



Railroad Commission of Texas

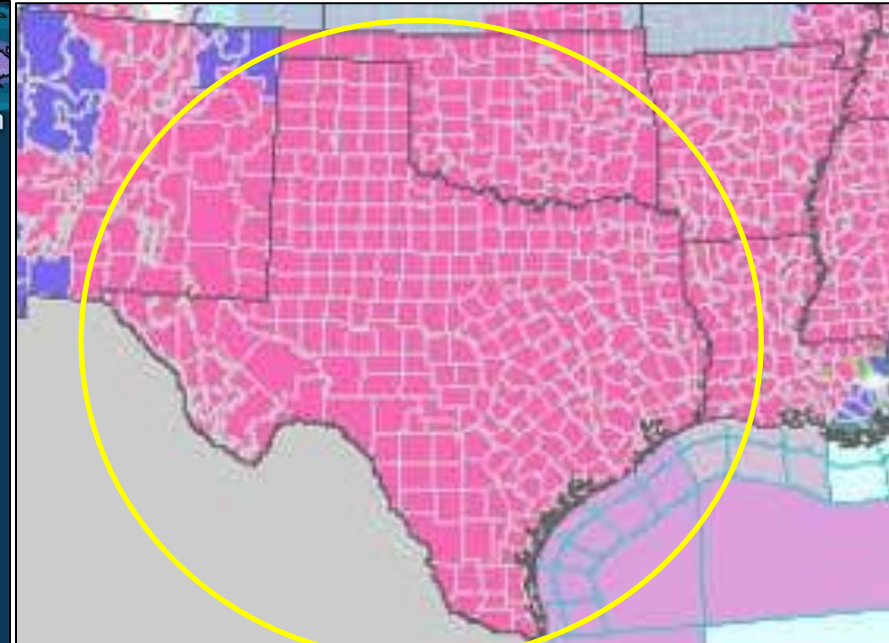
*Using GIS to Manage Natural Gas
Critical Infrastructure for the
Texas Electricity Supply Chain*

Jared Ware

Texas GIS Forum
October 26th, 2023



Why map the natural gas supply chain?



