



El Paso Natural Gas  
Company, L.L.C.  
a Kinder Morgan company

February 14, 2020

Mr. Mark Jones  
Mr. Kerwin Singleton  
NMED Air Quality Bureau  
525 Camino de los Marquez, Suite 1  
Santa Fe, NM 87505

RE: *El Paso Natural Gas LLC – Washington Ranch Storage Facility  
Regional Haze Four-factor Analysis December 23, 2019 Request for Additional Information*

Dear Mr. Jones and Mr. Singleton:

This letter addresses the additional information request for the El Paso Natural Gas Company, L.L.C. (EPNG) – Washington Ranch Storage Facility Four-Factor Analysis report received on December 23, 2019. For the Washington Ranch Storage Facility there were a total of seven item requests pertaining to the NO<sub>x</sub> emissions for both engines. Please see the responses for each item request below.

1. *Consider Good Combustion Practices (GCP) and routine maintenance as controls and provide the details of a maintenance schedule, employee training and operating procedures used to achieve emissions reductions.*

Washington Ranch complies with the routine maintenance schedule pursuant to A201.A in NSR Permit No. 0428M7. Washington Ranch complies with periodic testing pursuant to A201.B in order to monitor NO<sub>x</sub>, CO, and VOC emissions. Standard operating procedures and maintenance practices have been developed based on manufacturer's recommendations to keep the equipment in operating condition.

Additionally, each employee has an Operator Qualification (OQ) Checklist that is completed and tracked in the OQ system. Operators are paired with other operators and work as trainees until they are deemed qualified on the piece of equipment and operation at the site. During the training period, they are exposed to station operations, responding to call outs with operators, station shutdowns, and purging and pressurizing stations. This training period lasts on average about one (1) year. Attached is a sample OQ qualification checklist used to track employee training (Attachment 1).

2. *Consider and include a discussion on the feasibility and cost of technology that limits engine capacity to reduce NO<sub>x</sub> emissions. Also evaluate limitations on engine operating hours or shutting down engines that are no longer needed to reduce total NO<sub>x</sub> emissions.*

As the two units at Washington Ranch are two-stroke lean burn engines (2SLB), the technology for reducing NO<sub>x</sub> emissions are limited.

EPNG, being a transmission pipeline is also regulated by the Federal Energy Regulatory Commission (FERC). Hours of operation and facility horsepower are certificated by FERC to ensure effective operation of the facility to meet customer demands. EPNG must maintain the permitted loads and operating hours for the units in order to effectively operate and satisfy supply contracts in place. Accordingly, any operational restrictions could have the potential to



significantly disrupt gas supply in the area. Consideration of limiting capacity or operating hours will result in violation of EPNG's FERC commitment and will result in potential contract breach (with associated financial penalty), re-negotiating long-term contracts, and re-applying for a FERC certification.

3. *Consider and include a discussion of variations of Clean Burn Technology (CBT) used to reduce NOX emissions that may be more effective than the existing package if available. Please include cost and efficiencies in analysis. Show documentation of vendor quotes with cost and control efficiency.*

As noted in the report submitted November 1, 2019, the engines are currently equipped with the most recent available control technologies. Research indicates that there are no additional control technology available for this type 2 SLB engines at Washington Ranch. The Clean Burn Technologies currently installed on the two units include a turbocharger, advanced ignition system, Pre-Combustion Chambers System, High Pressure Fuel Injection, and an Automatic Balancing Platform. The engines are currently permitted at 2.75 gr/bhp-hr. EPNG has determined that no other package is currently available for this type of equipment at this time.

4. *Please verify and provide documentation that control systems have not yet been developed for selective catalytic reduction (SCR) controls that can handle variable load engines. This appears to be one main reason that SCR has not been implemented on two-stroke lean burn (2SLB) internal combustion engines in oil and gas midstream operations.*

U.S. EPA, Ap-42, Section 3.2 "Natural Gas-Fired Reciprocating Engines" currently states:

"For engines which typically operate at variable loads, such as engines on gas transmission pipelines, an SCR system may not function effectively, causing either periods of ammonia slip or insufficient ammonia to gain the reductions needed."

As noted in the November Four Factor Analysis, a 20-year review of the RBLC found that no 2SLB engines had used SCR as a control technology. Therefore, EPNG cannot comment on whether an SCR has been developed for 2SLB engines.

