National Fuel

National Fuel Gas Supply Corporation
Empire Pipeline, Inc.

Northern Access 2016 Project
Public Information Forum

November 7, 2015

Docket Number CP15-115-000
& CP15-115-001

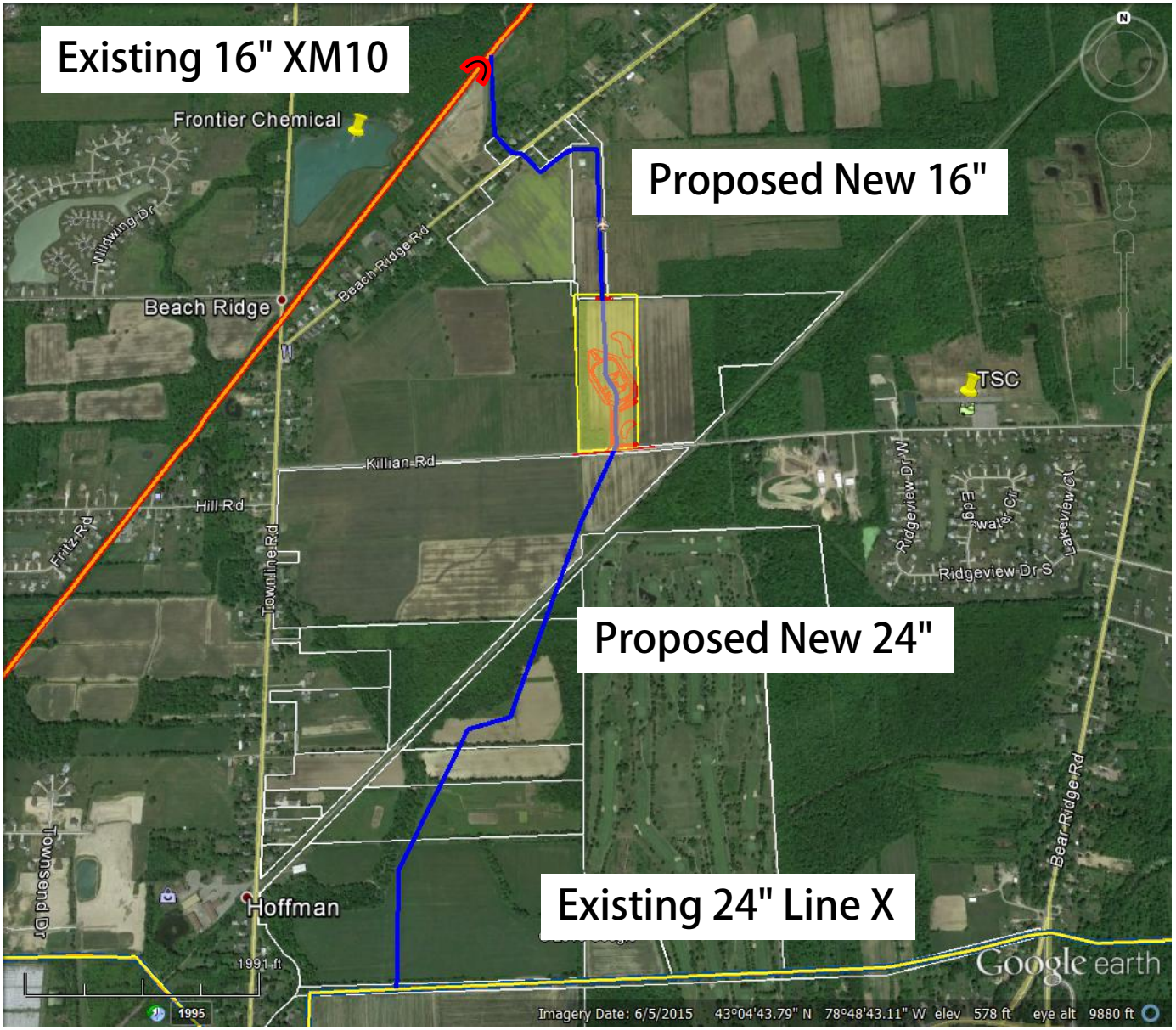
Presented by: Ron Kraemer, President, Empire Pipeline, Inc.

Northern Access 2016 Project

- $455 million project to expand the natural gas infrastructure of Western New York headquartered National Fuel Gas Company subsidiaries:
  - National Fuel Gas Supply Corporation
  - Empire Pipeline, Inc.
- Enable economically produced regional supplies of natural gas to enter the North American pipeline grid, including Western New York utility markets
- Project facilities span McKean County, Pa., and Alleghany, Cattaraugus, Erie and Niagara counties, N.Y.
- Project is regulated by the Federal Energy Regulatory Commission (FERC)
- Lengthy and rigorous environmental and regulatory review of project began July 2014
- FERC Application filed March 2015
- FERC Certificate typically received approximately 1 year after application

- Pendleton Compressor Station
  - 2 @ Solar (Caterpillar) T-70 — turbine-power natural gas compressors in buildings
    - Total of 22,214 horsepower
  - Meter and odorizer building
  - Electrical control and office buildings
  - Ancillary equipment: No storage tanks
- Approximately 2.05 miles of new pipeline
  - Approximately 1.15 miles of 24" pipeline to compressor station
  - Approximately 0.9 miles of 16" pipeline leaving compressor station

Pendleton Project Facilities

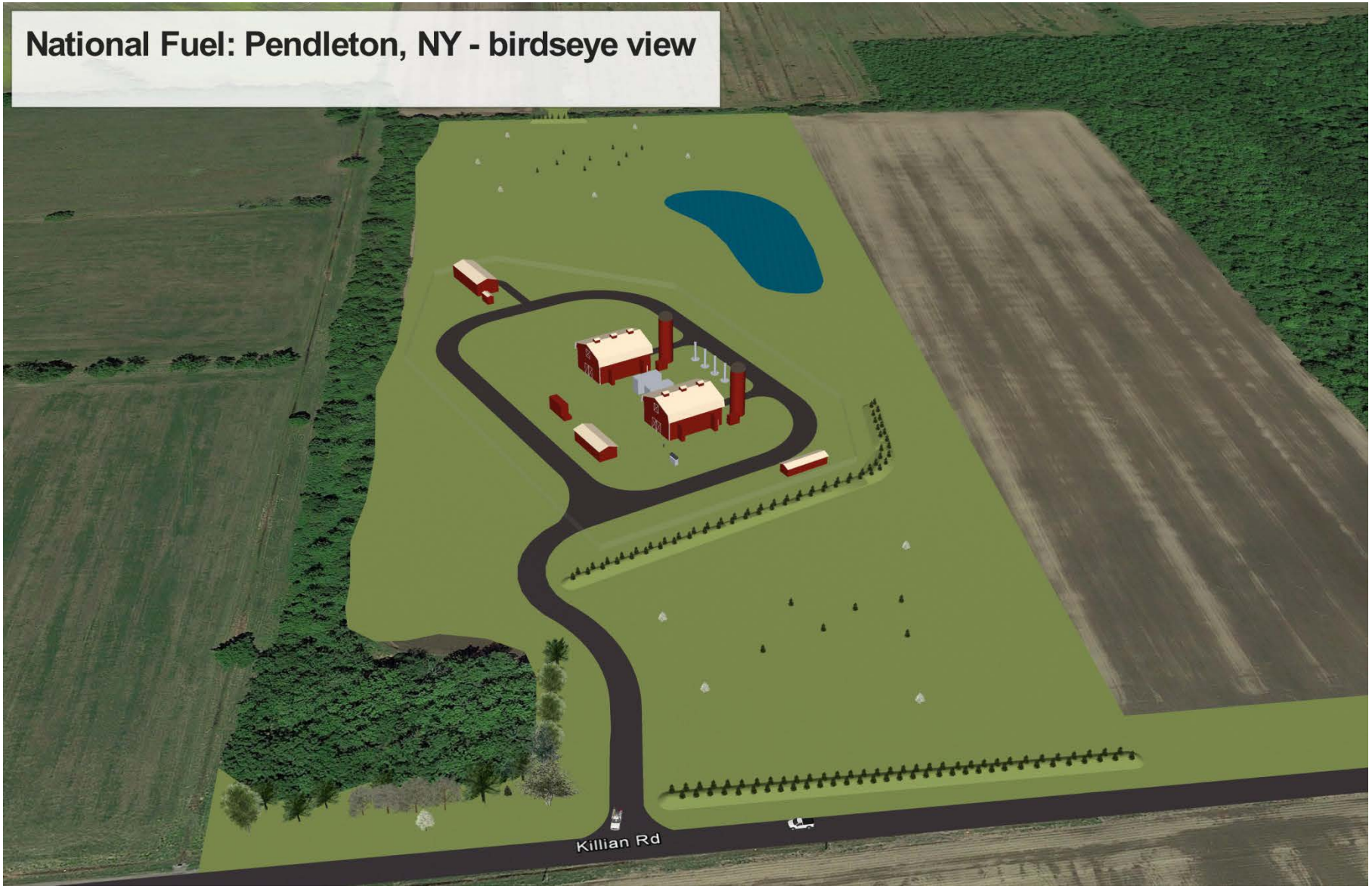


Proposed Facility Map

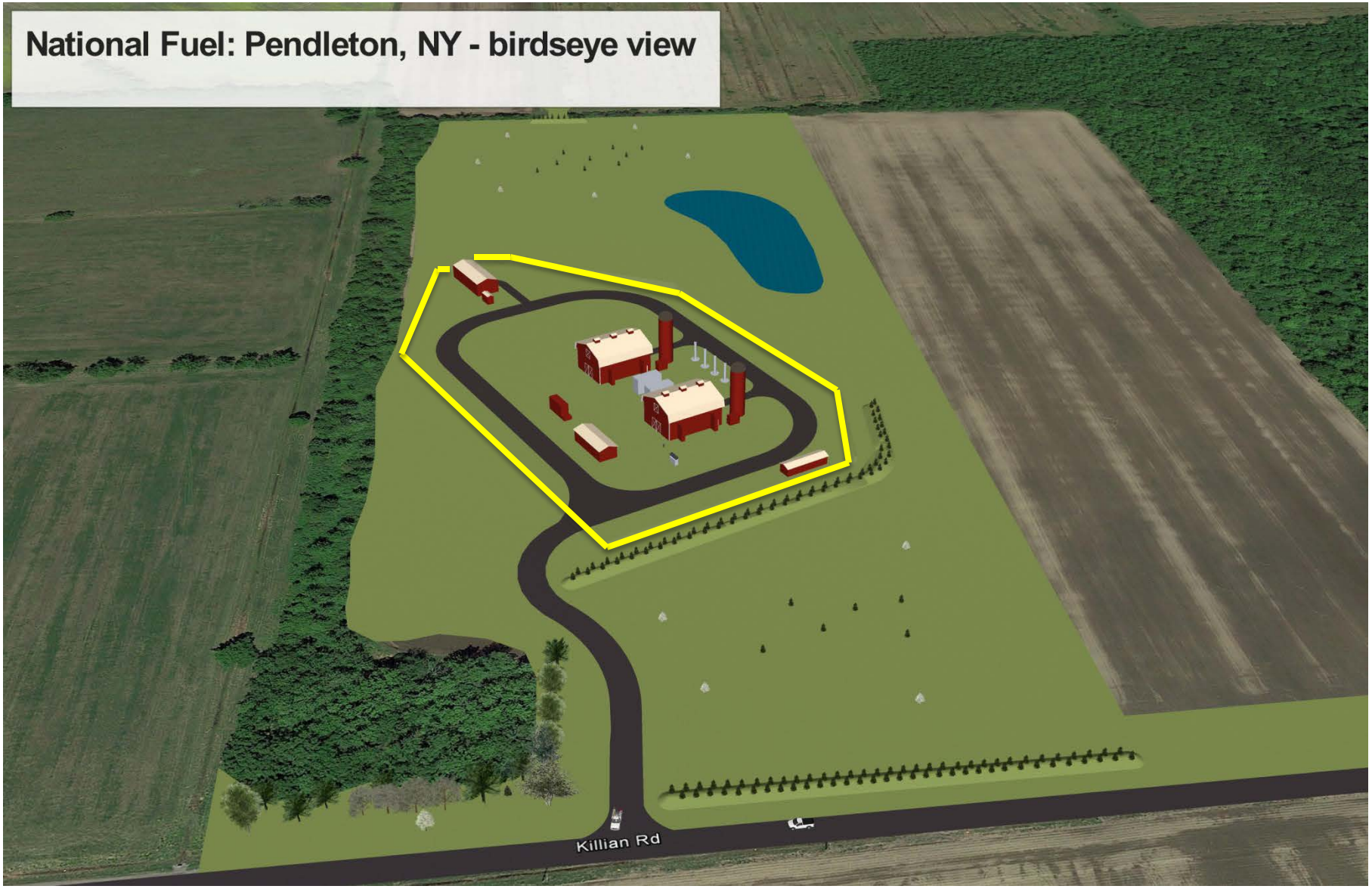
NOT PENDLETON COMPRESSOR STATION

Process Plant

Production Compressor Station



Station Site Layout



Station Site Layout

- Meet or beat all federal safety codes for design and operation
- Design and construct the station for minimal to no predicted increase over ambient noise levels at closest residences
- Meet or beat stringent Department of Environmental Conservation (DEC) and Environmental Protection Agency (EPA) air permit requirements
- Design, construct and operate the station with no perceptible increase in vibration

