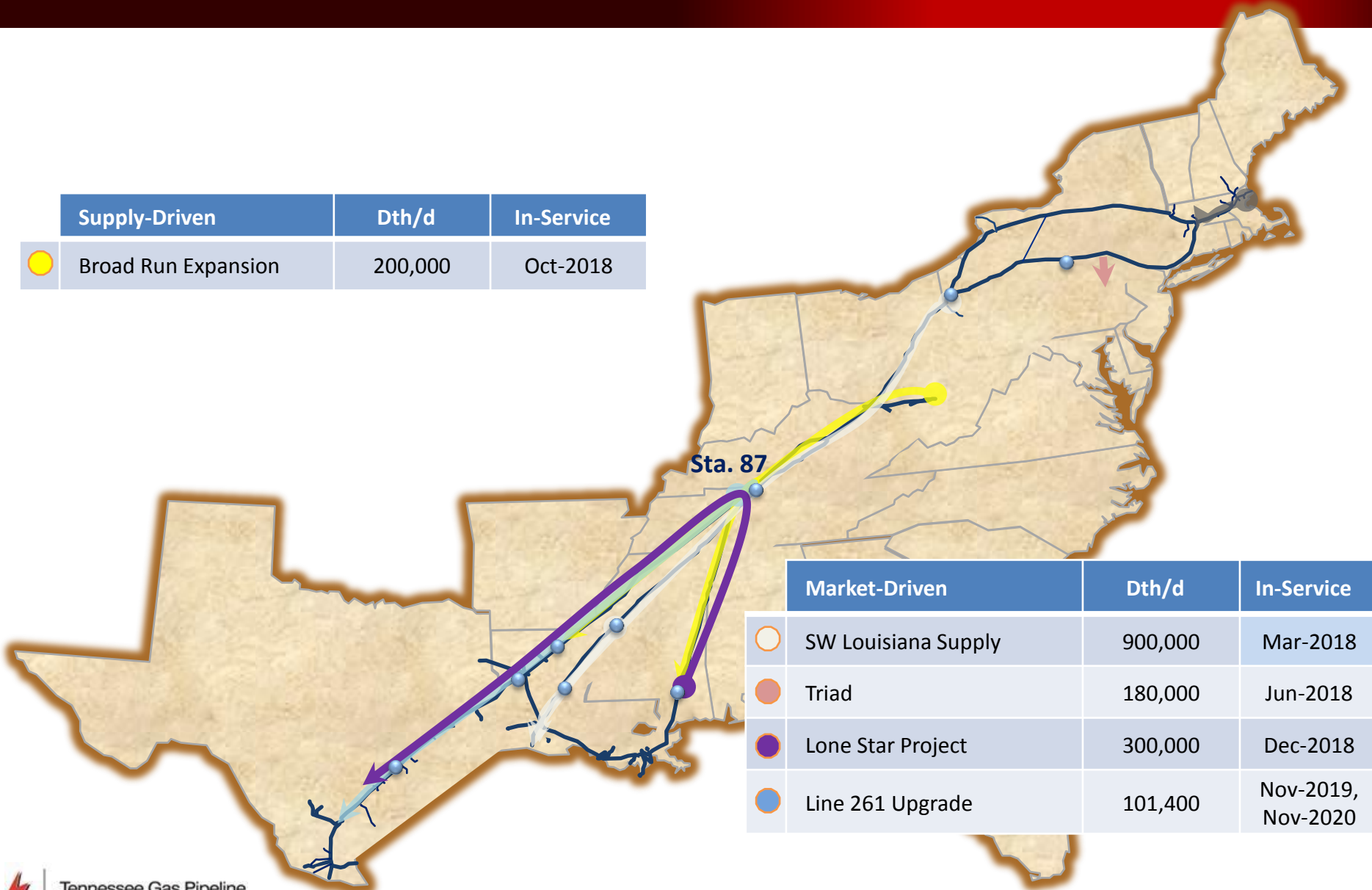
# TGP's Recent Development Projects





Name	Volume (Dth)	Shippers	Effective Date	Progress
Triad (Invenergy)	180,000	Lackawanna Energy (Invenergy)	June 2018	Facilities Complete (Commercial Contracts June 2018)
Southwest Louisiana Supply Project (Cameron LNG)	900,000	Mitsui, Mitsubishi	March 2018	In-service
Broad Run Flexibility Broad Run Expansion	590,000 200,000	Antero Resources	Nov 2015 October 2018	590,000 Dth/d – In-service 200,000 Dth/d – In-service