5. *Please consider and include a discussion on the feasibility of replacing natural gas-fueled engines/turbines with commercial electric powered compressors.*

EPNG conducted a review of the feasibility of replacing natural gas-fueled engines with commercial electric powered compressors. Although a complete four-factor analysis has not been conducted, an estimated cost summary was developed for the potential scope and has been included as Attachment 2.

Although this project is technically feasible, it is cost prohibitive. Additionally, given the life of the existing units and the fact that there is no current plans to replace them, a unit replacement is considered outside the scope of the Regional Haze Rule four factor analysis. Per Appendix Y to Part 51—Guidelines for BART Determinations Under the Regional Haze Rule Section IV.D.1.5:

"We do not consider BART as a requirement to redesign the source when considering available control alternatives. For example, where the source subject to BART is a coal-



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fired electric generator, we do not require the BART analysis to consider building a natural gas-fired electric turbine although the turbine may be inherently less polluting on a per unit basis.”

This report is essentially a BART analysis with only 4 factors which are reviewed. EPNG will only submit alternative control options and will not assess replacing equipment.

- 6. Provide vendor specifications that include the cost information, recommendations, and equipment specifications for the engine control estimates. This information is required to complete review of the analyses.*

At this time, there are no proposed control technologies to improve emissions on the engines at Washington Ranch. Therefore no vendor data is available for submittal at this time.

- 7. Provide any electronic spreadsheets used for control technology calculations.*

At this time, there are no proposed control technologies to improve emissions on the engines at Washington Ranch. Therefore no spreadsheets are available for submittal at this time.

If you have any other questions, please do not hesitate to reach me at 713-420-1841 or via email at [Zainab\\_Naqvi@kindermorgan.com](mailto:Zainab_Naqvi@kindermorgan.com).

Sincerely,

Zainab Naqvi  
Air Permitting and Compliance  
Kinder Morgan

# Attachment 1



**OPERATOR QUALIFICATION**  
**Appendix G**  
**COVERED TASK ASSIGNMENTS - GAS**  
 Revised 3/23/2017

Employee Name:	EE Number:	Date:
Supervisor's Name:	Region/Location:	
Date Discussed with Employee:		
<i>Supervisor's Signature</i>		

Submit this form with assigned covered tasks checked in the Yes column to your Regional OQ Coordinator.

CT #	Covered Task Title	Yes
01.01.01	Abnormal Operating Conditions	<input type="checkbox"/>
02.01.01	Gas Detection & Alarm System Maintenance & Performance Test	<input type="checkbox"/>
02.02.01	Isolation of Compressor Units	<input type="checkbox"/>
02.03.01	Compressor Station Inspection & Testing of Remote Control Shutdown Devices	<input type="checkbox"/>
03.01.01	Operating Compressor Units: Remote	<input type="checkbox"/>
03.01.02	Operating Compressor Units: Manual	<input type="checkbox"/>
03.02.01	Shutting Down Compressor Units: Remote	<input type="checkbox"/>
03.02.02	Shutting Down Compressor Units: Manual	<input type="checkbox"/>
03.03.01	Starting Compressor Units: Remote	<input type="checkbox"/>
03.03.02	Starting Compressor Units: Manual	<input type="checkbox"/>
04.01.01	Measure Damage on Installed Pipe and Components	<input type="checkbox"/>
04.01.02	Corrosion Monitoring – Atmospheric, External, and Internal: Offshore Pipelines	<input type="checkbox"/>
04.01.03	Visual Inspection of Buried Pipe and Components When Exposed	<input type="checkbox"/>
04.01.04	Visual Inspection of Internal Surface of Pipe	<input type="checkbox"/>
04.01.05	Visual Inspection for External/Atmospheric Corrosion (effective 6/30/17)	<input type="checkbox"/>
04.01.06	Insert and Remove Coupons/Probes for Internal Corrosion Monitoring	<input type="checkbox"/>
04.01.07	Nondestructive Testing – Magnetic Particle Testing of Pipe	<input type="checkbox"/>
04.02.01	Coating Maintenance /Application and Repair – Sprayed, Brushed, or Rolled	<input type="checkbox"/>
04.02.02	Coating Maintenance/Repair – Wrapped	<input type="checkbox"/>