Our Commitment To the Community & FERC

- Minimize and direct station lighting only as required for safe operation
- Design the station facilities, buildings and property to fit with the character of the community and minimize impact on surrounding property
- Empire will not seek any property tax abatements

Our Commitment To the Community & FERC

Meet or beat all federal safety codes for design and operation

- State-of-the-art control system:
  - Fire detection
  - Gas detection
  - Onsite automated fail-safe safety control systems
    - No off-site intervention required for shutdown
  - Automatic emergency shutdown system
- Monitored 24/7 by local National Fuel Gas Dispatch Center
- Highly trained and qualified National Fuel personnel operate 38 stations
  - On-site daily maintenance/inspection (M-F)
  - Local and on-duty and on-call station technicians

Compressor Station Safety

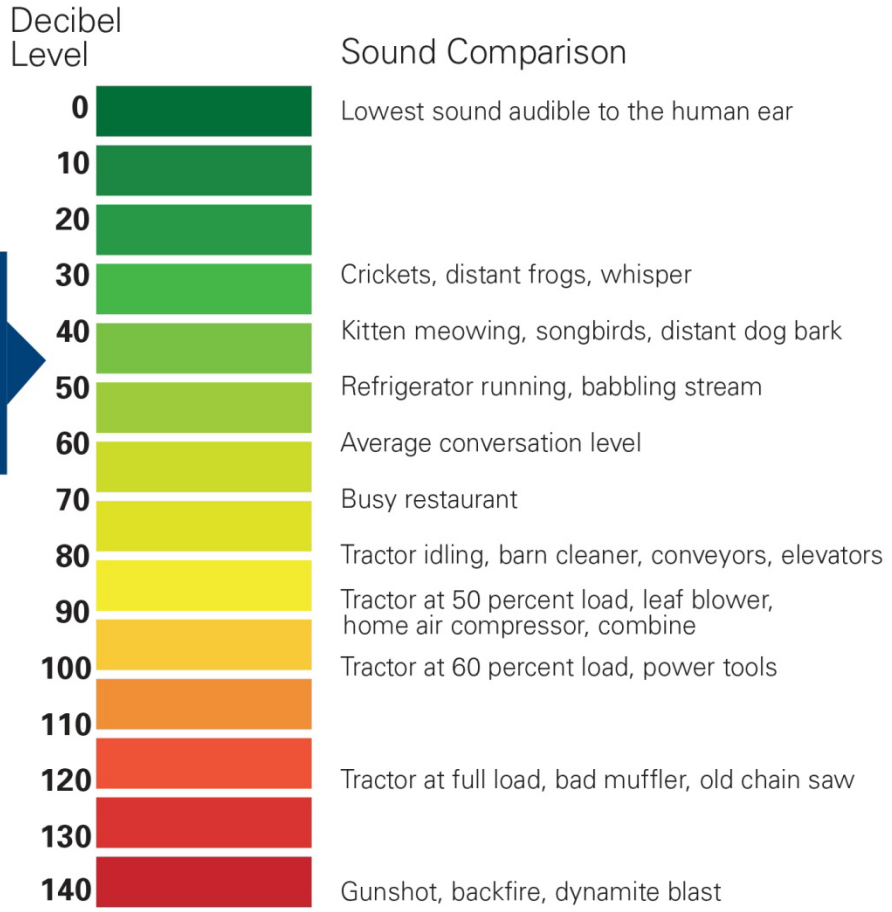
Minimal to no predicted increase over ambient noise levels at closest residences

- State-of-the-art noise control
  - All sources of noise are treated
  - Acoustically designed building enclosures
  - Silencers on all vent "blow downs"
- Federal requirement of 55 dBA Ldn (day-night average) at closest residence
  - Equivalent to 48.6 dBA continuous
- Predicted noise level* approximately 15 dBA Ldn better than federal requirement
  - Equivalent to 34.4 dBA continuous

*Pending results of noise study

State-of-the-Art Noise Control

48.6 dBA is a level much quieter than an average conversation



Data courtesy of the Texas Cooperative Extension, Texas A&M University

"The day-night average sound level (Ldn) is the average noise level over a 24-hour period. The noise between the hours of 10 p.m. and 7 a.m. is artificially increased by 10 dB."

Federal Noise Requirement

Meet or beat stringent Department of Environmental Conservation (DEC) and Environmental Protection Agency (EPA) air permit requirements

- Permit requirements are designed to protect public health and welfare including sensitive populations
- Air dispersion modeling assures air quality standards (NAAQS) are met at compressor station property line
- Annual emission testing for DEC demonstrates compliance
- Voluntary installation of oxidation catalyst for further reduction of emissions
- State-of-the-Art SoLoNOx technology
- Unit vent gas recycling

Low-Emission Technology

Federal Requirement:

No perceptible increase in vibration during operation

- Turbine compressors inherently vibration free
- No blasting or driven piles during construction

Vibration Free

Minimized Station Lighting

- Normal: Building entry lighting only
- Staffed: Shielded "down-lighting" - only as required for safety
- Lighting controlled by station control panel

National Fuel East Aurora Compressor Station

Unoccupied - Dusk

Occupied - Dusk

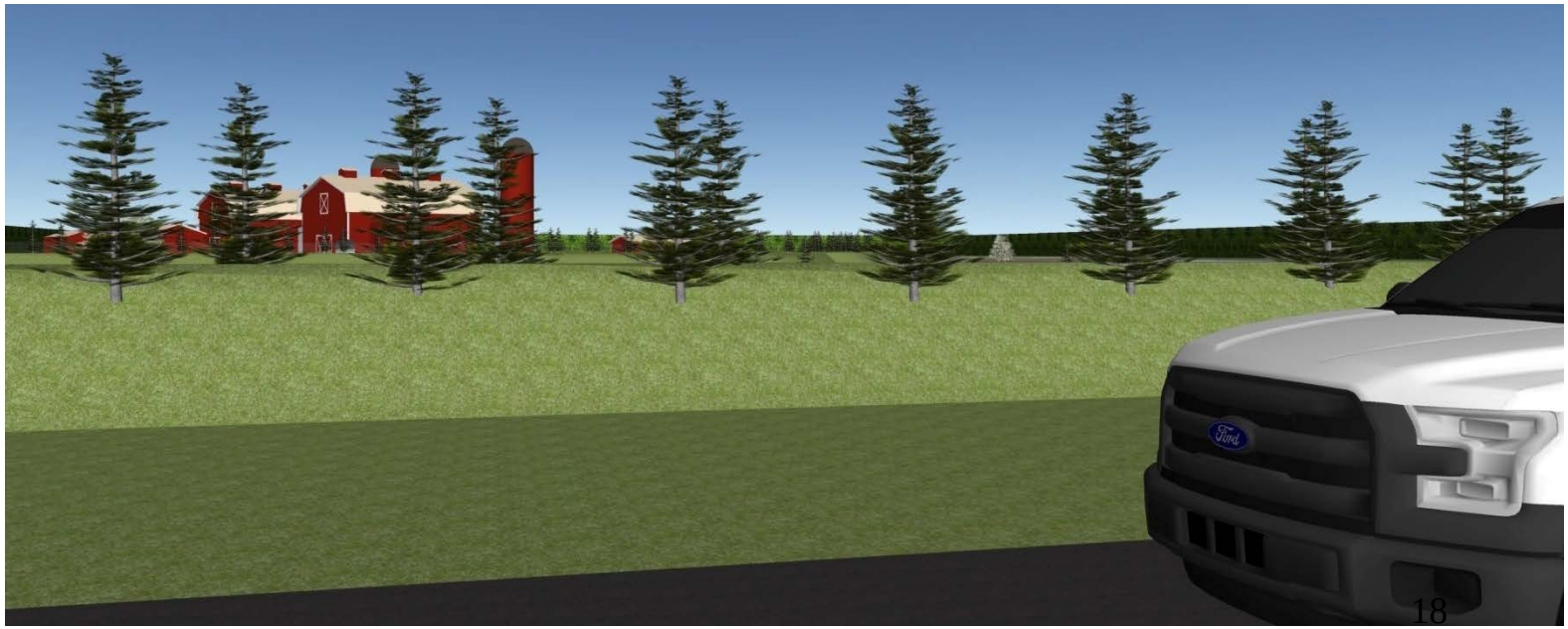
Occupied - Dark

Aesthetic treatment to fit with the character of the community

- Retained architect to assist with "agricultural design"
- Building architectural treatments
- Exhaust silencer enclosure/silo
- Berms and evergreen visual barrier
- Site layout to reduce sightlines
- Minimize visible above grade infrastructure
- Conservation deed restriction and plantings; preserves "buffer acreage"

View from Proposed Beach Ridge Subdivision

View from Killian Road



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No quantifiable evidence in the marketplace indicating a discernible impact on either property values or appreciation rates for properties in close proximity to natural gas compressor stations.

- Study results from 7 New York locations
- Constructed on large parcels of land set-back well off road
- Both natural buffers and constructed buffers are utilized as barriers for noise and view

Study study prepared by NYS Certified General Real Estate Appraiser

- Matches our experience with existing compressor stations

Protecting Property Values

Light Industrial Zone — Use fits within "Essential Services"

- Station is not "Heavy Industry"
  - The facility would be part of critical energy infrastructure necessary for the transportation of natural gas through our system, and bears no resemblance to heavy industry.
  - There is no processing of natural gas or any other product on the site
  - The only emission from the site is the products of combustion of natural gas — the same result as the burning of natural gas in the furnaces of homes
- Significant distance from residential development
  - 1,300' to closest proposed Beach Ridge Meadows
  - 2,650' to closest Ridgeview development
  - Extensive wooded buffer between Ridgeview Drive
- 2.8 miles to Starpoint Central School
- No pipeline construction adjacent to Frontier Chemical Site
- Remove and restore Aiken Road Meter/Odorizer Station
  - Incorporate in new station design within enclosure

Local Company Growing the Local Economy

- Headquartered in Williamsville, N.Y. (NYSE: NFG)
- More than 110 years experience

- **In Western New York:**
  - Employs 1,240 employees (728 union)
  - Supports 1,346 retirees
  - More than 230 employees and retirees live in Niagara County

- **Over the last 5 years:**
  - Hired 423 new employees
  - $4.2 billion capital invested in Western New York and Pennsylvania
  - Paid $380 million in taxes in New York state
  - $7.2 million in employee, Company and Foundation donations ($1.6 million in 2014)

Significant Annual Taxes in Niagara County

- Starpoint Central School: $1,587,000
- Niagara-Wheatfield Central School: $373,000
- Niagara County: $748,000
- Town of Pendleton (fire, water, etc.): $103,000
- Town of Wheatfield (fire, sewer, etc.): $25,000

- Total Estimated Property Taxes: $2,837,000

One-Time Sales Tax:

- Total Niagara County Sales Tax: $2,403,000

- Total project investment by National Fuel
  - $455 million
    - $359 million in New York

- Direct/indirect economic impact of $931 million
  - Multiplier effect adds $476 million with ripple effect related to increased economic activity during construction

- Construction estimated to create 1,000-1,200 jobs throughout entire project
  - $139 million in direct, incremental payroll
  - $65 million in North American-sourced pipe and compression

- Estimated economic impact in annual property taxes in 4 New York counties of $11.5 million

- One-time sales impact of approximately $6.6 million for 4 New York counties

Substantial NYS Investment

Timeline of Events
September-November 2015

- Community Outreach Focused on New Site
- Noise and Environmental/Engineering Studies
- Pipeline Routing and Surveys
- Compressor Station Site Tours on Sept. 18-19
- Public Information Forum on Oct. 7 and Nov. 7
- Began Site Plan Approval Process on Oct. 20
- FERC Filing Amendment on Nov. 2
- Begin Community Benefit Discussion
- FERC Scoping Meeting and Comment Period

National Fuel

National Fuel Gas Supply Corporation
Empire Pipeline, Inc.