Winter storm arrives – Texas freezes over – Multiple power outages

CID's Regulatory Requirements



- Rule 3.65 – Critical Infrastructure

- CI-D and CI-X Filings
- Administrative Compliance
- Technical Assessments



Information that constitutes part of the natural gas supply chain *

- Rule 3.66 – Weather Preparedness

- Emergency Operations Plans
- Inspections
- Technical Reviews



Information used for inspections and requirements analysis

Achieving GIS-enabled solutions to track regulatory requirements

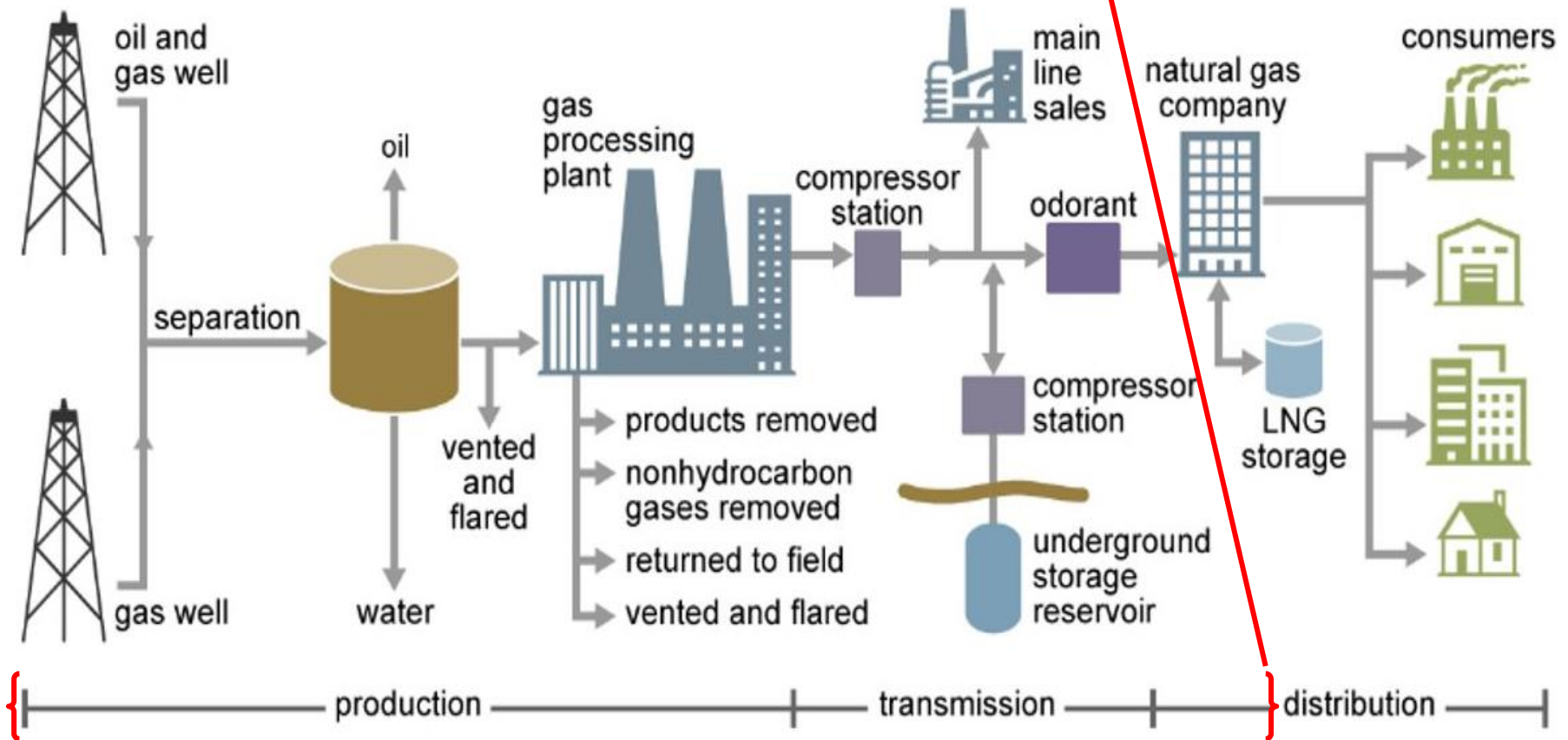
*note: not every critical load facility is on the electricity supply chain