CT #	Covered Task Title	Yes
05.01.01	Cathodic Protection System Maintenance: Rectifiers	<input type="checkbox"/>
05.01.02	Cathodic Protection System Maintenance: Electrical Isolation	<input type="checkbox"/>
05.01.03	Cathodic Protection System Maintenance: Anodes, Anode Ground Beds, & AC Voltage Mitigation (task name change)	<input type="checkbox"/>
05.01.04	Inspect or Test Cathodic Protection Bonds (task name change)	<input type="checkbox"/>
05.01.05	Cathodic Protection System Maintenance: Reverse Current Switches	<input type="checkbox"/>
05.01.06	Cathodic Protection System Maintenance: Automatic Potential Controlled Protection Systems	<input type="checkbox"/>
05.01.07	Cathodic Protection System Maintenance: AC Voltage Mitigation System	<input type="checkbox"/>
05.01.08	Cathodic Protection: Read Rectifier (effective 5/1/17)	<input type="checkbox"/>
05.02.01	Cathodic Protection Systems – Electrical Connections	<input type="checkbox"/>
05.03.01	Cathodic Protection System Testing: Test Stations	<input type="checkbox"/>
05.03.02	Cathodic Protection System Testing: Pipe to Soil	<input type="checkbox"/>
06.01.01	Indirect Inspection: Close Interval Survey	<input type="checkbox"/>
06.01.02	Indirect Inspection: Direct Current Voltage Gradient (DCVG) Survey	<input type="checkbox"/>
06.01.03	Indirect Inspection: Voltage Gradient (ACVG) Survey	<input type="checkbox"/>
06.01.04	Indirect Inspection: AC Current Attenuation (ACCA or PCM) Survey	<input type="checkbox"/>
07.01.01	Locating, Installing & Protecting Customer Meters & Regulators: Residential & Small Commercial	<input type="checkbox"/>
07.01.02	Locating, Installing & Protecting Customer Meters & Regulators: Large Commercial	<input type="checkbox"/>
07.02.01	Customer Pressure Regulating, Limiting & Relief Device: Residential & Small Commercial	<input type="checkbox"/>
07.02.02	Customer Pressure Regulating, Limiting & Relief Device: Large Commercial & Industrial	<input type="checkbox"/>
08.01.01	Locating Pipelines	<input type="checkbox"/>
08.02.01	Damage Prevention During Excavation Activities	<input type="checkbox"/>
09.01.01	System Patrolling	<input type="checkbox"/>
10.01.01	Plastic Pipe – Electrofusion: Couplings	<input type="checkbox"/>
10.01.02	Plastic Pipe – Electrofusion: Sidewall	<input type="checkbox"/>
10.02.01	Plastic Pipe – Butt Heat Fusion	<input type="checkbox"/>
10.03.01	Plastic Pipe – Sidewall Heat Fusion	<input type="checkbox"/>
10.04.01	Mechanical Joints: Stab Fittings	<input type="checkbox"/>