Contact Information

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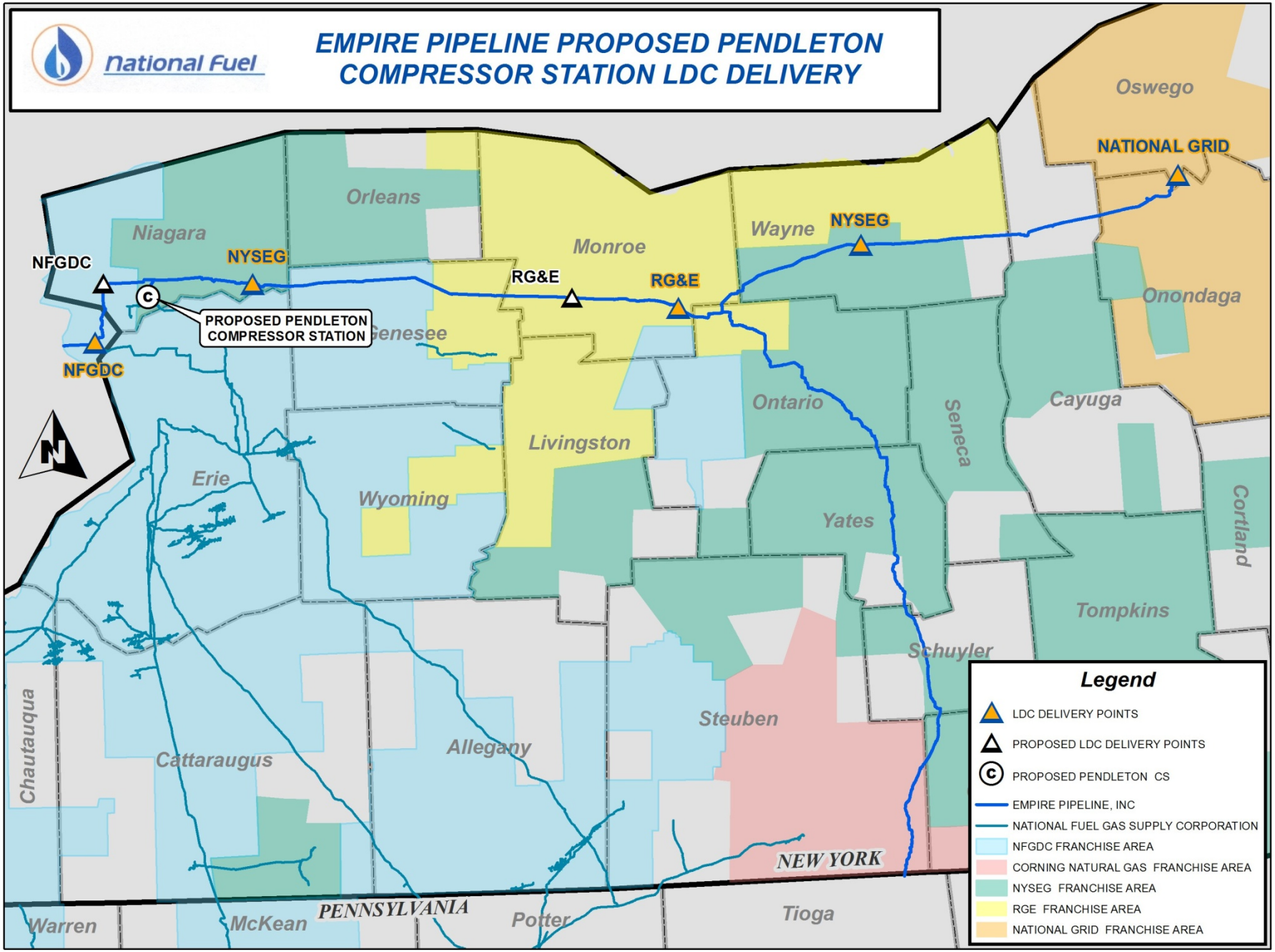
National Fuel
EMPIRE PIPELINE PROPOSED PENDLETON COMPRESSOR STATION LDC DELIVERY
Oswego
NATIONAL GRID
Orleans
Niagara
NYSEG
Wayne
NYSEG
Monroe
NFGDC
NYSEG
RG&E
RG&E
Onondaga
PROPOSED PENDLETON COMPRESSOR STATION
Genesee
NFGDC
Ontario
Seneca
Cayuga
Livingston
Erie
Wyoming
Yates
Cortland
Tompkins
Schuyler
Chautauqua
Steuben
Allegany
Cattaraugus
NEW YORK
PENNSYLVANIA
Warren
McKean
Potter
Tioga
Legend
LDC DELIVERY POINTS
PROPOSED LDC DELIVERY POINTS
PROPOSED PENDLETON CS
EMPIRE PIPELINE, INC
NATIONAL FUEL GAS SUPPLY CORPORATION
NFGDC FRANCHISE AREA
CORNING NATURAL GAS FRANCHISE AREA
NYSEG FRANCHISE AREA
RGE FRANCHISE AREA
NATIONAL GRID FRANCHISE AREA

ies, inc.

Air Quality Management at the New Pendleton Compressor Station

Docket Number CP15-115-000
& CP15-115-001

Presented by: Jeff Panek Principal, Innovative Environmental Solutions, Inc.

Primary Clean Air Act (CAA) requirements that trigger emission control regulations:

- National Ambient Air Quality Standards (NAAQS): are ambient air standards for six "criteria pollutants"
  - Ozone, particulate, NO_2, CO, SO_2 and lead
  - State Implementation Plans (SIPs) define how state will achieve and maintain the NAAQS — i.e., emission reduction rules

- New Source Performance Standards (NSPS): EPA adopts standards for *"new"* sources of "criteria pollutants" (e.g., NOx, CO, VOC, Particulate)
  - National standard based on "best demonstrated technology"
  - Affects new units and existing units that are "modified"
  - Additional pollutants addressed under National Emissions Standards for Hazardous Pollutants (NESHAPs) regulations

NAAQS is protective of human health and welfare:

- Primary standards protect public health and sensitive populations such as children, the elderly, and individuals with respiratory diseases
- Secondary standards protect public welfare, including protection against visibility impairment, harm to animals, crops, and vegetation
- Sources, including compressor stations, must demonstrate that emissions from the facility satisfy the NAAQS
- Dispersion modeling is being completed to demonstrate compliance with the NAAQS

National Ambient Air Quality Standards (NAAQS)

State-of-the-art controls selected:

- Controls represent industry established best practices for the equipment at this station
- Two natural gas Solar Taurus 70 turbines equipped with state-of-the-art SoLoNOx emissions controls to minimize emissions
    - Uses lean-premixed combustion technology to prevent formation of pollutants
- Oxidation Catalyst(s)- Voluntarily installing for further reduction of pollutants beyond state and federal requirements resulting in additional environmental benefit
- Emissions from these turbines will be less than applicable EPA and New York State Department of Environmental Conservation (NYSDEC) standards for turbines

State-of-the-Art Controls

Air quality registration and impact assessments:

- New sources of air emissions must obtain air quality permits or registrations under the CAA and New York State law and regulations
  - New York classifies facilities by Potential To Emit (PTE)
    - "Major" Facilities
      - Title V Air Permit
    - "Minor" Facilities (Pendleton)
      - State Facility Air Permit
      - Minor Facility Registration applies if actual emissions are < 50% major source level
  - For Proposed Pendleton Facility: PTE is <50% of the "major" or Title V emissions level

Air Quality Registration & Impact Assessments

Air quality registration and impact assessments (cont.)

- Emissions and air quality impacts are assessed, reviewed and approved by NYSDEC before the air permit or registration is issued

- NYSDEC also implements EPA air quality rules and requirements
  - NSPS for Stationary Combustion Turbines establish acceptable emissions levels and requires annual stack testing/reporting

- The Federal Energy Regulatory Commission (FERC) is responsible for reviewing compliance with applicable regulations and issuing a project certificate

Project air quality impacts are expected to be minimal/negligible:

- National Fuel is committed to complying with all Federal CAA, FERC and state air quality and emissions-related regulatory requirements during both construction and operation of the Pendleton facility
  - Source impacts are projected to be below the NAAQS levels at and beyond property line
  - Analyses are being completed

- National Fuel encourages residents and surrounding communities to review the project website: www.natfuel.com/supply/NorthernAccess2016

- National Fuel currently operates compressor units at 38 sites across New York and Pennsylvania
  - These compressor stations and transmission pipelines consistently receive "clean" audits by federal and state environmental and safety regulators

Expected Air Quality Impacts

Additional Information

- EPA NAAQS - Home page with links to various NAAQS
  - http://www3.epa.gov/ttn/naaqs/criteria.html
- EPA Turbine NSPS site - Rule and related documents
  - http://www3.epa.gov/airtoxics/nsps/turbine/turbnsps.html
- EPA Oil and Natural Gas Air Pollution Standards
  - http://www3.epa.gov/airquality/oilandgas/index.html
- NYSDEC Air Pollution Control Permit Program
  - http://www.dec.ny.gov/permits/6069.html

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The following slides were presented at the Public Information Forum Open House on Nov. 7, 2015, at the Wendelville Fire Hall.

Public Information Forum Open House

Station Control System

General

* The design for National Fuel compressor stations incorporates multiple systems that combine to provide control of the station's equipment in a safe and reliable manner. Each of the systems is designed to equip the station with a distinct control function that enhances the overall functionality, efficiency and safety of the compressor station.
* The Station Control System is responsible for the control of station level systems, coordination of the units according to pipeline conditions and setpoints, and communication with SCADA. It also controls the overall station safety systems such as the coordination and isolation responses to emergency shutdown issues . It provides control of the system end devices such as block and vent valves and equipment shutdown.

Pressure Control & Protection

* Station discharge pressure and station flow are modulated to meet set point requirements by controlling the unit compressor speeds. Increasing the unit speed results in reduced suction pressure with increased discharge pressure and flow. Decreasing the unit speed results in higher suction pressures with decreased discharge pressure and flow.
* There are multiple layers of overpressure protection to ensure the integrity of the station and pipeline. Each of the layers has primary and secondary devices to provide redundancy to the control system.
* Per DOT part 192 a layer of pressure protection must reside outside of the control system. This is accomplished through a pressure switch which when triggered will cause the fuel gas to the units to close.

Control & Monitoring

* Ability to shutdown within the facility automatically with reaction to a possible issue that is immediate.
* Consists of hundreds of points of instrumentation and control.
* Continuously monitored with logic resolution within milliseconds of program scan time.

Communications

* Through the distinct layers of redundant, fail-safe controls that automatically counteract the effect of anticipated possible sources of failure, communication links, and power systems, the station will be capable of being operated locally as well as remotely.
* National Fuel does not connect the station control systems to the public internet in order to prevent an opportunity for remote attacks onto our systems.

Electrical

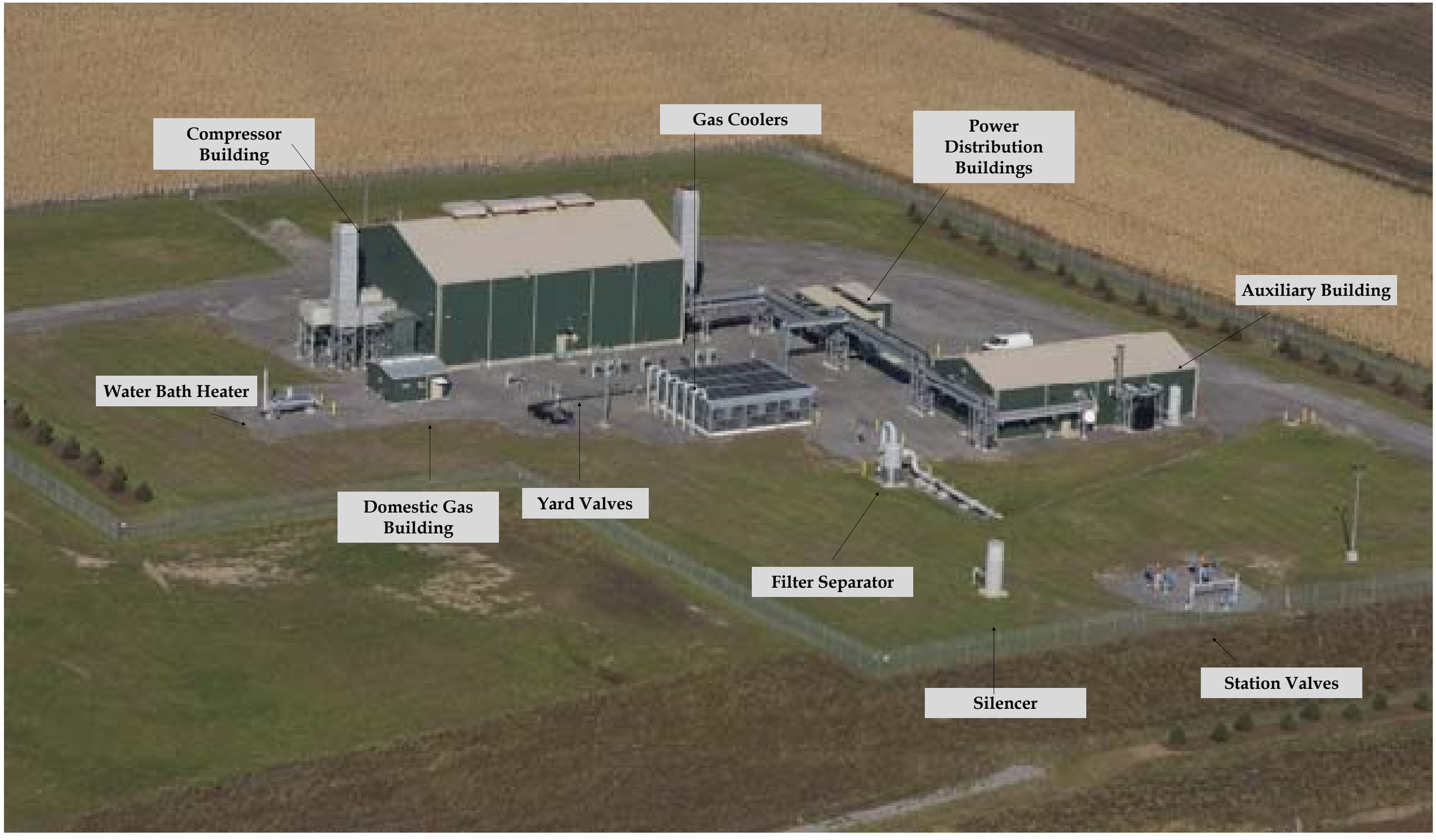
* National Fuel implements a multistage philosophy to power within the facility. While our prime source of power is provided by the utility there are multiple backup sources in the case of a utility interruption.
* The power to the facility and the backup sources are monitored by our gas control system and actions are taken to send personnel to the location if required.
* If all of the layers of power systems are not available the system is designed to operate in a failsafe manner. In this instance the station would go through a controlled emergency shutdown.

SCADA & Gas Control

* Supervisory Control & Data Acquisition, (SCADA) allows centralized monitoring, data collection, and system control from Gas Control to remote sites throughout NFG's service territory. Operational data and alarms are transferred between SCADA and the Station to allow for the remote operation and monitoring of the station.