Natural Gas Infrastructure on the Map



Rule 3.65 and Rule 3.66 Regulatory Requirements

Regulated by the Railroad Commission of Texas

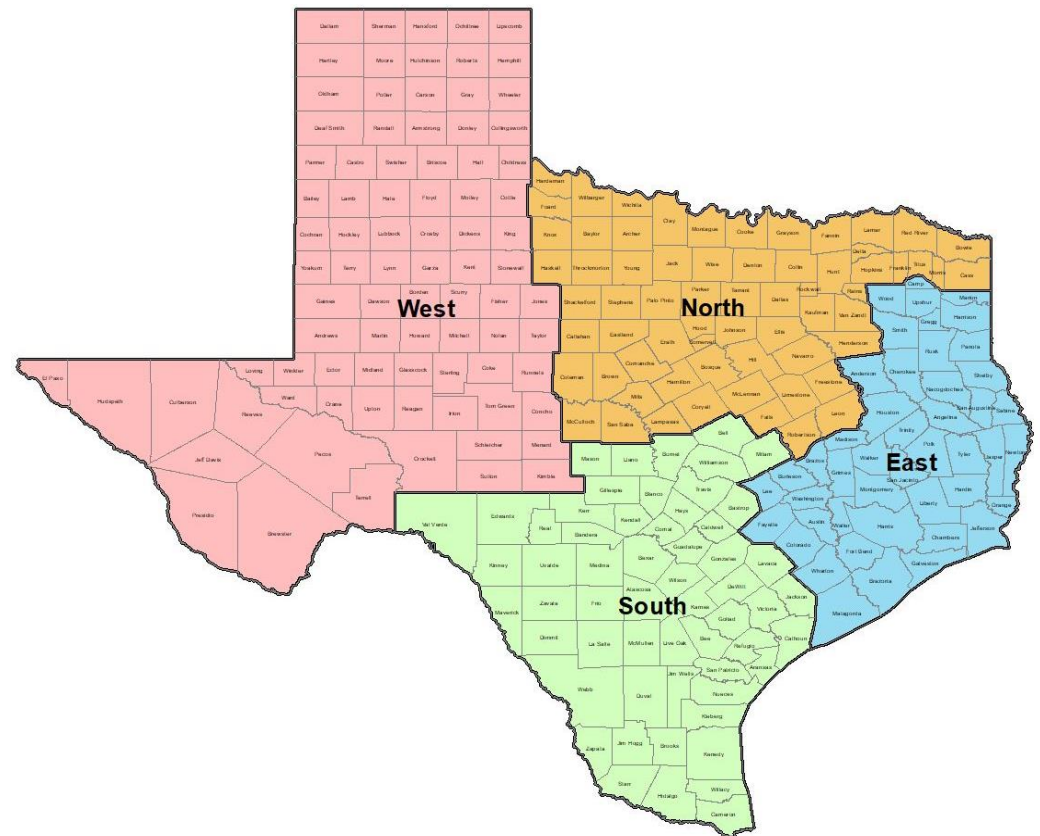


Inspected by RRC's Critical Infrastructure Division

RRC's GIS-enabled Applications



- Electricity Supply Chain Map
- Critical Infrastructure Inspection System (CIIS)
- GeoTAB
- RRC MAP
- Power BI



Mapping the Natural Gas Supply Chain



- Over 6,000 natural gas critical infrastructure facilities in the supply chain subject to Rule 3.66
- Systems currently consists of:
 - Over 15,000 miles of gas transmission pipeline
 - Over 60,000 miles of power transmission lines
- Emergency contact information for facilities
- Live visualizations of weather watches and warnings
 - National Weather Service feeds
 - Localized weather across counties and regions

Natural Gas Critical Infrastructure Layers



• 8 Primary Layers & 4 Supplemental Layers

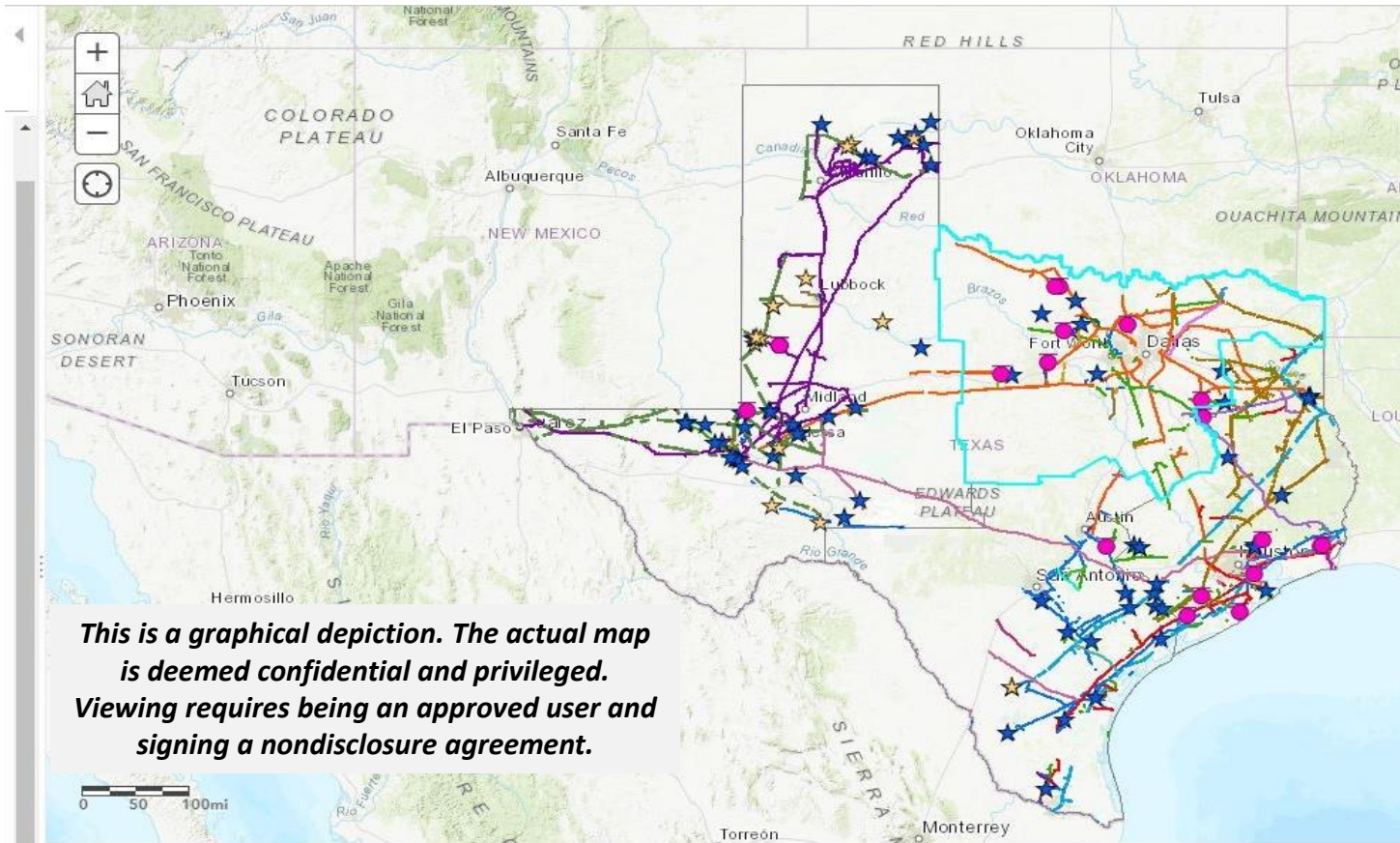
– Pipelines (Transmission)	Primary	~21,000
– Pipeline Compressor Stations		~200
– Gas Processing Facilities		~70
– Off lease Gas Processing Compressor Stations		~300
– Gas Wells		~3000
– Oil Leases		~1000
– Saltwater Disposal Wells		~1400
– Underground Storage		~20
– Liquid Storage Facilities	Supplemental *	
– Pipeline Meter Stations		
– Pipeline Regulators		
– Pipeline Control Centers		