CT #	Covered Task Title	Yes
10.04.02	Mechanical Joints: Compression Couplings 2" & Less	<input type="checkbox"/>
10.04.03	Mechanical Joints: Compression Couplings Greater Than 2"	<input type="checkbox"/>
10.05.01	Joining of Pipe - Flange Assembly	<input type="checkbox"/>
10.05.02	Joining of Pipe/Tubing – Threaded Fittings	<input type="checkbox"/>
10.07.01	Solvent Cement Joints	<input type="checkbox"/>
11.01.01	Direct/Inspect In-service Pipeline Lowering	<input type="checkbox"/>
11.02.01	Detect/Inhibit/Mitigate Pipeline Hydrate Formation in Pipeline	<input type="checkbox"/>
12.01.01	Leakage Survey: Walking	<input type="checkbox"/>
12.01.02	Leakage Survey: Mobile	<input type="checkbox"/>
12.02.01	Outside Leakage Investigation, Pinpointing and Grading	<input type="checkbox"/>
12.03.01	Inside Gas Leakage Investigation	<input type="checkbox"/>
13.01.01	Leak & Strength Test – Service Lines, Mains & Transmission Lines: Gaseous: Test Pressures < = 100 psi	<input type="checkbox"/>
13.01.02	Leak & Strength Test – Service Lines, Mains & Transmission Lines: Gaseous: Test Pressures ≥ 100 psi	<input type="checkbox"/>
13.01.03	Leak & Strength Test – Service Lines, Mains & Transmission Lines: Hydrostatic Test	<input type="checkbox"/>
13.01.04	Leak & Strength Test – Service Lines, Mains & Transmission Lines: Test at Operation Pressure	<input type="checkbox"/>
14.01.01	Abandonment or Inactivation of Facilities	<input type="checkbox"/>
14.02.01	Backfilling	<input type="checkbox"/>
14.03.01	Installation of Steel Pipe – Field Bends	<input type="checkbox"/>
14.04.01	Casing Vents and Seals	<input type="checkbox"/>
14.05.01	Underground Clearances	<input type="checkbox"/>
14.06.01	Installation of Plastic Pipe: Direct Burial	<input type="checkbox"/>
14.06.02	Installation of Plastic Pipe: Boring	<input type="checkbox"/>
14.06.03	Installation of Plastic Pipe: Plowing/Planting	<input type="checkbox"/>
14.06.04	Installation of Plastic Pipe: Plowing/Pull-In	<input type="checkbox"/>
14.06.05	Installation of Plastic Pipe: Above Ground	<input type="checkbox"/>
14.06.06	Installation of Plastic Pipe: Insertion	<input type="checkbox"/>
14.07.01	Installation of Steel Pipe: Direct Burial	<input type="checkbox"/>
14.07.02	Installation of Steel Pipe: Boring	<input type="checkbox"/>
14.07.03	Installation of Steel Pipe: Plowing/Pull-In	<input type="checkbox"/>
14.07.04	Installation of Steel Pipe: Above Ground	<input type="checkbox"/>

CT #	Covered Task Title	Yes
14.07.05	Installation of Steel Pipe: Insertion	<input type="checkbox"/>
14.08.01	Cover – Service Lines, Mains & Transmission Lines	<input type="checkbox"/>
14.08.02	Cover – Offshore Pipelines	<input type="checkbox"/>
14.09.01	Inspection: Compliance with Procedures & Standards	<input type="checkbox"/>
14.09.02	Inspection: Inspection of Materials	<input type="checkbox"/>
14.10.01	Line Markers	<input type="checkbox"/>
14.11.02	Pipeline Shutdown, Startup or Pressure Change: Stopple Fitting	<input type="checkbox"/>
14.11.03	Pipeline Shutdown, Startup or Pressure Change: Operating Identified Valve(s)	<input type="checkbox"/>
14.11.04	Pipeline Shutdown, Startup or Pressure Change: Method(s) Required for Other Pipe Materials	<input type="checkbox"/>
14.11.05	Launching and Receiving Internal Devices	<input type="checkbox"/>
14.12.01	Protection from Hazards	<input type="checkbox"/>
14.13.01	Protection When Minimum Cover Not Met	<input type="checkbox"/>
14.14.01	Purging: Large Volume, i.e. Segment of Main or Transmission Line, etc.	<input type="checkbox"/>
14.14.02	Purging: Small Volume, i.e. Service Line, Short Pipeline Segments, Compressor, Component, etc.	<input type="checkbox"/>
14.15.01	Uprating: Reinforce or Anchor Offsets, Bends and Dead Ends – Longitudinal Straps	<input type="checkbox"/>
14.15.02	Uprating: Reinforce or Anchor Offsets, Bends and Dead Ends – Anchoring & Buttrressing	<input type="checkbox"/>
14.16.01	Installation of Steel Pipe – Repair of Imperfections or Damage: Grinding	<input type="checkbox"/>
14.18.01	Support, Expansion Joint and Anchor Maintenance – Exposed Pipeline	<input type="checkbox"/>
14.19.01	Tapping Steel and Plastic Pipe: Manual (Self-Tapping)	<input type="checkbox"/>
14.19.02	Tapping Steel and Plastic Pipe: Mechanical Tapping Equipment	<input type="checkbox"/>
14.20.01	DOT Inspection of Valves	<input type="checkbox"/>
14.20.02	Repair Valves	<input type="checkbox"/>
14.21.01	Segment Removal	<input type="checkbox"/>
14.22.01	Leak Clamps & Sleeves: Bolt-On Type	<input type="checkbox"/>
14.22.02	Leak Clamps & Sleeves: Composite Sleeve (Clock Spring)	<input type="checkbox"/>
15.01.01	Odorization – Mains & Transmission Lines: Periodic Sampling	<input type="checkbox"/>
15.01.02	Odorization – Mains & Transmission Lines: Odorizer Maintenance	<input type="checkbox"/>
16.01.01	Gas Quality: Operate/Test/Maintain Carbon Dioxide (CO2) Analyzers	<input type="checkbox"/>
16.01.02	Gas Quality: Maintain/Service Chromatographs	<input type="checkbox"/>
16.01.03	Gas Quality: Operate/Test/Maintain Oxygen (O2) Analyzers	<input type="checkbox"/>
16.01.04	Gas Quality: Operate/Test/Maintain Sulfur Analyzers	<input type="checkbox"/>