* National Fuel's Gas Control Operations Center (GCOC) monitors all major gas facilities and can identify abnormal or emergency conditions, should they occur. In the event GCOC identifies one of these conditions, GCOC is able to make system adjustments remotely and/or dispatch appropriate field personnel to respond. In the event an emergency condition was reported by the public, National Fuel would also dispatch appropriate field personnel to respond.

Oakfield Compressor Station



Safety Systems

General

* Meet or beat all federal safety codes for design and operation.
* Automatic fail-safe emergency shutdown system.
* Flame detectors and gas sensors are utilized to render a hazardous situation safe without human intervention. The response to an issue is immediate.
* Operations personnel must be onsite to resolve any issues and to bring the station or unit back online.
* Operators can also trigger the system manually if required.
* National Fuel's Gas Control Operation Center (GCOC) has the ability to control the fail-safe emergency shutdown system remotely.
* Consists of various of points of instrumentation and control: Fire detection, gas detection, ESD pushbuttons, building ventilation, operator alerts such as horns and strobes.

Fire Detection

* Multiple flame detectors are installed with the compressor buildings to detect a fire event. Each building design and unit is reviewed to ensure there is proper coverage.
* System response- upon detection of a flame event the station automatically goes into an emergency shutdown. Alarms are activated and GCOC performs notifications.


Flame Detector

Gas Detection

* Gas sensors and transmitters are installed in each compressor building to monitor for an abnormality of gas within the building outside of the unit or piping.
* System response-

  Low level alarm - The ventilation rate in the affected building is increased. Alarms are activated and GCOC performs notifications.

  High level alarm- The unit in the affected building is shutdown and gas is isolated from the building. Alarms are activated and GCOC performs notifications.


Gas Sensor

Monitoring & Response

* Distinct alarms are transmitted through the SCADA system which allows GCOC to dispatch appropriately trained personnel to respond to the station as required.
* Monitored 24/7 by local National Fuel Dispatch Center.
* Safety system will operate at the station without requirement of human intervention.

System Testing

* Prior to in-service- Every device and system is distinctly verified by a team of engineering and operations personnel. A full emergency shutdown is conducted to validate the system and the designed blowdown time.
* 60 day- Every 60 days operation personnel calibrate and verify functionality of the system.
* 6 month and annual- Every 6 months operations and technical personnel perform a full system test against the base design documents.

Facility Lighting

General

* Lighting levels mandated by DOT Part 192 and OSHA regulations .
* Controlled by the station automation system .
* Yard lighting will be directed into the facility and properly shielded to limit illumination to the immediate work areas.
* LED lights utilized to offer softer light than other technologies.

Unoccupied

* Only lights that allow safe entry into the facility are on to minimize lighting when personnel are not on site.
* Example is low level light at the main gate and main entry into the control room.

Occupied

* An appropriate level of lighting will be automatically activated to provide a safe working environment.
* Lights controlled by Dusk-to- Dawn sensors.
* Key areas with focused light on points of egress and headers.
* Manual control for other lights for maintenance purposes.

Safety

* During an Emergency Shutdown additional lights are activated.

National Fuel East Aurora Compressor Station

Unoccupied- Dusk

Occupied- Dusk

Occupied- Dark

Unit Control System

General

* The Unit Control System is responsible for the distinct safe operation of the Solar Turbines Taurus T70.
* Solar Turbines Turbotronic control system utilizes an industry standard Allen-Bradley ControlLogix PLC and I/O technology for more precise and reliable operation with onboard diagnostics.
* Monitor various parameters and initiate start sequences, local operational control, unit alarms, and shutdowns as appropriate.

Control & Monitoring

* Consists of hundreds of points of instrumentation and control.
  - Pressure and temperature transmitters
  - Vibration sensors
  - Valve actuators
  - Pressure/Level Switches
  - Thermocouples & Resistance Temperature Detectors
  - Magnetic Speed Pickups
  - Solenoid Valves
  - Electro-hydraulic actuators
* Continuously monitored with logic resolution within milliseconds of program scan time.
* Will automatically stop and lockout unit if unsafe conditions are sensed.
* Pressure control is monitored and controlled by the station control system typically however the unit safety control has overriding control.

Solar Turbines Taurus T70

Familiarity of Terms

DOT 192- Code of minimum federal safety standards for the Transportation of Natural and Other Gas by Pipeline. Subpart D includes the design of pipeline components which references compressor stations.

Dusk-to-Dawn- A photocell sensor that senses the difference between daylight and nighttime. This sensor is utilized to trigger an automated lighting scheme.

ESD- Emergency Shutdown, a safety system that stops the compressor units and isolates and vents the compressor station piping.

Fail-safe- System's design prevents or mitigates unsafe consequences of the system's failure. Each system is evaluated for the proper design approach to the process. For example the fail-safe position of a station block valve is closed therefore no additional gas may enter the station whereas a vent valve failure position is open which prevents gas from accumulating in the station piping.

Flame Detector- A sensor designed to detect and respond to the presence of a flame or fire. The flame detector utilizes multispectrum technology, ultraviolet and infrared, for continuous protection with the quickest detection. Responses to a detected flame include sounding an alarm, remote notification, and an emergency shutdown of the facility.

Gas Detector- A device that detects the presence of gases in an area, as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically controlled.

HMI- Human Machine Interface, a hardware and software application that presents information to an operator or user about the state of a process, and to accept and implement the operators control instructions. Information is displayed in a graphic format. This is also known as a Graphical User Interface (GUI).

OPP- Overpressure protection, pressure relief or other suitable protective devices that ensure that the maximum allowable operating pressure of the station piping and equipment is not exceeded to meet code requirements.

OSHA- Occupational Safety and Health Administration, a federal organization which is part of the Department of Labor that ensures safe and healthy working conditions by enforcing standards and providing workplace safety standards.

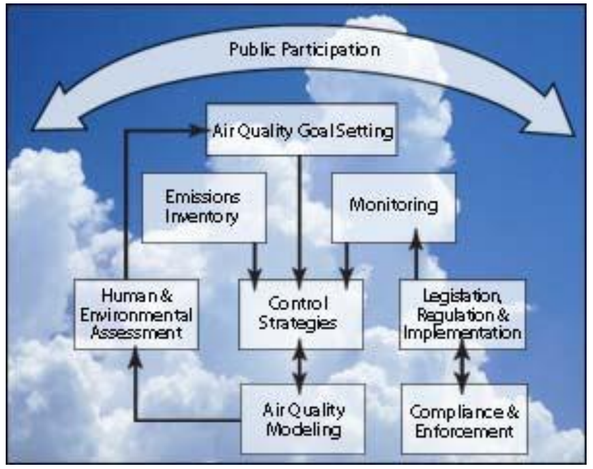
PHMSA- Department of Transportation Pipeline and Hazardous Material Safety Administration.

PLC- Programmable Logic Controller, an industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices.

Redundancy- Systems that are utilized with the ability to fail over to a secondary source of control or information for a more robust system.

Unmanned- Personnel not at a distinct facility 24 hours a day. Systems however are covered from operations on a planned operational basis as well as as required for maintenance and system responses.

Air Quality: Multi-Regulatory Agency Involvement



Federal Clean Air Act (CAA)

The basic driving force that forms the basis for National Air Pollution Control

- **Promulgated, amended, and enforced by the EPA**
- **EPA may enforce state requirements where necessary**

Air Pollution Control Regulations / Pollution Prevention Techniques

National Ambient Air Quality Standards (NAAQS)

Establishes national goals for ambient concentrations for six criteria pollutants

- Protects public health and sensitive populations
- Protects public welfare

National Emission Standards for Hazardous Air Pollutants (NESHAPS)

- Industry-specific standards for individual Hazardous Air Pollutants (HAPs)
- Regulates approximately 187 HAPs
- Major source controls are based on "Maximum Achievable Control Technology"

New Source Performance Standards (NSPS)

- Technology based standards that apply to specific categories of stationary sources
- Apply to new, modified, and reconstructed sources
- Promulgates reporting, operation and testing requirements, and emission limits for stationary sources
- Reflects the application of best demonstrated technology (BDT)
- Equipment manufacturers must meet regulatory design requirements

NYSDEC Implementation

NYSDEC Implements Federal CAA Requirements:

- EPA oversees and approves NY State Implementation Plan (SIP) for attainment of air quality standards
- NYSDEC develops and enforces NYS regulations which meet or exceed corresponding federal standards

Construction/Operating Permits

- Reviews and approves air permit applications
- NYSDEC issues air operating permits in accordance with the CAA

Routine Emission Testing

- Reviews emissions reporting and source testing results
- Emission testing conducted in accordance with federal and NYS requirements

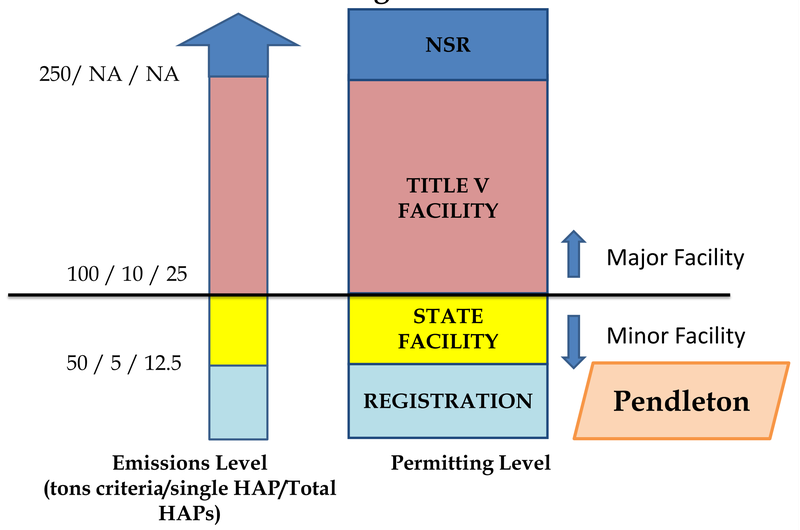
Compliance, Inspection, and Enforcement

Regulatory Agencies:

- Conduct facility inspections
- Perform enforcement activities for NYS and delegated federal regulations
- Review mandatory regulatory required recordkeeping elements included in the air permit

As part of the Federal Energy Regulatory Commission (FERC) certification process, FERC ensures that air permitting is completed in accordance with applicable federal and state regulations

Air Permitting Thresholds



Low PTE Emissions = Minor Facility Permit

The NYSDEC is delegated permitting authority by the EPA under the CAA to regulate new/modified sources of air emissions in New York State

New York State classifies facilities as Major or Minor and issues permits based on the facility annual Potential to Emit (PTE) emissions

PTE = The maximum capacity of a facility to emit any regulated pollutant under its physical and operational design (i.e., worst case emissions)

MAJOR Facilities – "Largest Emitters" PTE emissions greater than Major Source Thresholds	**MINOR Facilities** PTE emissions less than Major Source Thresholds
❖ New Source Review (NSR) ▪ Prevention of Significant Deterioration (PSD) ▪ Nonattainment New Source Review (NNSR) ❖ Title V Permit	❖ State Facility Air Permit ❖ Air Facility Registration Certificate [**actual emissions** less than 50% of major source thresholds]

The proposed Pendleton Compressor Station is anticipated to be classified as a **Minor facility** with PTE emissions less than 50 % of major source thresholds

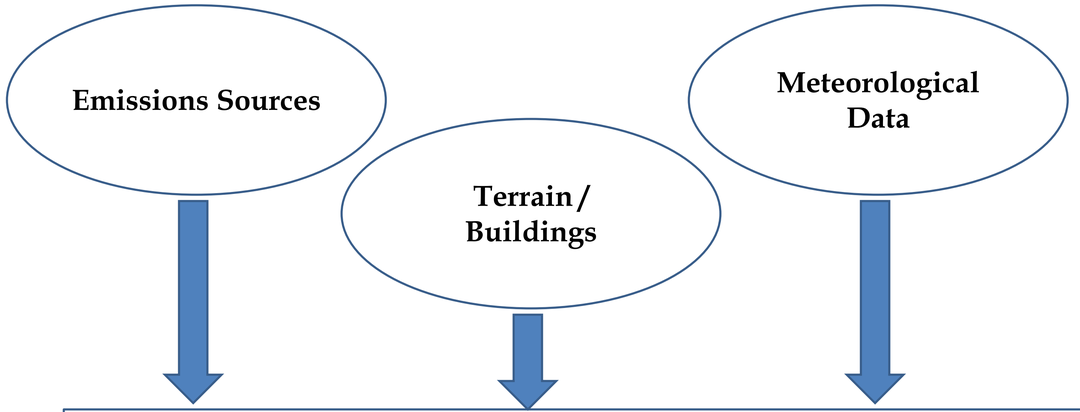
Major Source Thresholds = Annual facility PTE emissions thresholds in tons per year (tpy) that classifies a facility as Major if exceeded for any of the specified pollutants.

MAJOR SOURCE THRESHOLDS (tpy)						
NOx	**CO**	**VOC***	**Particulate Matter**	**SO_2**	**Total Hazardous Air Pollutants (HAPs)**	**Individual HAPs**
100	100	50	100	100	25	10

* The proposed Pendleton Compressor Station is located in the "Ozone Transport Region" and therefore a reduced major source threshold for VOC of 50 tpy is applicable.