Lone Star	300,000	Cheniere	July 2019	In-Service December 2018
Line 261 Upgrade	101,400	Columbia Mass, Holyoke	Phased in-service 2019-2020	Regulatory/Permitting Phase



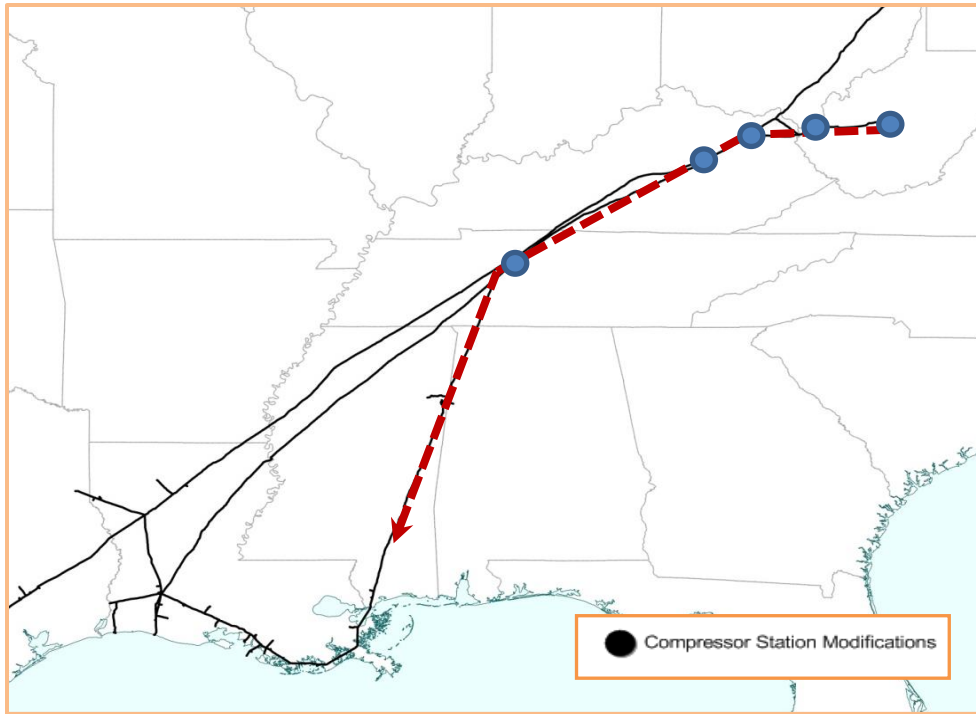
# TGP Active/Recently Completed Projects

	Supply-Driven	Dth/d	In-Service
	Broad Run Expansion	200,000	Oct-2018



	Market-Driven	Dth/d	In-Service
	SW Louisiana Supply	900,000	Mar-2018
	Triad	180,000	Jun-2018
	Lone Star Project	300,000	Dec-2018
	Line 261 Upgrade	101,400	Nov-2019, Nov-2020