CT #	Covered Task Title	Yes
16.01.05	Gas Quality: Operate/Test/Maintain Moisture Analyzers	<input type="checkbox"/>
16.01.07	Gas Quality: Operate & Maintain Gas Samplers	<input type="checkbox"/>
16.01.08	Gas Quality: Troubleshoot/Repair Chromatographs	<input type="checkbox"/>
16.01.09	Gas Quality: Troubleshoot & Repair Sulfur Analyzers	<input type="checkbox"/>
16.01.10	Gas Quality: Troubleshoot/Repair Moisture Analyzers	<input type="checkbox"/>
16.01.11	Gas Quality: Troubleshoot/Repair Carbon Dioxide (CO2) Analyzers	<input type="checkbox"/>
16.01.12	Gas Quality: Troubleshoot/Repair Oxygen (O2) Analyzers	<input type="checkbox"/>
18.01.01	Overpressure Safety Devices – Inspect, Test, and Calibrate Relief Valves	<input type="checkbox"/>
18.01.02	Pressure Limiting Devices – Inspect, Test and Calibrate	<input type="checkbox"/>
18.02.01	Vault Maintenance	<input type="checkbox"/>
20.01.01	Service Line Replacement	<input type="checkbox"/>
20.01.02	Service Line Replacement: Underground Service Entrance (Prerequisite 20.01.01)	<input type="checkbox"/>
20.03.01	Service Lines Not in Use and Service Discontinuance	<input type="checkbox"/>
24.01.01	Welding Process	<input type="checkbox"/>
24.02.01	Visual Inspection of Welds	<input type="checkbox"/>
24.03.01	Nondestructive Testing of Welds	<input type="checkbox"/>
24.04.01	Miter Joints	<input type="checkbox"/>
25.01.01	Dehydration: Operate/Maintain Liquid Knock-out	<input type="checkbox"/>
25.01.02	Dehydration: Maintain/Repair Gas Fired Dehydration System Controls	<input type="checkbox"/>
25.01.03	Dehydration: Operate/Maintain Gas Dehydration System	<input type="checkbox"/>
25.01.04	Dehydration: Start-up/Shutdown of Dehydration System	<input type="checkbox"/>
25.01.05	Dehydration: Troubleshoot/Repair Gas Dehydration System	<input type="checkbox"/>
25.01.06	Gas Treatment: Read/Verify/Maintain Operating Parameters for Gas Processing/Amine System	<input type="checkbox"/>
25.01.07	Gas Treatment: Troubleshoot/Correct Gas Processing/Amine System	<input type="checkbox"/>
25.01.08	Dehydration: Maintain/Repair Gas Fired Mole Sieve Dehydration System Controls	<input type="checkbox"/>
25.01.09	Dehydration: Operate/Maintain Gas Fired Mole Sieve Dehydration System	<input type="checkbox"/>
25.01.10	Dehydration: Start-up/Shutdown of Mole Sieve Dehydration System	<input type="checkbox"/>
25.01.11	Dehydration: Troubleshoot/Repair Mole Sieve Dehydration System	<input type="checkbox"/>
27.01.01	Gas Control	<input type="checkbox"/>