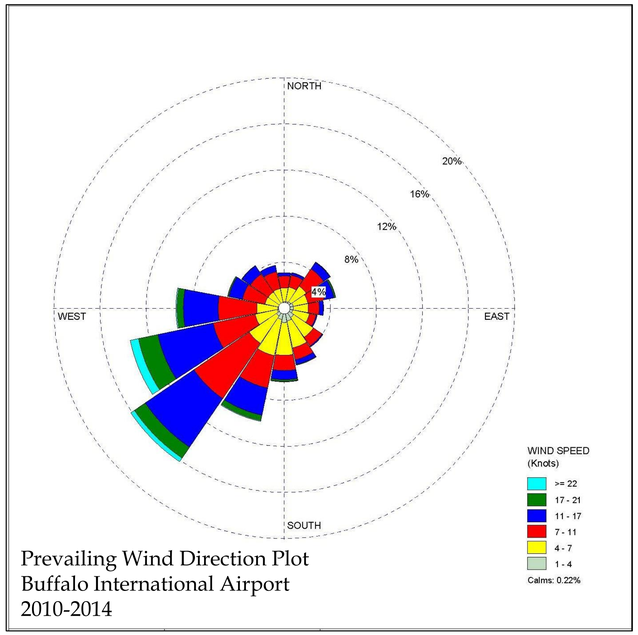
Project Air Quality Impacts: Below Ambient Standards

National Fuel is performing air dispersion modeling as part of the FERC Certification and NYSDEC Air Permitting process to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) and select NYSDEC ambient air quality standards.

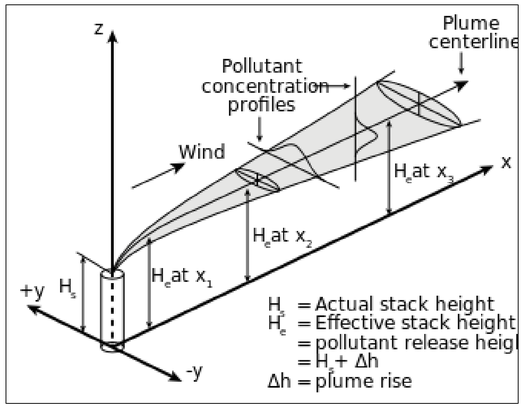


AERSCREEN& AERMOD

- ❖ **EPA's preferred** dispersion modeling software for estimating air quality impacts at distances less than 50 kilometers
- ❖ Mathematical model **DEVELOPED and maintained by the EPA**
- ❖ Performed in accordance with EPA and NYSDEC guidance
- ❖ Predicts **CONSERVATIVE** estimates of air quality impacts



Prevailing Wind Direction Plot
Buffalo International Airport
2010-2014



Modeled Emissions

Compare *modeled emissions* to **NYSDEC Standards**

Modeled PTE Emissions

Compare *modeled emissions* to **National Ambient Air Quality Standards (NAAQS):**

Primary Standards – protect human health
Secondary Standards – protect public welfare

NO_2

CO

$PM_{2.5}$

PM_{10}

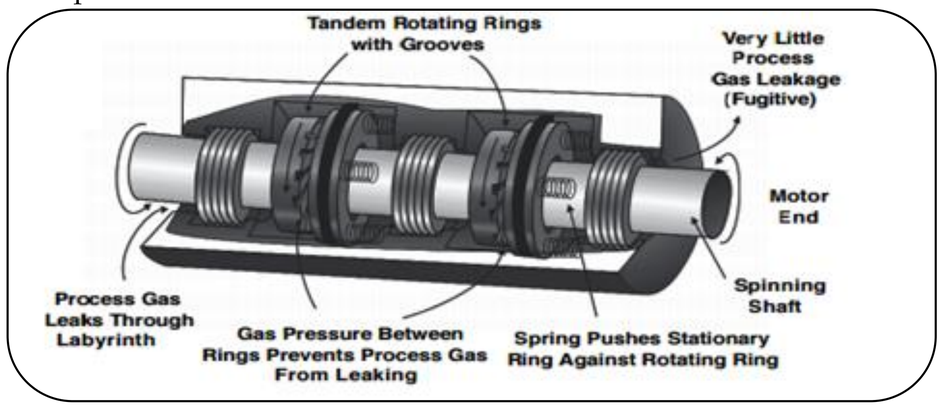
SO_2

Low Emission Technology:
Reducing Emissions Beyond Regulatory Requirements

National Fuel is committed to using State-of-the-Art Technology

Meet or beat stringent Department of Environmental Conservation (NYSDEC) and Environmental Protection Agency (EPA) air permit requirements

- **SoLoNOx:** SoLoNOx technology ensures uniform air/fuel mixture for cleaner combustion and lower Nitrogen Oxide (NOx) emissions (Solar guarantees 40% lower NOx emissions than the regulatory standard)
- **Oxidation Catalyst:** Each Turbine will have an **Oxidation Catalyst** installed to reduce Carbon Monoxide (CO), and Hydrocarbons (HCs)/Volatile Organic Compounds (VOCs) for reductions beyond state and federal requirements.
- **Dry Seal Technology:** Reduction of Natural Gas and HCs/VOCs venting to the atmosphere
- **Leak Detection and Repair (LDAR):** LDAR identifies Natural Gas Leaks with leak detection equipment such as infrared optical imaging cameras and requires repair of leaks within designated time frames indentified in the facility LDAR plan



Oxidation Catalyst systems on turbines have demonstrated greater than 90% reduction in CO emissions and an additional 85 – 90% reduction of HC/VOCs

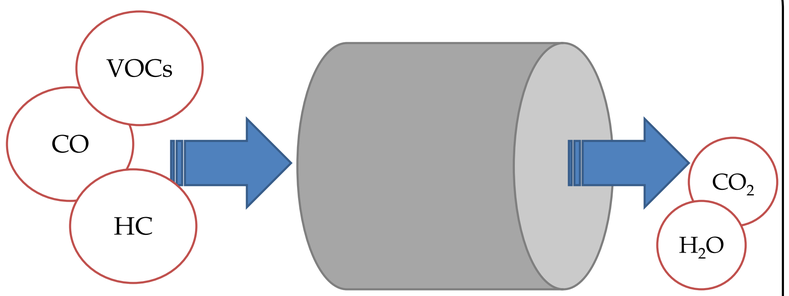
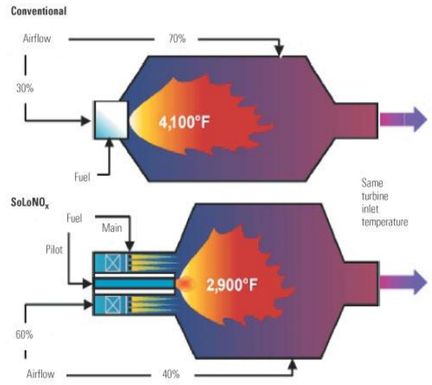
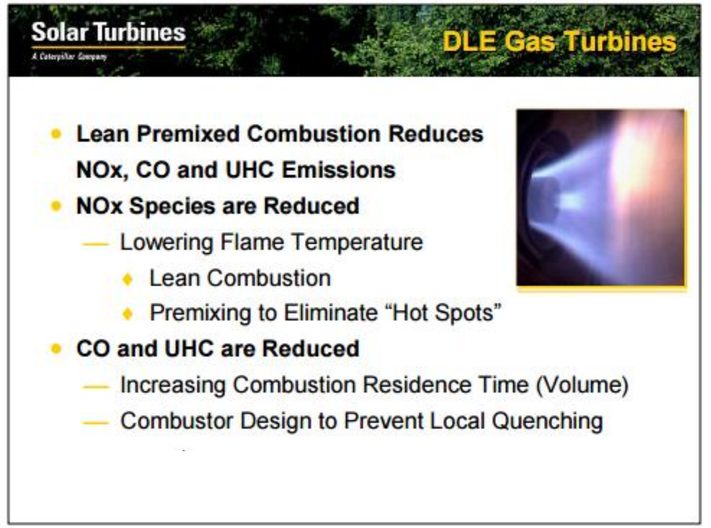


Illustration of Oxidation Catalyst

*Solar's proprietary **SoLoNOx** is the best available technology on the market dry emissions system that reduces pollution by limiting the formation of nitrous oxides (NOx), carbon monoxide (CO), and unburned hydrocarbons (UHC). This system uses lean premix combustion to lower the maximum flame temperature and reduce pollution formation.*



Solar's SoLoNOx Technology



NOx emissions 40% lower than regulatory standard

Continual Compliance Demonstrations

Facilities are required to continually demonstrate compliance with applicable clean air regulations as incorporated in the facility air permit.

Recordkeeping and Reporting

- ☑ Submittal of Required Reports
- ☑ Submittal of Required Notifications
- ☑ Continuous Recordkeeping
- ☑ Hours of Operation Tracking

Testing and Monitoring

- ☑ Performance Emission Testing
- ☑ Conduct Fuel Sampling
- ☑ Leak Detection and Repair (LDAR)

Demonstrating Compliance

Work Practice Standards

- ☑ Routine Maintenance
- ☑ Hours of Operation Tracking
- ☑ Continuous Operation Parameters Monitoring

National Fuel completes on-going compliance in accordance with applicable federal and NYS regulations and internal National Fuel safety and environmental policies.

Leak Detection Monitoring

What is a Compressor Station?

A compressor station is a facility which helps the transportation process of natural gas from one location to another. Natural gas, while being transported through a gas pipeline, needs to be constantly pressurized at intervals of 40 to 100 miles. The gas in compressor stations is normally pressurized by special turbines and/or engines.

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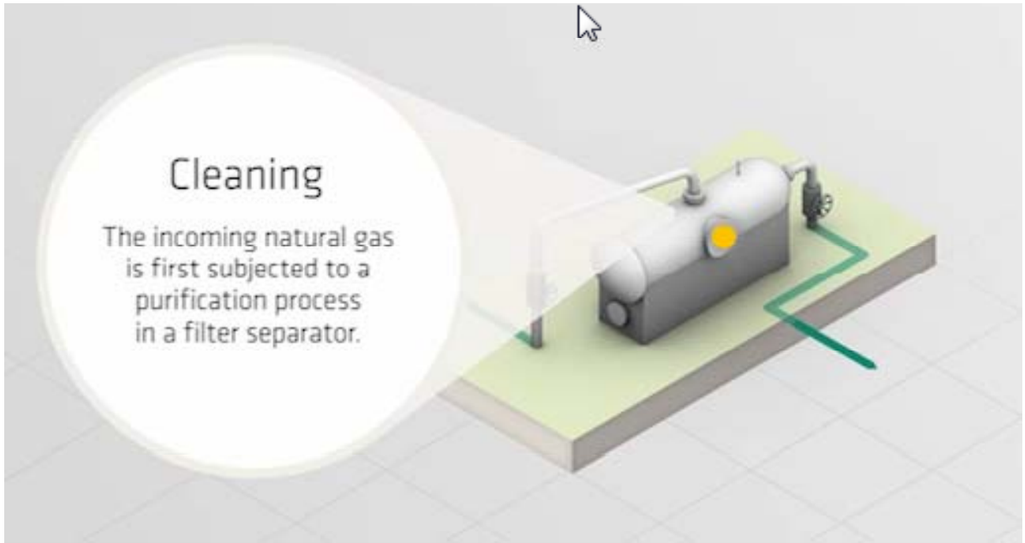
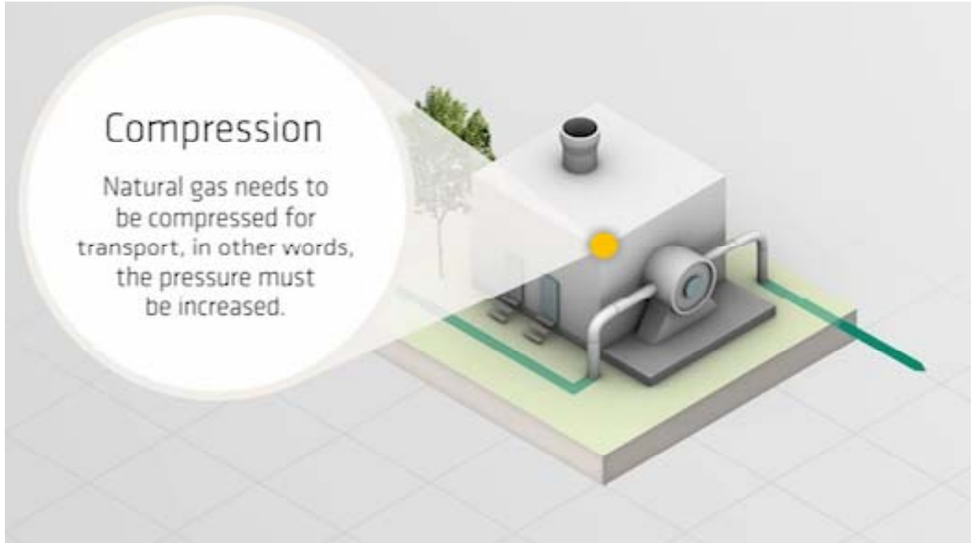
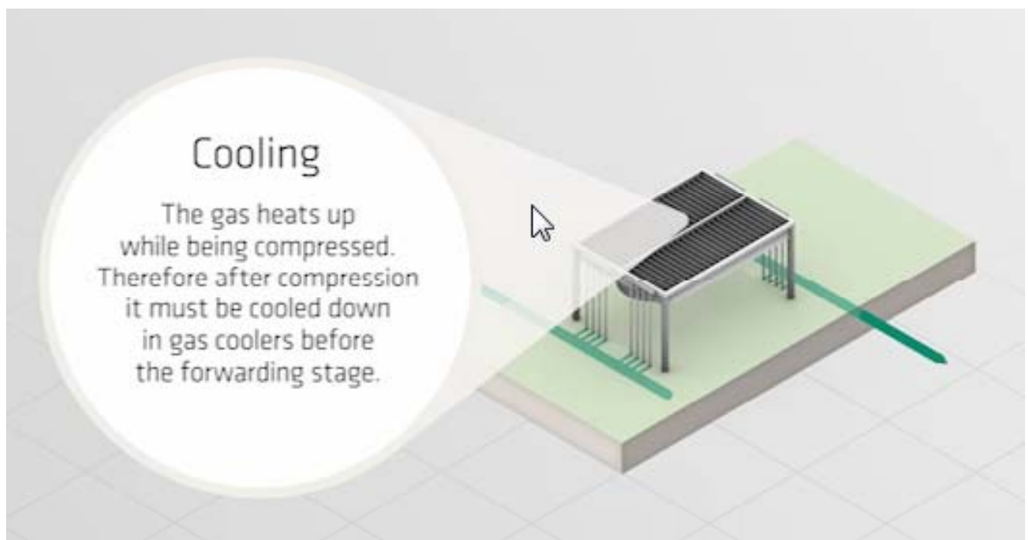