* Required only for CID Inspections

Data Manipulation and Visualization



Maintained through Esri's ArcPro & ArcGIS Online



This is a graphical depiction. The actual map is deemed confidential and privileged. Viewing requires being an approved user and signing a nondisclosure agreement.

RRC SB3 Layers - RRC CID Regions (Features: 4, Selected: 1)

REGION

EAST

NORTH

SOUTH

WEST

Critical Infrastructure Inspection System



- Repository for the inspection universe
- Formal database of record for all CID regulatory requirements and actions
- Maintains version control as data changes

Account **ENERGY**

Account Record Type: Organization | Phone: (713) 989- | Mailing Address: ATTN JOCELYN S HOUSTON, TX 77002 | Business Area: | PS Number: 5201 | Meets Critical Infrastructure:

Buttons: Merge | Transfer | Generate Document

Details | News

Account Name	ENERGY	Account Record Type	Organization
Business Area		Mailing Address	ATTN JOCELYN S HOUSTON, TX 77002
Organization ID	006770	County	
Region List	07-Corpus Christi; 02-Midland; 03-Kilgore; 05-Houston; 01-Lubbock; 06-Fort Worth; 09-Multi-Regional (RETIRED); 04-Austin; 00-Statewide	District	
T4 Permit List	9098; 06812; 8625; 08625; 6812; 09758; 749; 09207; 2105; 09640; 05260; 09207,00751; 00751; 02105; 03925; 08475; 00749; 07084; 05299; 05781; 08199; DDDDD; 08393; 09352; 09810; 582; 9640; 08505; 09625; 3674; 09369; 5781; 751; 01234; 09379; 8448; 664; 323; 129; 109; 1360; 4184; 787; 538; 4141; 3151; 2300; 2571; 7140; 7068; 7084; 6056; 9317; 8199; 7182; 7621; 7610; 09317; 88888; 7529; 6792; 7567; 8505; 07567; 09189; 09378; 09380; 09753; 06792; 09351; 09463; 66666; 01646; 08448; 09700; 05016; 02267; 04680; 09639; 09188; 07203; 07710; 06397; 07527; 00787; 06209; 00109; 00323; 04141; 06590; 04193; 02214; 08951; 07777; 00726; 08459; 10068; 09783; 7527; 09771; 10133; 55555; 00979; 09814; 8459; 7998; 2214; 726; 4193; 10370; 564; 09207,04825; 00284,04825; 05604; 09207,05604; 00557,09207; 04195,04722,04193; 09207,10250,09422,09559; 09422,09041,09559; 5604		
PS Number	5201	Account Owner	Integrations User
		Primary Emergency Representative	

Geolocations (1)

GEO-007318
 Geolocation Name: pipe inlet
 Geolocation For (delete): Organization
 UIC Number (delete):

[View All](#)

Related Contacts (3+)

Alex A
 Account Name: ENERGY
 Title: Sr. Engineer - Pipeline Integrity
 Email: AlexA@energy.com