## Attachment 2

# KINDER MORGAN

LOOK BACK DATABASE

Compression ▼

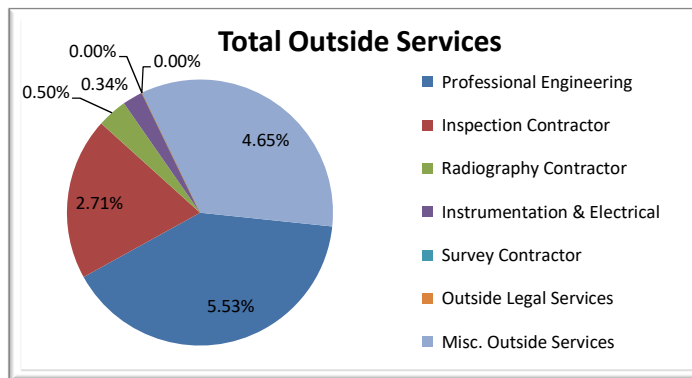
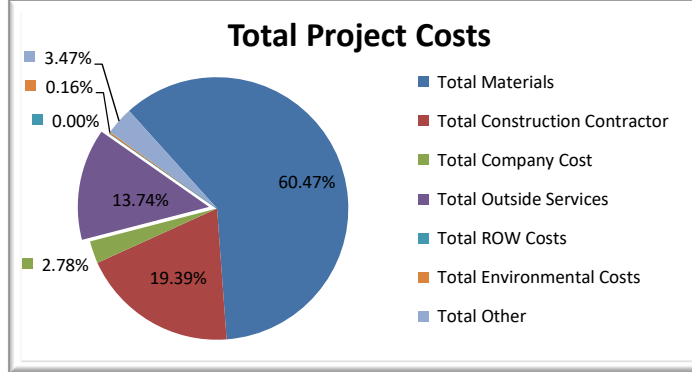
REGION		
UNION STATUS		
FERC STATUS		
ENTITY		
COMPRESSOR TYPE	Siemens EMD	
HORSE POWER	10500	17000

**Selected Compression Projects: 1**

Acct Category	\$	%	D+C %
<b>Total Materials</b>	<b>\$11,547,176</b>	<b>60.47%</b>	<b>62.57%</b>
<b>Total Construction Contractor</b>	<b>\$3,701,897</b>	<b>19.39%</b>	<b>20.06%</b>
<b>Total Company Cost</b>	<b>\$530,452</b>	<b>2.78%</b>	<b>2.87%</b>
Professional Engineering	\$1,056,568	5.53%	5.73%
Inspection Contractor	\$518,259	2.71%	2.81%
Radiography Contractor	\$95,028	0.50%	0.51%
Instrumentation & Electrical	\$65,427	0.34%	0.35%
Survey Contractor	\$0	0.00%	0.00%
Outside Legal Services	\$0	0.00%	0.00%
Misc. Outside Services	\$887,962	4.65%	4.81%
<b>Total Outside Services</b>	<b>\$2,623,244</b>	<b>13.74%</b>	<b>14.21%</b>
ROW Contractor	\$0	0.00%	0.00%
ROW & Damages	\$0	0.00%	0.00%
<b>Total ROW Costs</b>	<b>\$0</b>	<b>0.00%</b>	<b>0.00%</b>
Environmental Contractor	\$0	0.00%	0.00%
Permits & Fees	\$31,146	0.16%	0.17%
<b>Total Environmental Costs</b>	<b>\$31,146</b>	<b>0.16%</b>	<b>0.17%</b>
Gas Pack and Purge	\$21,358	0.11%	0.12%
Overhead	\$0	0.00%	0.00%
AFUDC	\$640,926	3.36%	0.00%
Contingency	\$0	0.00%	0.00%
<b>Total Other</b>	<b>\$662,283</b>	<b>3.47%</b>	<b>0.12%</b>
<b>Project Total</b>	<b>\$19,096,198</b>	<b>100.00%</b>	<b>100.00%</b>