# Broad Run Expansion Project – *In Service*

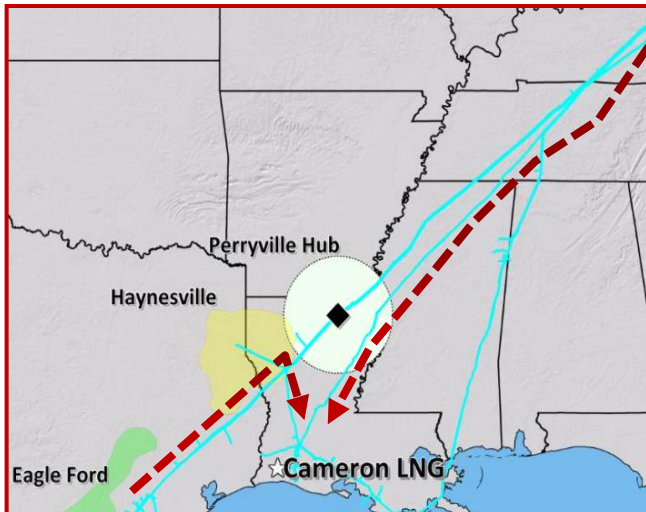
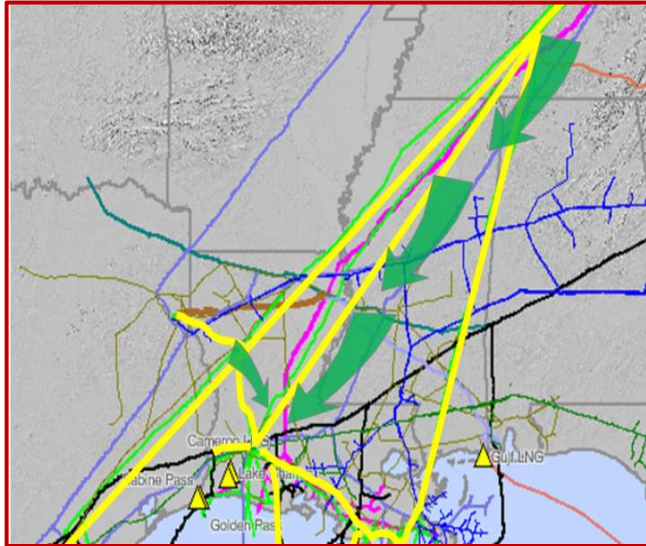


## Details

- Commercial Driver:
  - SW Marcellus/ Utica production to Gulf Coast markets
- Capacity: 200,000 Dth/d
- Customer: Antero Resources
- Project Scope:
  - New compression/HP replacement at 2 existing stations (S114 and S106)
  - New compression at 4 greenfield stations (S118, S119, S875 and S563)
- In Service October 2018



# Southwest Louisiana Supply Project *In-Service*



## Details

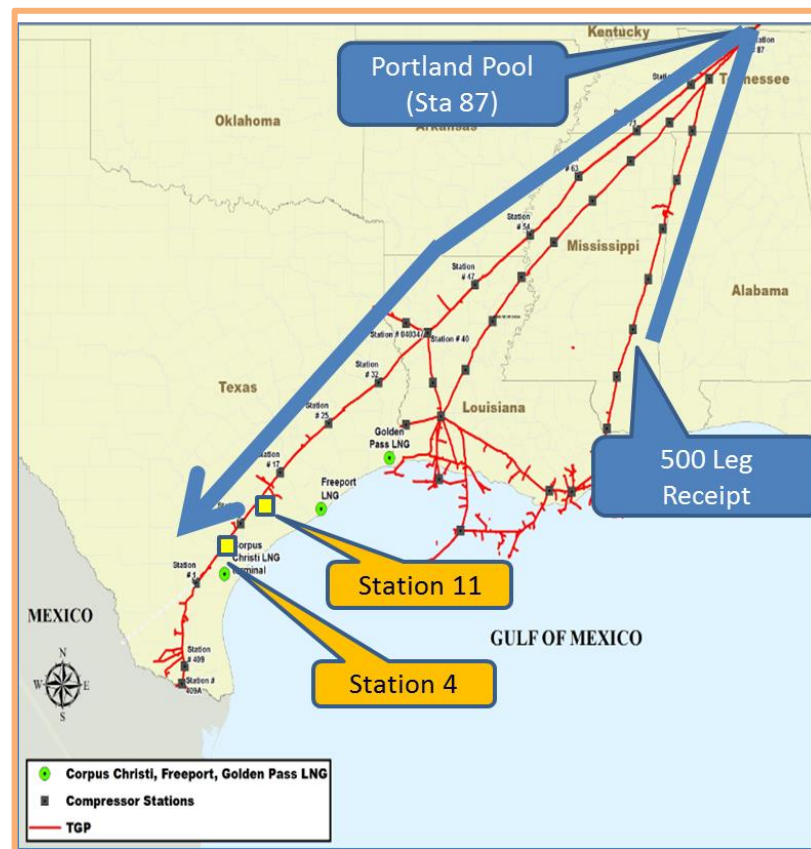
- **Commercial Driver:** Supply from multiple basins to Cameron LNG Export Facility
- **Capacity:** 900 MDth/d
- **Customer:** Mitsubishi, MMGS
- **Project Scope:**
  - Station reversals: S847, S834, S827 and S823
  - 18,000 HP of new compression
  - 2 new laterals (3.8 miles) for enhanced supply access to Perryville/Delhi
  - 5 new pipeline interconnects: MEP, Tiger, Gulf South, Gulf Crossing, Line CP
- **In-Service:** March 2018