Eric A
 Account Name: ENERGY
 Title: SVP of Operations
 Email: EricA@energy.com

JAMES B
 Account Name: ENERGY
 Title: VICE PRESIDENT
 Email: JamesB@energy.com

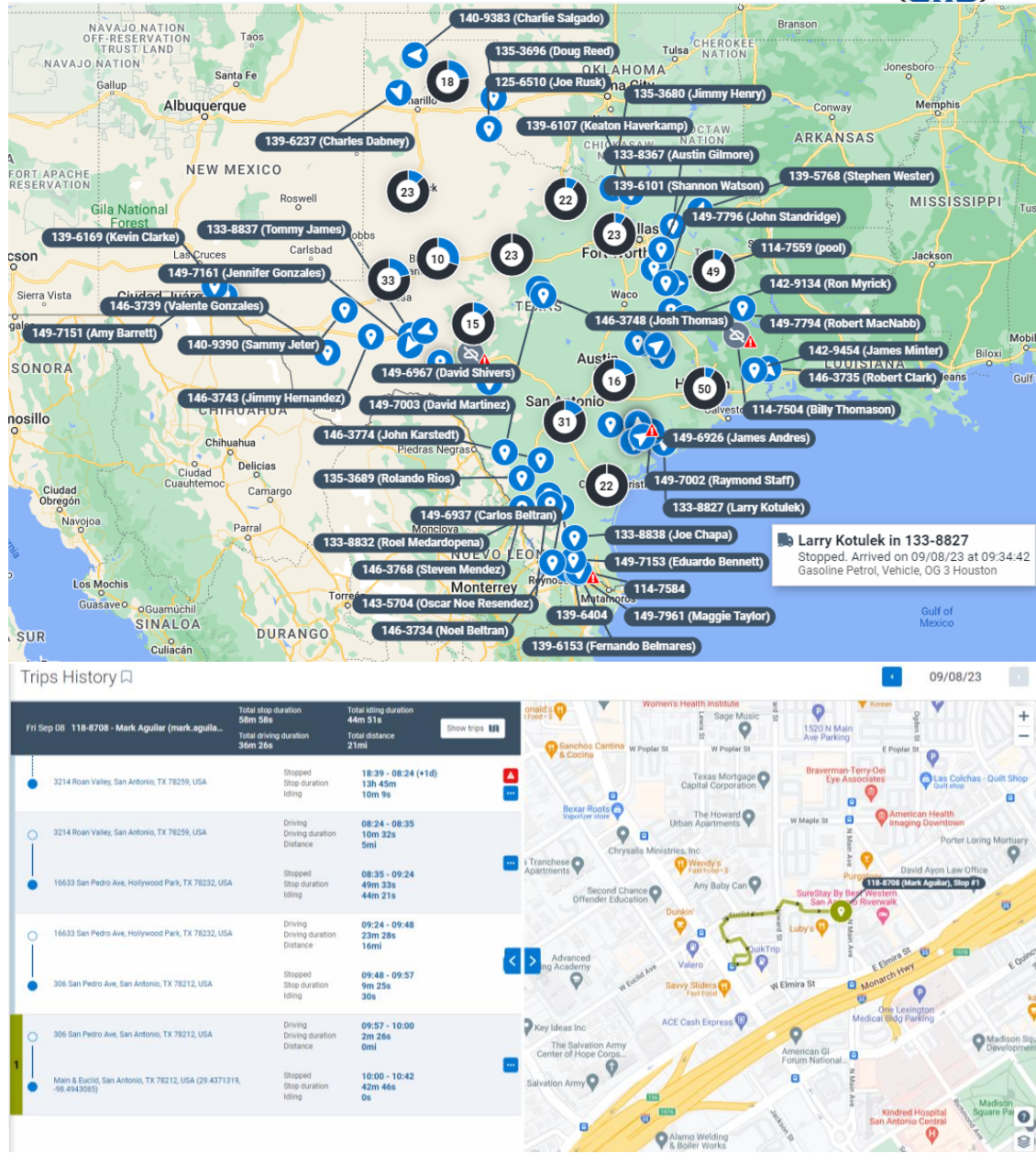
[View All](#)

Contacts (3+)

GeoTAB Application



- Ability to track inspections in real-time.
- Ability to analyze fleet usage and equipment operations
- Ability to optimize site inspections through route planning





MAP Application - Location

- File, confirm and store operator information
- Provides operators with mapped locations

Select the pipeline segment(s) from AUSTIN LATERAL, 20" that supplies gas to SAND HILL ENERGY CTR (SANDHSYD) in appropriate segment order.