What the Proposed Pendleton Compressor Station is ***NOT***

NO Unsilenced Gas Vents

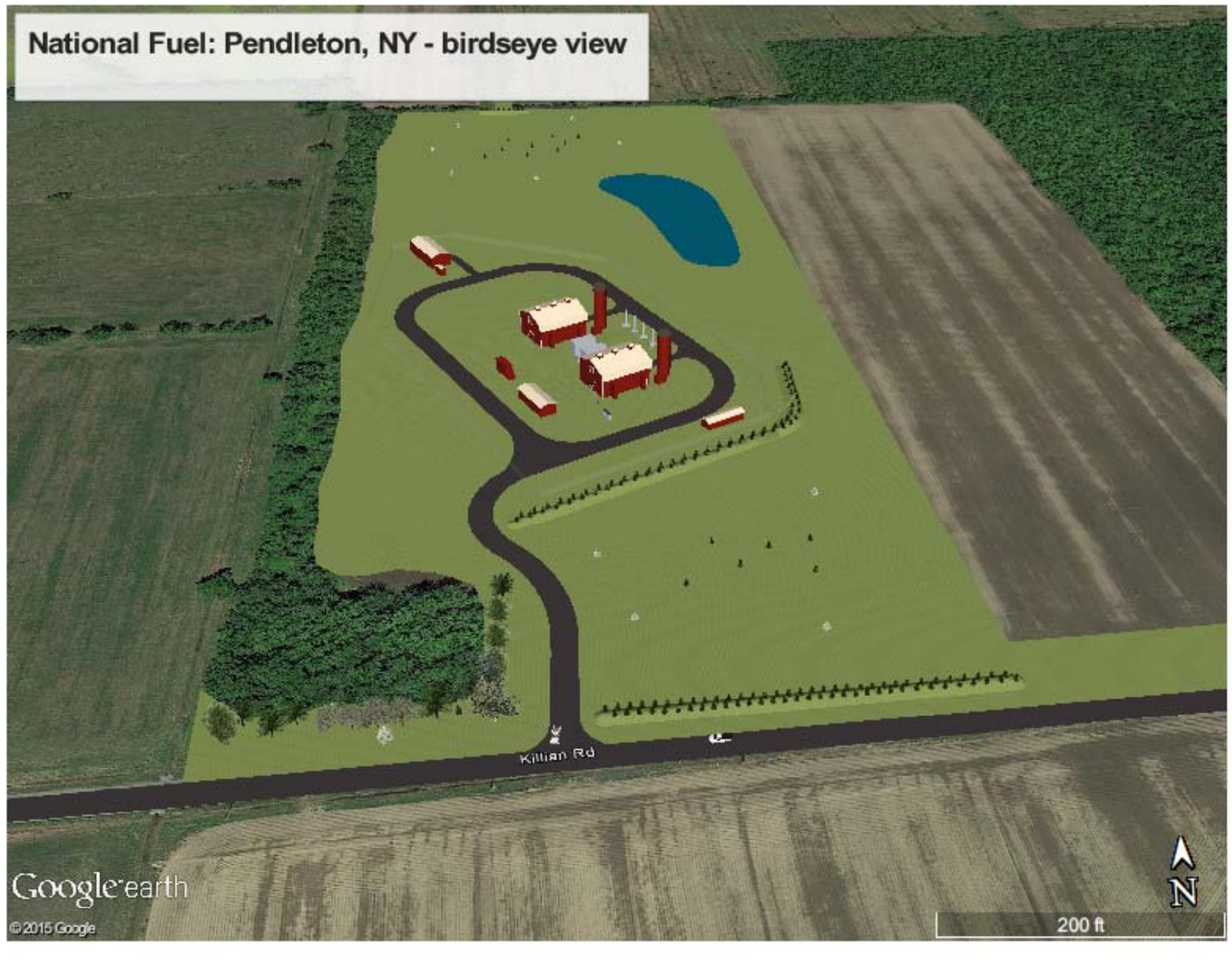
Unit & Station Blowdown Silencers

What the Proposed Pendleton Compressor Station is *NOT*

NO Gas Production Style Processing & Compressing Plant

NO:

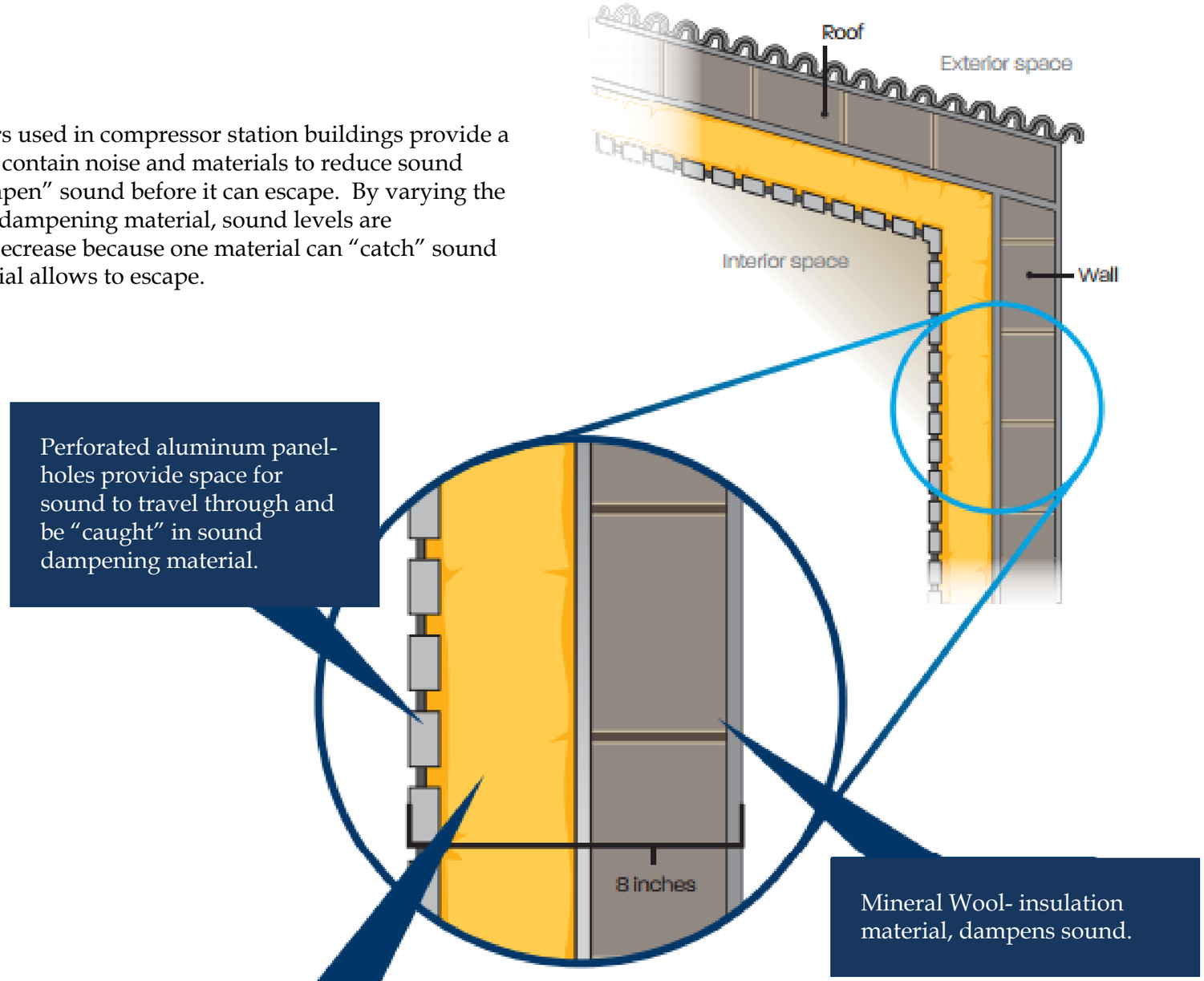
* Gas processing and associated emissions.
* Multiple high noise direct drive cooling fans
* Extensive exposed piping and electrical structures
* Bare landscape and industrial aesthetics
* Multiple large volume process storage tanks

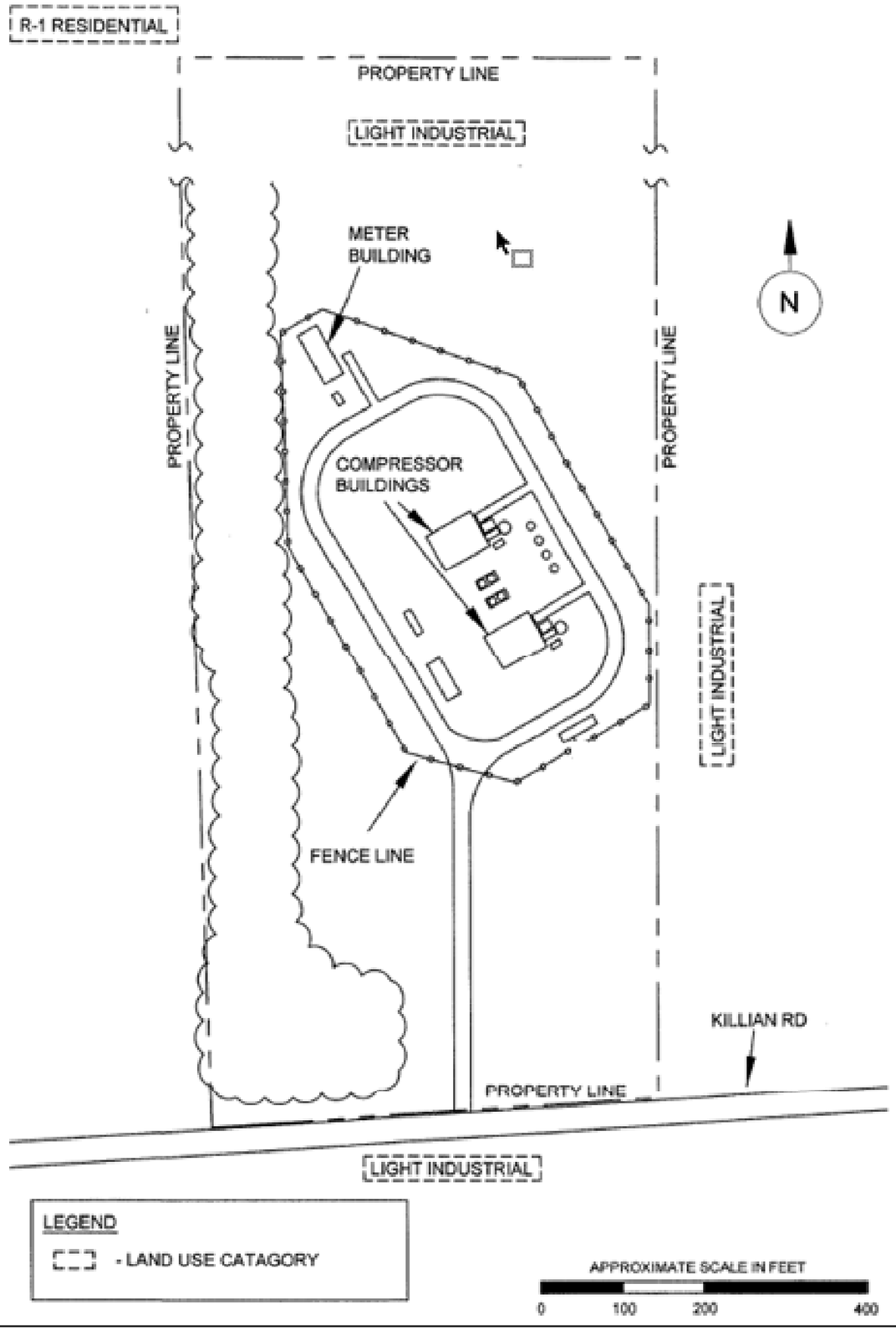


Best-in-Industry Acoustic Performance Building Designs

Well-insulated

Insulation layers used in compressor station buildings provide a solid surface to contain noise and materials to reduce sound energy or "dampen" sound before it can escape. By varying the types of sound dampening material, sound levels are exponentially decrease because one material can "catch" sound the other material allows to escape.