# Lone Star – *In Service*

## Details

- **Commercial Driver:**
  - Supply for new Corpus Christi LNG export project
- **Capacity:** 300,000 Dth/d
- **Customer:** Cheniere
- **Project Scope:**
  - 2 new compressor stations (3A and 11A)
- **In Service:** December 2018

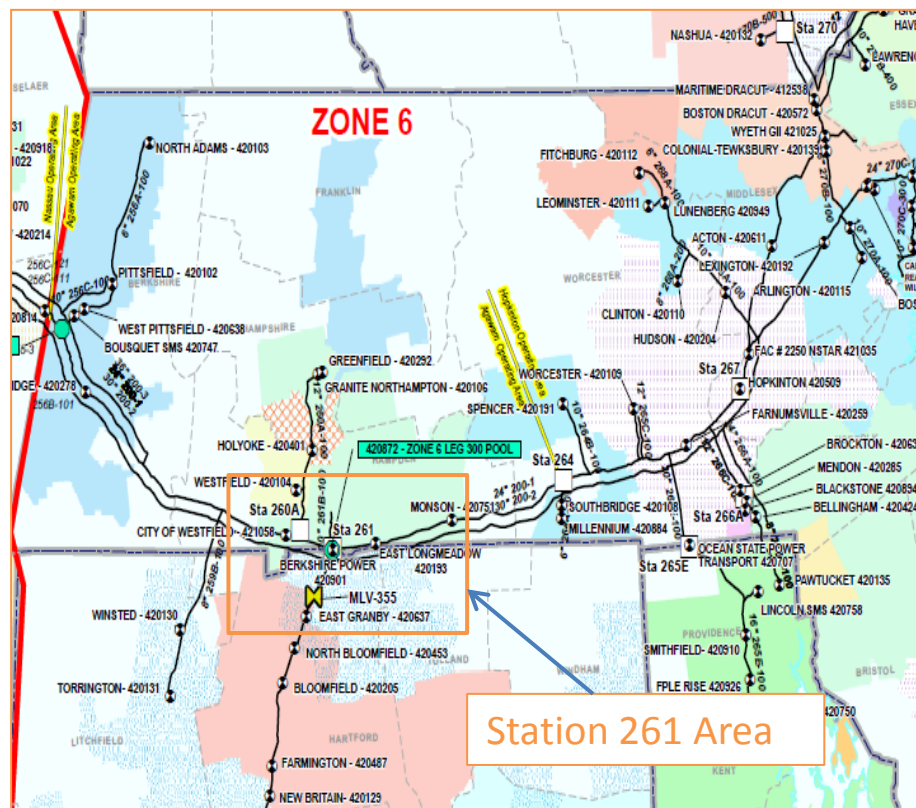




# Line 261 Upgrade – *Regulatory / Permitting Phase*

## Details

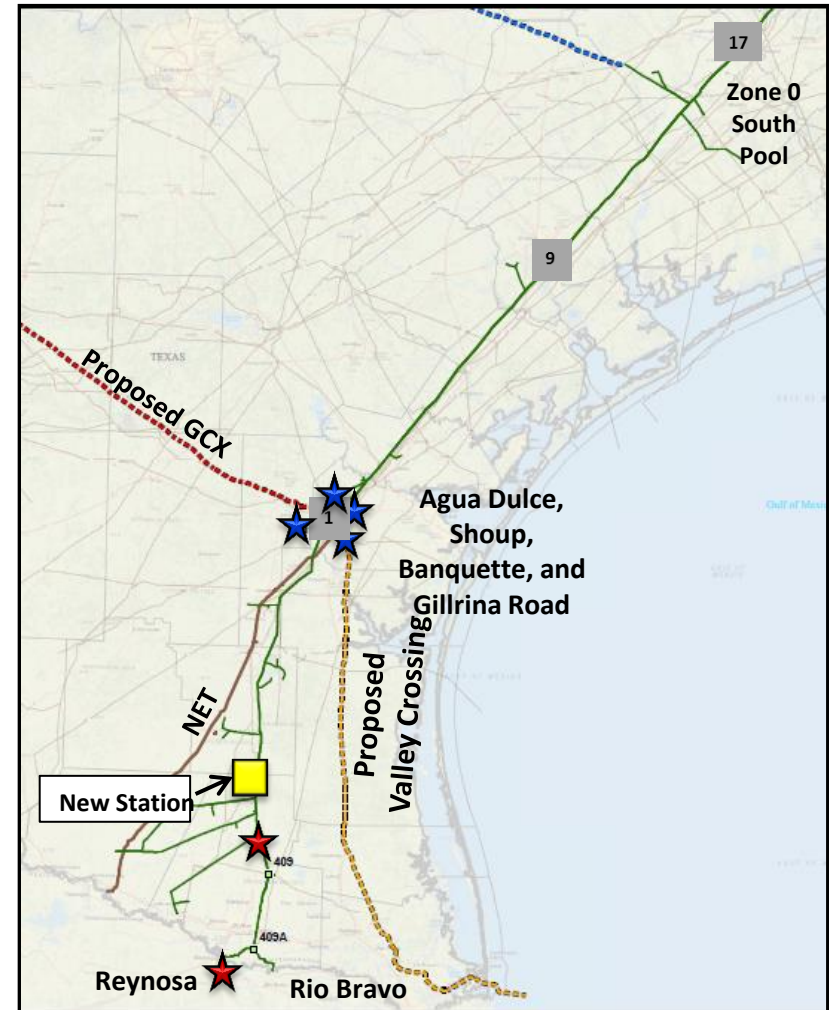
- **Commercial Driver:**
  - ☐ Residential/commercial gas demand growth
- **Capacity:** 101,400 Dth/d
- **Customer:** Columbia Gas of Mass (96,400 Dth/d)  
Holyoke (5,000 Dth/d)
- **Phased In-service 2019-2020 timeframe**
- **Project Scope:**
  - ☐ New delivery meter
  - ☐ HP Replacement at Station 261
  - ☐ 2 miles of looping Springfield Lateral



# Mexico/South Texas

## Details

- **Commercial Driver:** Mexico Demand
- **Capacity Path:**
  - Receipts immediately north of Station 1
  - up to 150,000 Dth/d to Mexico Border
  - up to 150,000 Dth/d to Edinburg area delivery
- **Proposed In-service:** 4Q 2021
- **Project Scope:**
  - Compression only
  - No looping/pipe required
- **Status:**
  - Binding Open Season: Q2 2019