**Total Project All-in (\$/HP) \$1,469**

## COMPRESSION

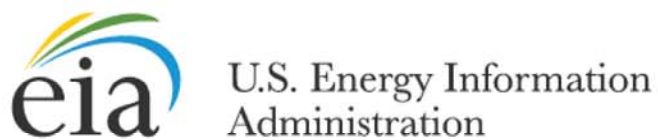


Replacement Cost: \$19,096,198

Electric Utility Cost\*: \$9,000,000

**TOTAL COST: \$28,096,198**

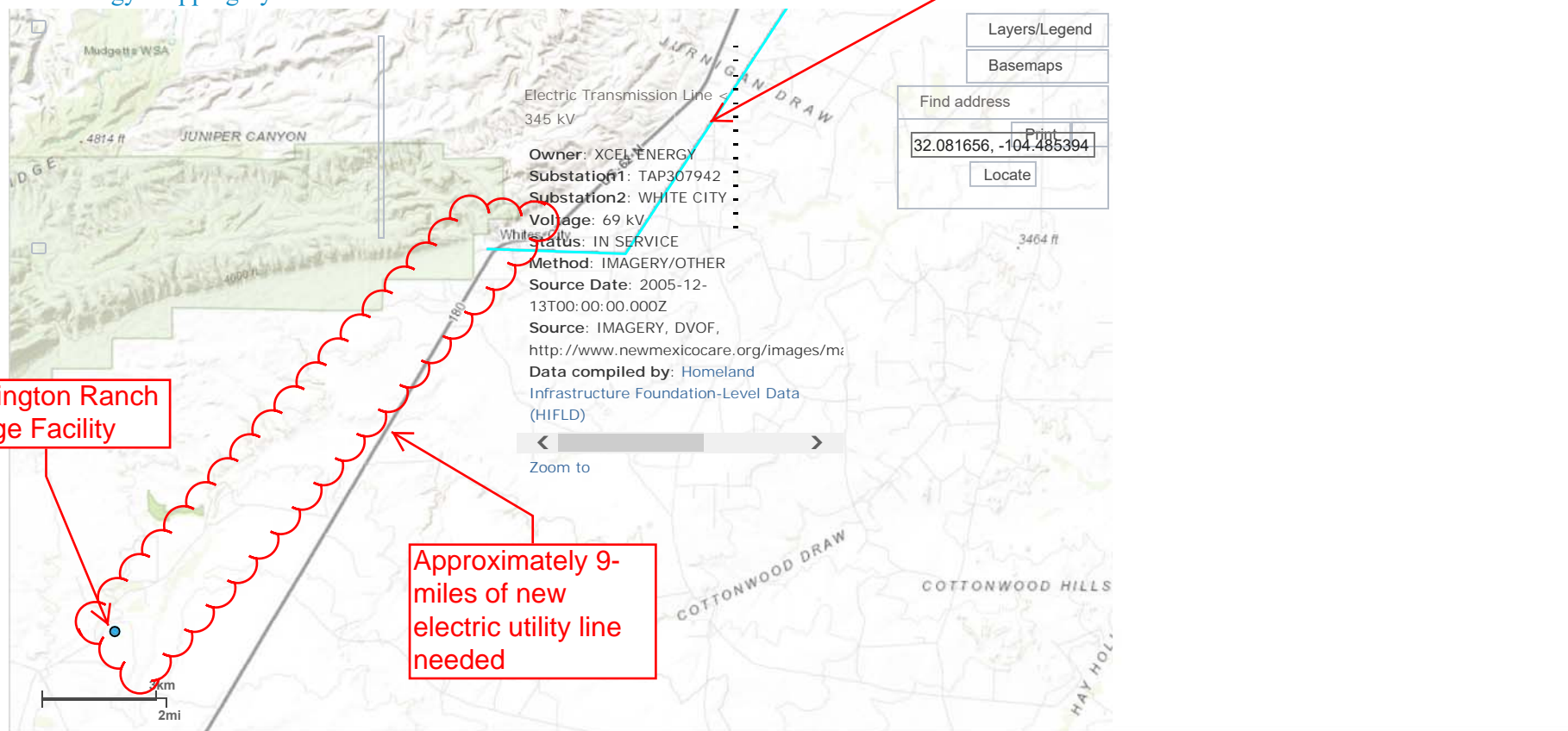
\* This cost represents the local electric utility bringing medium voltage power, sufficient to drive the new horsepower, to the facility at a cost of \$1,000,000 per mile.



U.S. States 

State Profiles and Energy Estimates

Newly released in Beta: State Energy Portal featuring customizable dashboards and more state data.  
U.S. Energy Mapping System



Layer information and map data

Map questions, comments and suggestions: [mapping@eia.gov](mailto:mapping@eia.gov)

Related Maps

U.S. Energy Mapping System  
Energy Disruptions  
Flood Vulnerability

State Energy Profiles  
Gulf of Mexico Fact Sheet  
Major Oil and Gas Plays