MAP will enable operators to file, retrieve and track 100% of their critical infrastructure in one application

Selected Segments:

SAND HILL ENERGY CTR (SANDHSYD) ★

Open Search Filters

Map Satellite

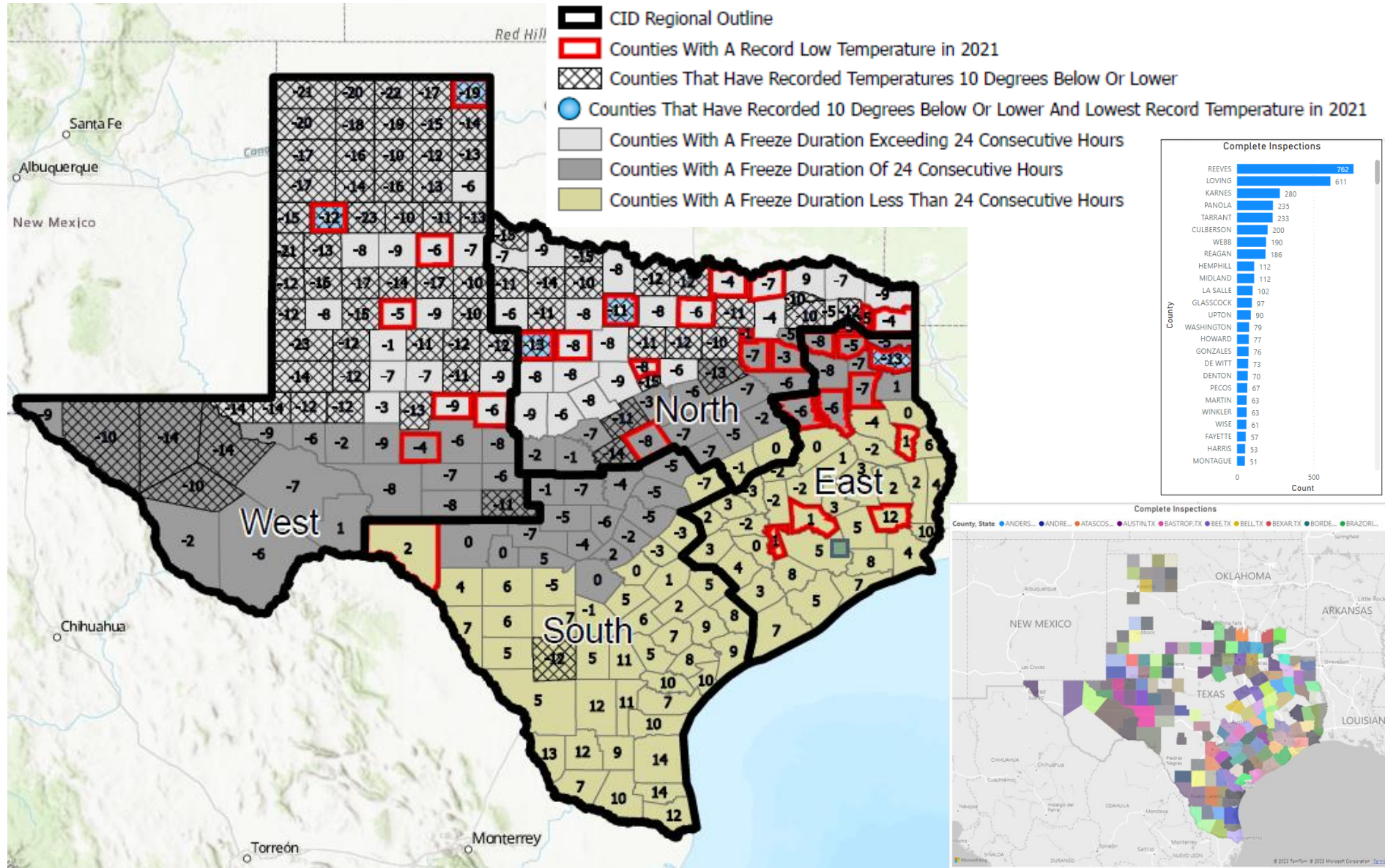
Markers (3)

- SAND HILL ENERGY CTR (SANDHSYD)
30.209561, -97.614261
- ↔ Seg #4027676 D20 L0 PID 8250010100
30.211349369999994, -97.61530747400002
- ↔ Seg #4028102 D20 L1.36 PID 8250010100
30.211283562000006, -97.615190412