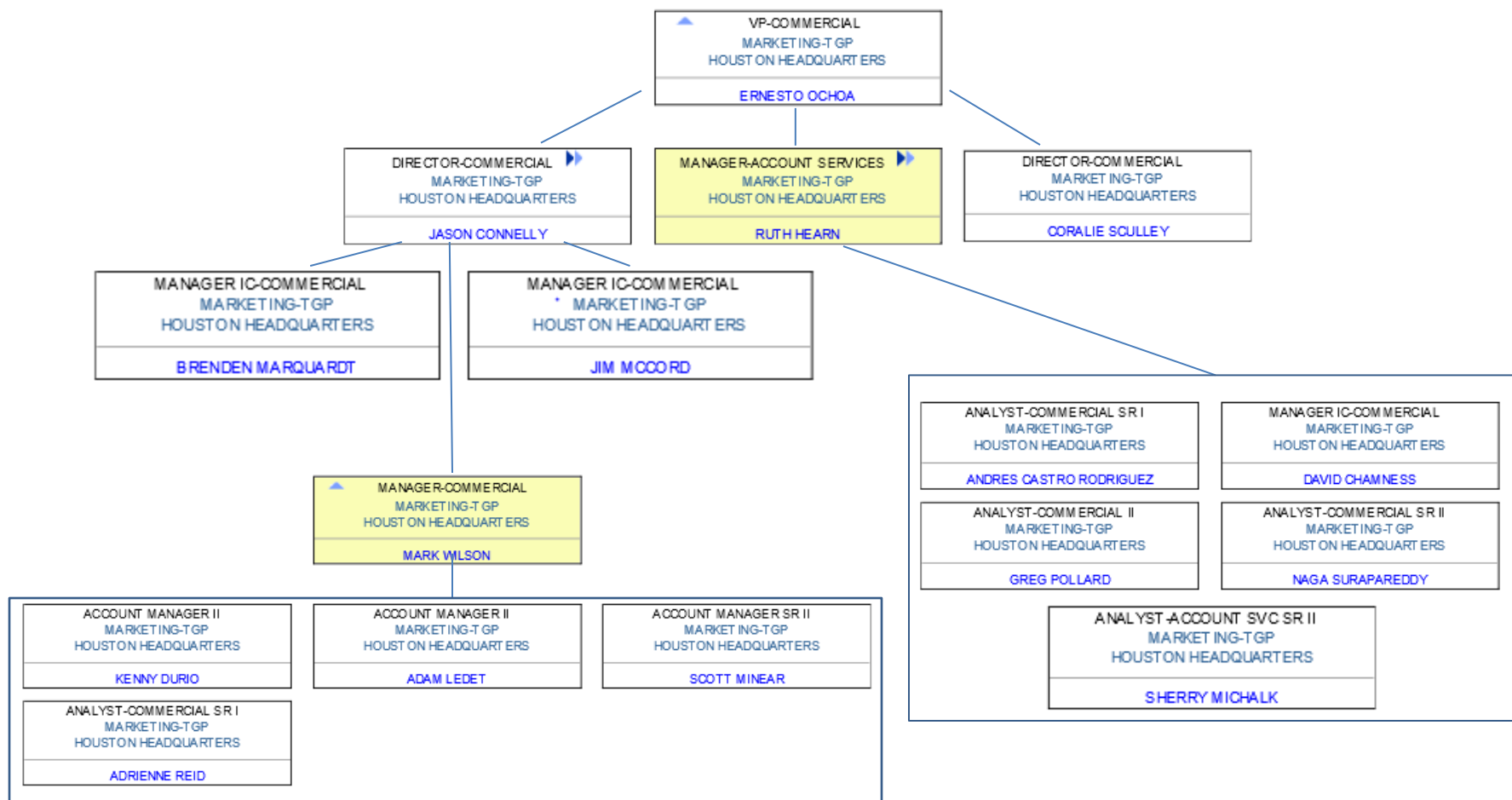
# “Update & On the Horizon”

- TGP Cash-Out filing update
- Permian & Haynesville Supply Basins
- LNG
  - U.S. Export and Global market dynamics/Fundamentals
  - Creative LNG peaking facilities and services
- Power Plants
- Continuing development of emerging southeastern U.S. and Texas markets