R-1 RESIDENTIAL
PROPERTY LINE
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KILLIAN RD
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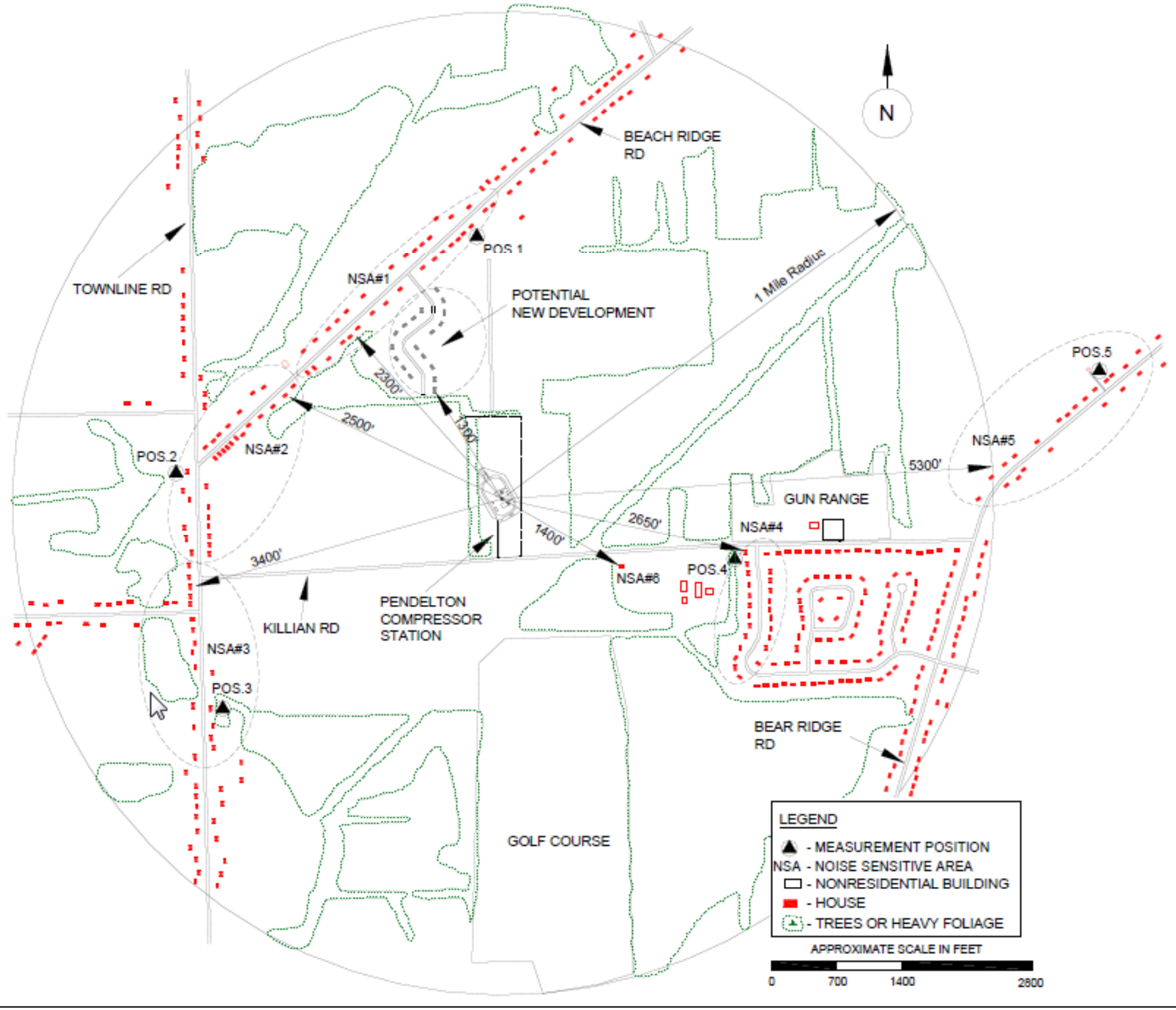
LEGEND
- LAND USE CATAGORY
APPROXIMATE SCALE IN FEET
0
100
200
400

PENDLETON COMPRESSOR STATION		SOUND LEVELS FOR TYPICAL ACTIVITIES & COMMUNITY RESPONSES		
	dBA Scale (Level)	Community and Traffic (Outdoor Noise)	Reference Loudness	Community Reaction To Outdoor Noise
	-- 140 --	Aircraft Carrier Military Jet Aircraft		
	-- 130 --	Large Siren at 100 Ft.		
		Jet Takeoff at 200 Ft.	16 Times	
	-- 120 --	Thunderstorm Activity	as Loud	
			8 Times	
	-- 110 --	Elevated Train	as Loud	
		Auto Horn at 5 Ft.	4 Times	
	-- 100 --	Compacting Trash Truck	as Loud	
			2 Times	
	-- 90 --	Heavy Truck at 25 Ft.	as Loud	Vigorous Action and Law Suits
		Motorcycle at 25 Ft.	Reference	
	-- 80 --	Small Truck at 25 Ft.	Loudness	Threats of Legal Action
		Heavy Traffic at 50 Ft.		Appeals to Officials
	-- 70 --	Avg. Traffic at 100 Ft.	1/2 as Loud	Widespread Complaints
	-- 60 --		1/4 as Loud	Sporadic Complaints
		Light Traffic at 100 Ft.		No Reaction,
	-- 50 --		1/8 as Loud	Although Noise is Noticeable
FERC 55 dBA Ldn Criteria (i.e., 48.6 dBA)		Typical Suburban Area		
	-- 40 --	Birdsong		
Range of Estimated Sound Level Contributions of the Pendleton CS at the Surrounding NSAs	-- 30 --	Rural Area (With No Insects or Wind)		
			Just Audible	
	-- 20 --			
			Threshold of Hearing	
	-- 10 --			
Hoover & Keith Inc. (Consultants in Acoustics) 11391 Meadowglen, Suite I Houston, Texas 77082	-- 0 --			

Proposed Pendleton Compressor Station & Surrounding Area



Station Control System

General

* The design for National Fuel compressor stations incorporates multiple systems that combine to provide control of the station's equipment in a safe and reliable manner. Each of the systems is designed to equip the station with a distinct control function that enhances the overall functionality, efficiency and safety of the compressor station.
* The Station Control System is responsible for the control of station level systems, coordination of the units according to pipeline conditions and setpoints, and communication with SCADA. It also controls the overall station safety systems such as the coordination and isolation responses to emergency shutdown issues . It provides control of the system end devices such as block and vent valves and equipment shutdown.

Pressure Control & Protection

* Station discharge pressure and station flow are modulated to meet set point requirements by controlling the unit compressor speeds. Increasing the unit speed results in reduced suction pressure with increased discharge pressure and flow. Decreasing the unit speed results in higher suction pressures with decreased discharge pressure and flow.
* There are multiple layers of overpressure protection to ensure the integrity of the station and pipeline. Each of the layers has primary and secondary devices to provide redundancy to the control system.
* Per DOT part 192 a layer of pressure protection must reside outside of the control system. This is accomplished through a pressure switch which when triggered will cause the fuel gas to the units to close.

Control & Monitoring

* Ability to shutdown within the facility automatically with reaction to a possible issue that is immediate.
* Consists of hundreds of points of instrumentation and control.
* Continuously monitored with logic resolution within milliseconds of program scan time.

Communications

* Through the distinct layers of redundant, fail-safe controls that automatically counteract the effect of anticipated possible sources of failure, communication links, and power systems, the station will be capable of being operated locally as well as remotely.
* National Fuel does not connect the station control systems to the public internet in order to prevent an opportunity for remote attacks onto our systems.

Electrical

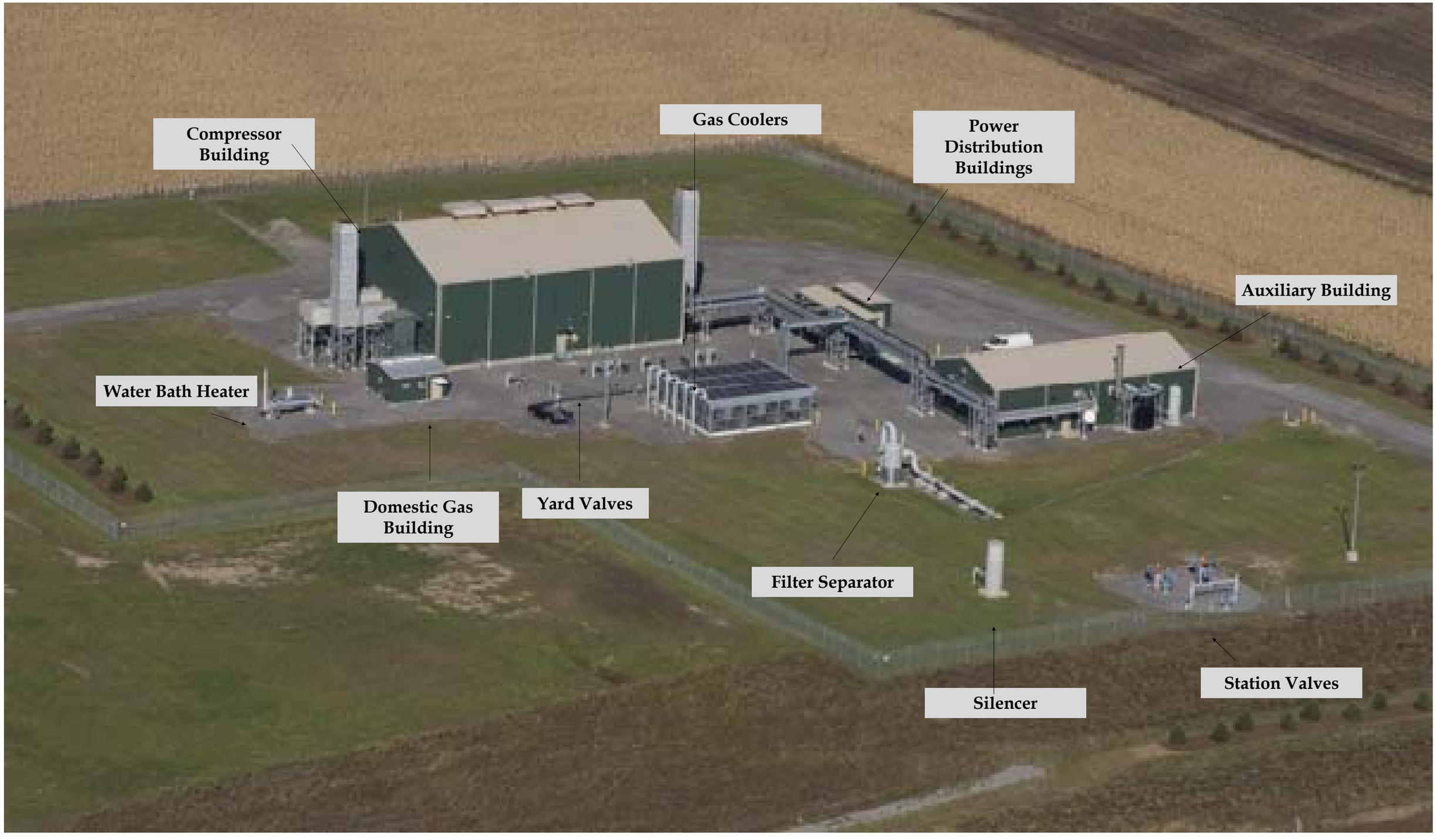
* National Fuel implements a multistage philosophy to power within the facility. While our prime source of power is provided by the utility there are multiple backup sources in the case of a utility interruption.
* The power to the facility and the backup sources are monitored by our gas control system and actions are taken to send personnel to the location if required.
* If all of the layers of power systems are not available the system is designed to operate in a failsafe manner. In this instance the station would go through a controlled emergency shutdown.

SCADA & Gas Control

* Supervisory Control & Data Acquisition, (SCADA) allows centralized monitoring, data collection, and system control from Gas Control to remote sites throughout NFG's service territory. Operational data and alarms are transferred between SCADA and the Station to allow for the remote operation and monitoring of the station.

* National Fuel's Gas Control Operations Center (GCOC) monitors all major gas facilities and can identify abnormal or emergency conditions, should they occur. In the event GCOC identifies one of these conditions, GCOC is able to make system adjustments remotely and/or dispatch appropriate field personnel to respond. In the event an emergency condition was reported by the public, National Fuel would also dispatch appropriate field personnel to respond.

Oakfield Compressor Station



Safety Systems

General

* Meet or beat all federal safety codes for design and operation.
* Automatic fail-safe emergency shutdown system.
* Flame detectors and gas sensors are utilized to render a hazardous situation safe without human intervention. The response to an issue is immediate.
* Operations personnel must be onsite to resolve any issues and to bring the station or unit back online.
* Operators can also trigger the system manually if required.
* National Fuel's Gas Control Operation Center (GCOC) has the ability to control the fail-safe emergency shutdown system remotely.
* Consists of various of points of instrumentation and control: Fire detection, gas detection, ESD pushbuttons, building ventilation, operator alerts such as horns and strobes.

Fire Detection

* Multiple flame detectors are installed with the compressor buildings to detect a fire event. Each building design and unit is reviewed to ensure there is proper coverage.
* System response- upon detection of a flame event the station automatically goes into an emergency shutdown. Alarms are activated and GCOC performs notifications.


Flame Detector

Gas Detection

* Gas sensors and transmitters are installed in each compressor building to monitor for an abnormality of gas within the building outside of the unit or piping.
* System response-

  Low level alarm - The ventilation rate in the affected building is increased. Alarms are activated and GCOC performs notifications.

  High level alarm- The unit in the affected building is shutdown and gas is isolated from the building. Alarms are activated and GCOC performs notifications.