Google

Please use this field describe your pipeline segments grouping (if needed)

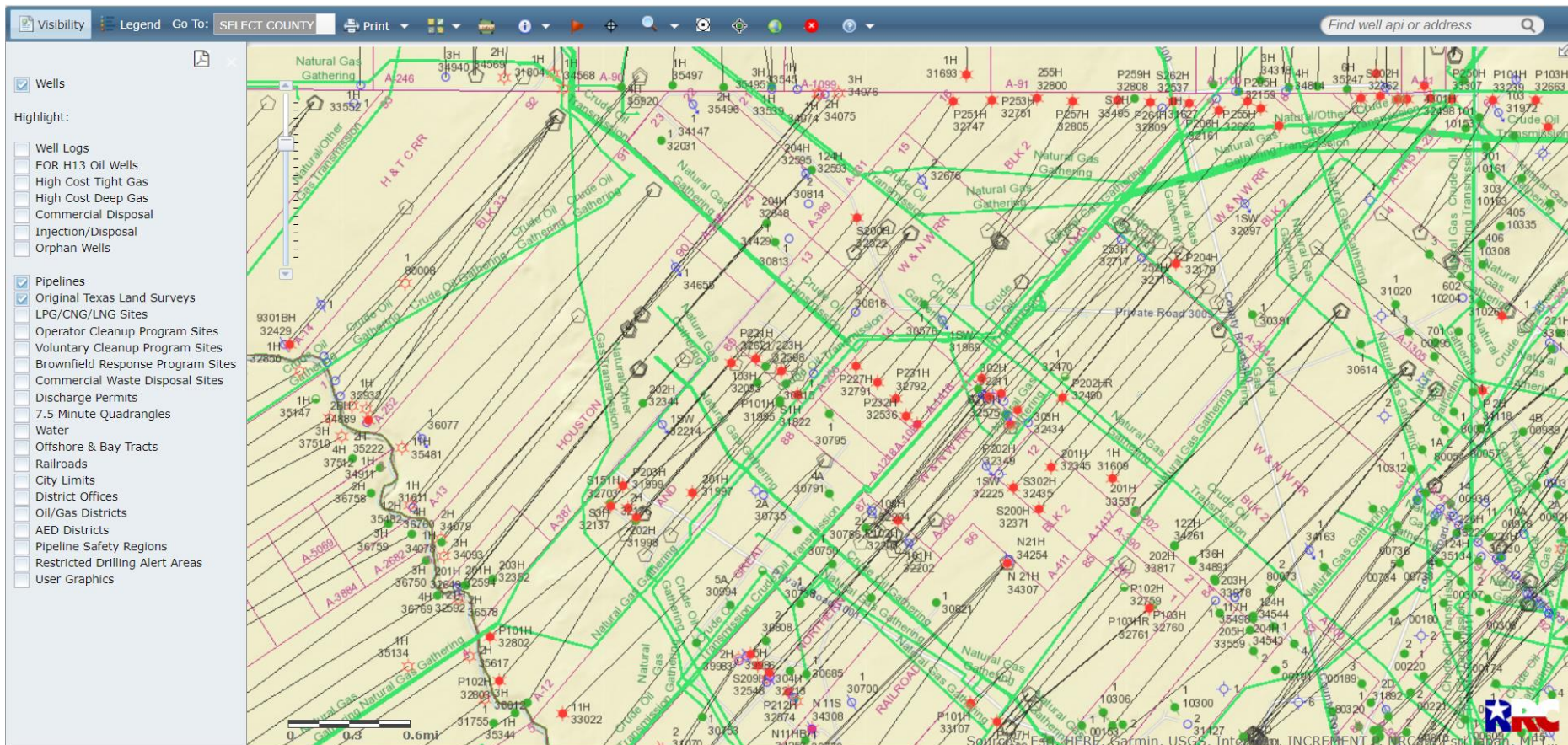
Geospatial Analysis – Extreme Cold



RRC Public GIS Viewer



- Baseline research for infrastructure on a lease
- Determine closest pipeline locations
- Determine electricity provider for operating assets



What Texas Experienced in FY23



Winter Storm Elliott “Once In A Generation”

A ‘once in a generation’ winter storm will impact nearly every state and cripple Christmas travel

By Aya Elamroussi and Jennifer Gray, CNN
Updated 7:22 AM EST, Thu December 22, 2022



Winter Storm Mara “Epic & Historic”

'Epic' ice storm leaves more than 370,000 without power and is blamed for at least 8 deaths

The “prolonged and damaging” ice storm that has pounded areas from Texas to Tennessee is forecast to finally end Thursday, the National Weather Service said.