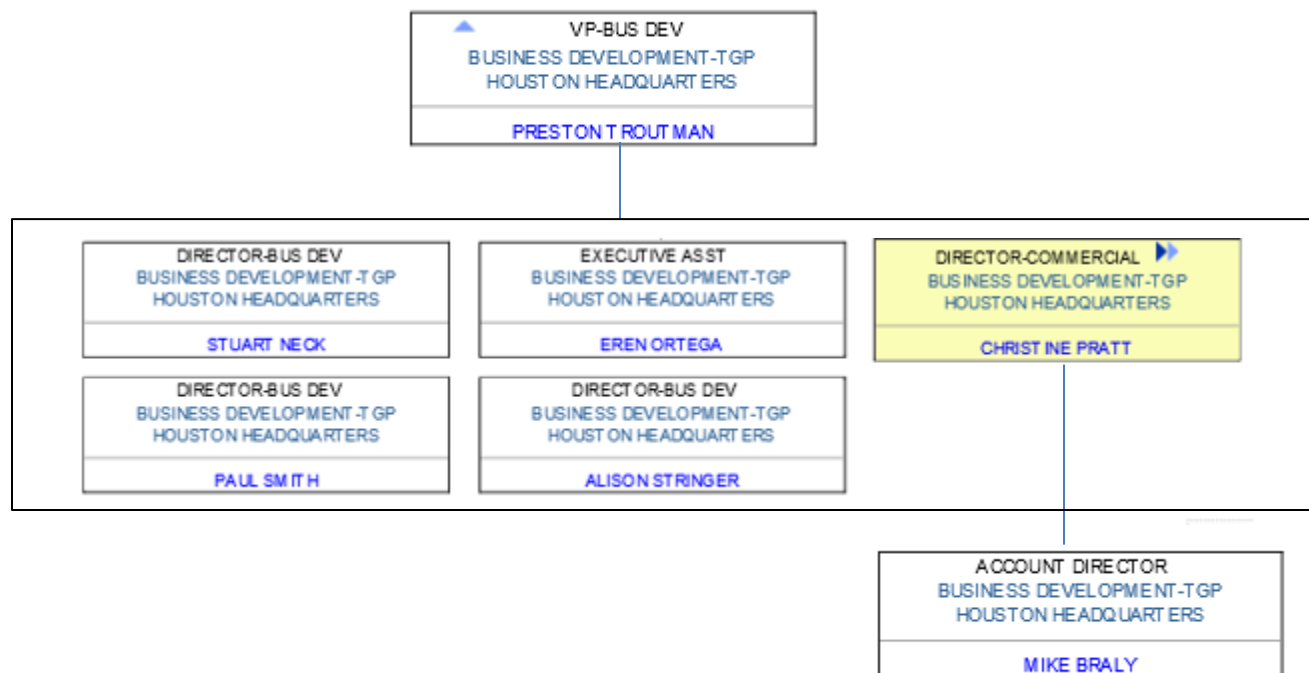




# TGP Commercial Team



# TGP Business Development Team



# TGP Contact List



# Tennessee Gas Pipeline Contact List

## Gas Control

24 hour and emergency

**800-231-2800**

Ganesh Venkateshan– Mgr

713-420-2099

Cell –832-980-8296

Layne Sanders – Dir

713-420-5024

Cell – 832-563-5024

Brian Merchant-Dir

713-420-5867

Cell-713-206-0590

Danny Ivy - VP

713-369-9311

Cell – 713-829-2761

Tom Dender – VP

713-420-3833

Cell – 205-572-1549

## Transportation and Storage

24 hour Scheduling Hotline

713-420-4999

Cathy Soape – Manager

713-420-3814

Cell – 713-922-5083

Katie Cornutt – Manager

713-420-5648

407-902-8027

Gina Mabry – Director

713-420-3685

Cell – 281-744-8666

Gene Nowak – VP

713-369-9329

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## Commercial/Marketing

Jason Connelly - Director

713-420-2446

Cell – 713-444-3940

Coralie Sculley – Director

713-420-6336

Cell – 713-818-0411

Ernesto Ochoa – VP

713-420-1734

Cell – 281-414-3823

Kim Watson – President

713-369-9233

Cell – 713-204-5423

## Field Operations

Bret Metzger– Ops Manager (Coudersport Area)

814-274-3122

Cell – 814-366-1712

Butch Ferguson – Ops Manager (Nassau Area)

860-763-6013

Cell – 518-542-8907

Mitchell Myer– Ops Manager (NE Area)

413-821-2022

Cell – 713-205-7864

Tom Burgett – Director (Northeast)

860-763-6027

Cell – 713-829-2919

Ron Bessette– VP

713-420-6012

Cell – 413-313-4380

Ken Grubb –COO GAS Pipelines

713-369-8763

Cell – 713-702-1210