“Historic” Winter Storm Mara recovery drags on



By Darcy Sprague, Ben Thompson | 1:34 PM Feb 28, 2023 CST
Updated 8:57 AM Mar 16, 2023 CDT

“This storm is ungodly,” said Elton Richards, Austin Energy vice president of field operations. “I’ve never seen it in my life...I worked in the northern part of Illinois, never saw this level of devastation.”

No loss of electricity due to the natural gas supply chain

What Else We Experienced in FY23



The Second-hottest Summer Ever Recorded in Texas

This was the second-hottest summer ever recorded in Central Texas – and September won't provide much relief

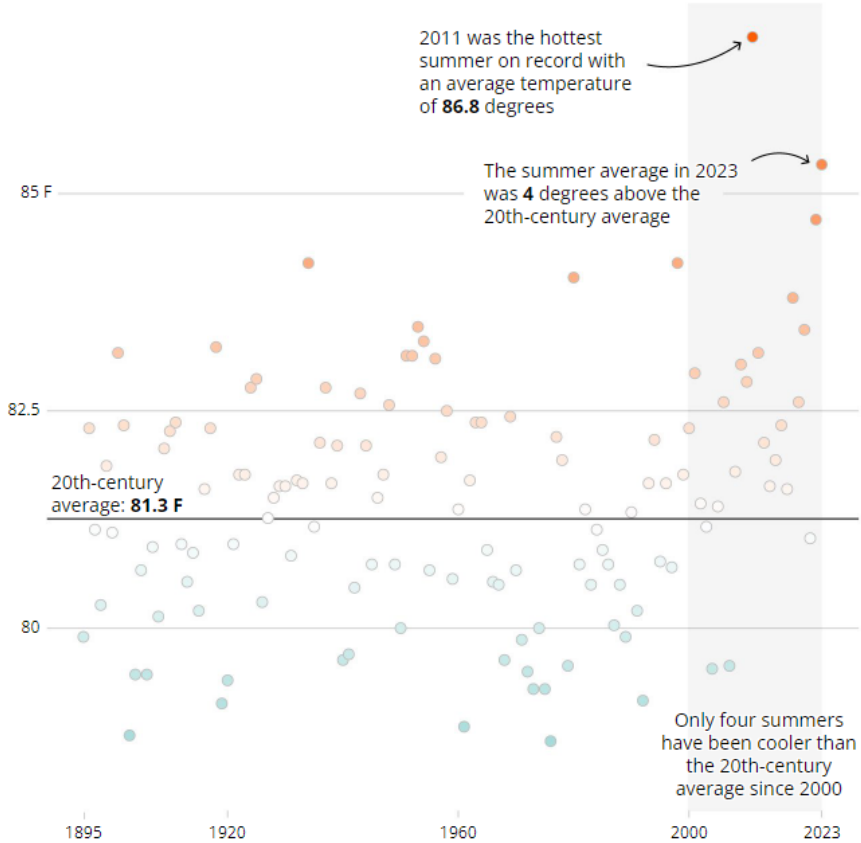
–
Camp Mabry finished one-tenth of a degree shy of the all-time summer heat record.

METEOROLOGICAL SUMMER | AUSTIN

AVG TEMP: 89.4° -2ND HOTTEST SUMMER EVER RECORDED -TRAILS ONLY 2011 (89.5°)	TOTAL PRECIP: 1.31" -2ND DRIEST ON RECORD -NORMAL RAIN IS 8.38"
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The summer of 2023 was Texas' second hottest on record

The average temperature in June, July and August this year was 85.3 degrees, which was 4 degrees warmer than the 20th-century average. Since 2000, only four summers have been cooler than the 20th-century average, while 19 were warmer.



Sources: National Oceanic and Atmospheric Administration (1985-2022); John Nielsen-Gammon, Texas state climatologist (2023 estimate)

No loss of electricity due to the natural gas supply chain

Additional Information



Railroad Commission of Texas Website

www.rrc.texas.gov

For information on the critical infrastructure program, navigate to the agency homepage and select this icon:



CRITICAL INFRASTRUCTURE