Gas Sensor

Monitoring & Response

* Distinct alarms are transmitted through the SCADA system which allows GCOC to dispatch appropriately trained personnel to respond to the station as required.
* Monitored 24/7 by local National Fuel Dispatch Center.
* Safety system will operate at the station without requirement of human intervention.

System Testing

* Prior to in-service- Every device and system is distinctly verified by a team of engineering and operations personnel. A full emergency shutdown is conducted to validate the system and the designed blowdown time.
* 60 day- Every 60 days operation personnel calibrate and verify functionality of the system.
* 6 month and annual- Every 6 months operations and technical personnel perform a full system test against the base design documents.

Unit Control System

General

* The Unit Control System is responsible for the distinct safe operation of the Solar Turbines Taurus T70.
* Solar Turbines Turbotronic control system utilizes an industry standard Allen-Bradley ControlLogix PLC and I/O technology for more precise and reliable operation with onboard diagnostics.
* Monitor various parameters and initiate start sequences, local operational control, unit alarms, and shutdowns as appropriate.

Control & Monitoring

* Consists of hundreds of points of instrumentation and control.
  - Pressure and temperature transmitters
  - Vibration sensors
  - Valve actuators
  - Pressure/Level Switches
  - Thermocouples & Resistance Temperature Detectors
  - Magnetic Speed Pickups
  - Solenoid Valves
  - Electro-hydraulic actuators
* Continuously monitored with logic resolution within milliseconds of program scan time.
* Will automatically stop and lockout unit if unsafe conditions are sensed.
* Pressure control is monitored and controlled by the station control system typically however the unit safety control has overriding control.

Solar Turbines Taurus T70

Familiarity of Terms

DOT 192- Code of minimum federal safety standards for the Transportation of Natural and Other Gas by Pipeline. Subpart D includes the design of pipeline components which references compressor stations.

Dusk-to-Dawn- A photocell sensor that senses the difference between daylight and nighttime. This sensor is utilized to trigger an automated lighting scheme.

ESD- Emergency Shutdown, a safety system that stops the compressor units and isolates and vents the compressor station piping.

Fail-safe- System's design prevents or mitigates unsafe consequences of the system's failure. Each system is evaluated for the proper design approach to the process. For example the fail-safe position of a station block valve is closed therefore no additional gas may enter the station whereas a vent valve failure position is open which prevents gas from accumulating in the station piping.

Flame Detector- A sensor designed to detect and respond to the presence of a flame or fire. The flame detector utilizes multispectrum technology, ultraviolet and infrared, for continuous protection with the quickest detection. Responses to a detected flame include sounding an alarm, remote notification, and an emergency shutdown of the facility.

Gas Detector- A device that detects the presence of gases in an area, as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically controlled.

HMI- Human Machine Interface, a hardware and software application that presents information to an operator or user about the state of a process, and to accept and implement the operators control instructions. Information is displayed in a graphic format. This is also known as a Graphical User Interface (GUI).

OPP- Overpressure protection, pressure relief or other suitable protective devices that ensure that the maximum allowable operating pressure of the station piping and equipment is not exceeded to meet code requirements.

OSHA- Occupational Safety and Health Administration, a federal organization which is part of the Department of Labor that ensures safe and healthy working conditions by enforcing standards and providing workplace safety standards.

PHMSA- Department of Transportation Pipeline and Hazardous Material Safety Administration.

PLC- Programmable Logic Controller, an industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices.

Redundancy- Systems that are utilized with the ability to fail over to a secondary source of control or information for a more robust system.

Unmanned- Personnel not at a distinct facility 24 hours a day. Systems however are covered from operations on a planned operational basis as well as as required for maintenance and system responses.

Facility Lighting

General

* Lighting levels mandated by DOT Part 192 and OSHA regulations .
* Controlled by the station automation system .
* Yard lighting will be directed into the facility and properly shielded to limit illumination to the immediate work areas.
* LED lights utilized to offer softer light than other technologies.

Unoccupied

* Only lights that allow safe entry into the facility are on to minimize lighting when personnel are not on site.
* Example is low level light at the main gate and main entry into the control room.

Occupied

* An appropriate level of lighting will be automatically activated to provide a safe working environment.
* Lights controlled by Dusk-to- Dawn sensors.
* Key areas with focused light on points of egress and headers.
* Manual control for other lights for maintenance purposes.

Safety

* During an Emergency Shutdown additional lights are activated.

National Fuel East Aurora Compressor Station

Unoccupied- Dusk

Occupied- Dusk

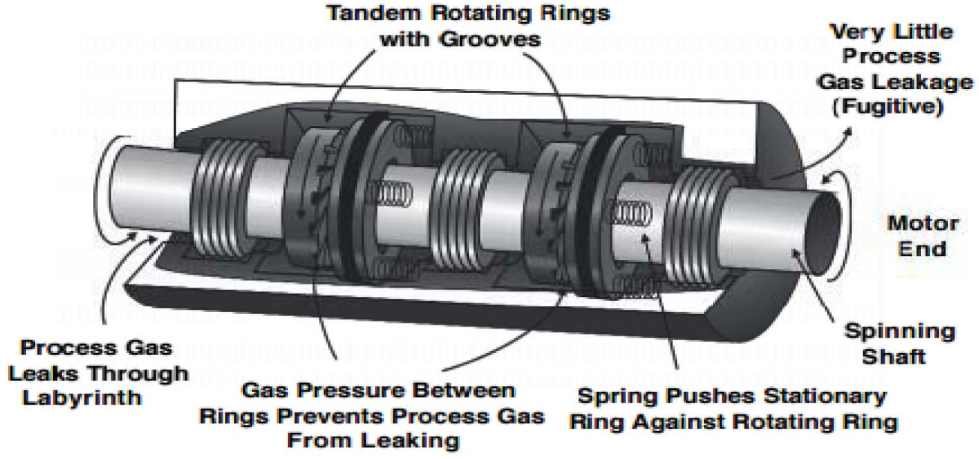
Occupied- Dark

Methane Emission Reduction

Operators of natural gas transmission systems have many technology options to reduce natural gas losses at the same time that they reduce methane emissions. These range from simple leak repairs to larger scale measures, such as replacing wet seals with dry seals, implementing Directed Inspection and Maintenance (DI&M) programs and installing vent gas recovery systems on compressor stations.

Replace compressor Wet Seals with Dry Seals

U.S. Experience: Several U.S. EPA Natural Gas STAR partners have also noted benefits from deploying dry seals compared to wet seals. One U.S. partner company determined that installing a dry seal on an existing compressor reduced emissions by 97%.



Directed Inspection and Maintenance (DI&M)

National Fuel utilizes and has extensive experience with D&M programs, and there are third party specialized companies that provide this regular service.

Typical DI&M survey conducted by third party specialists

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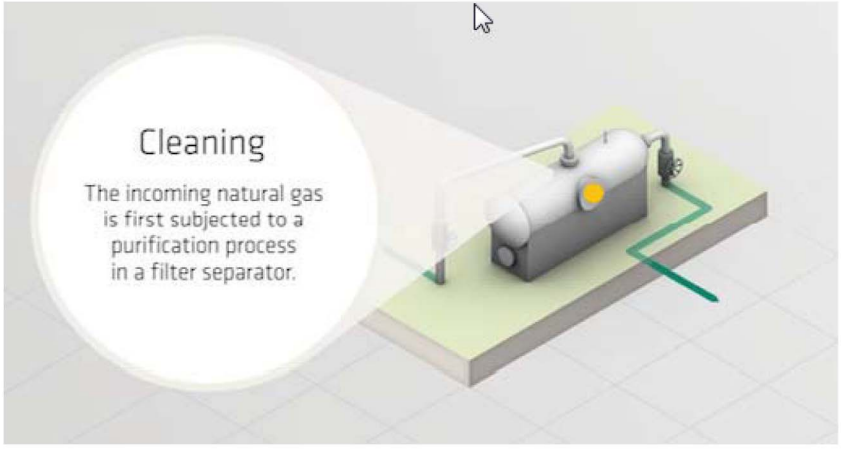

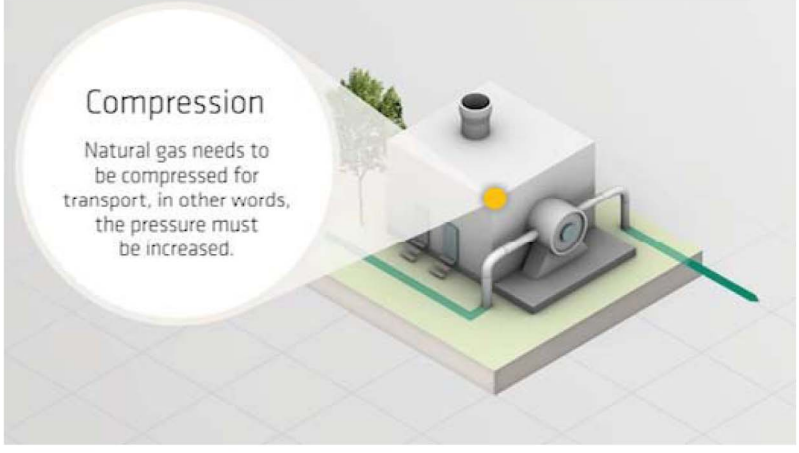

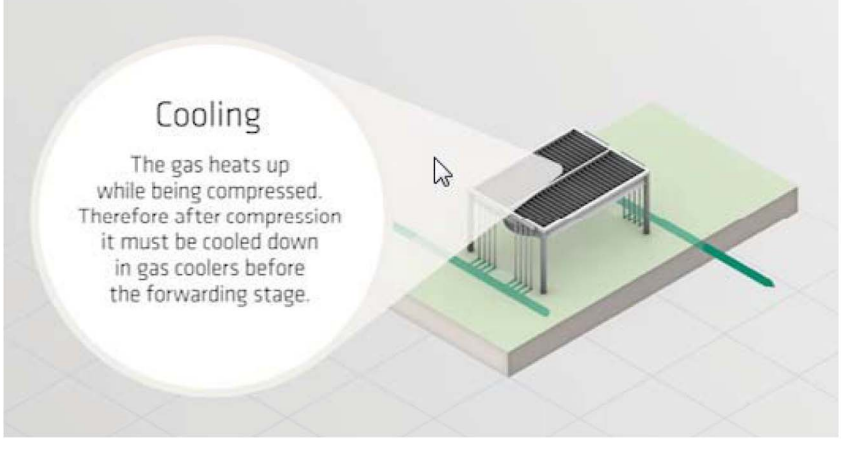

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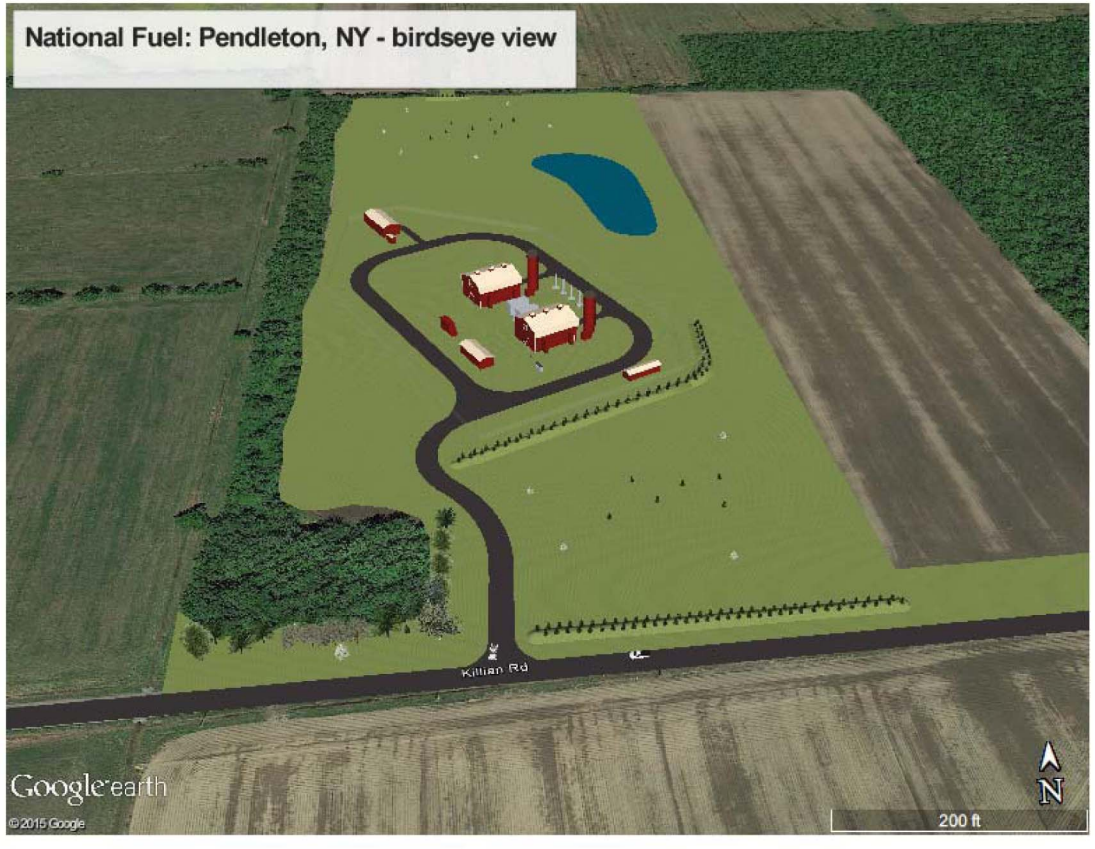

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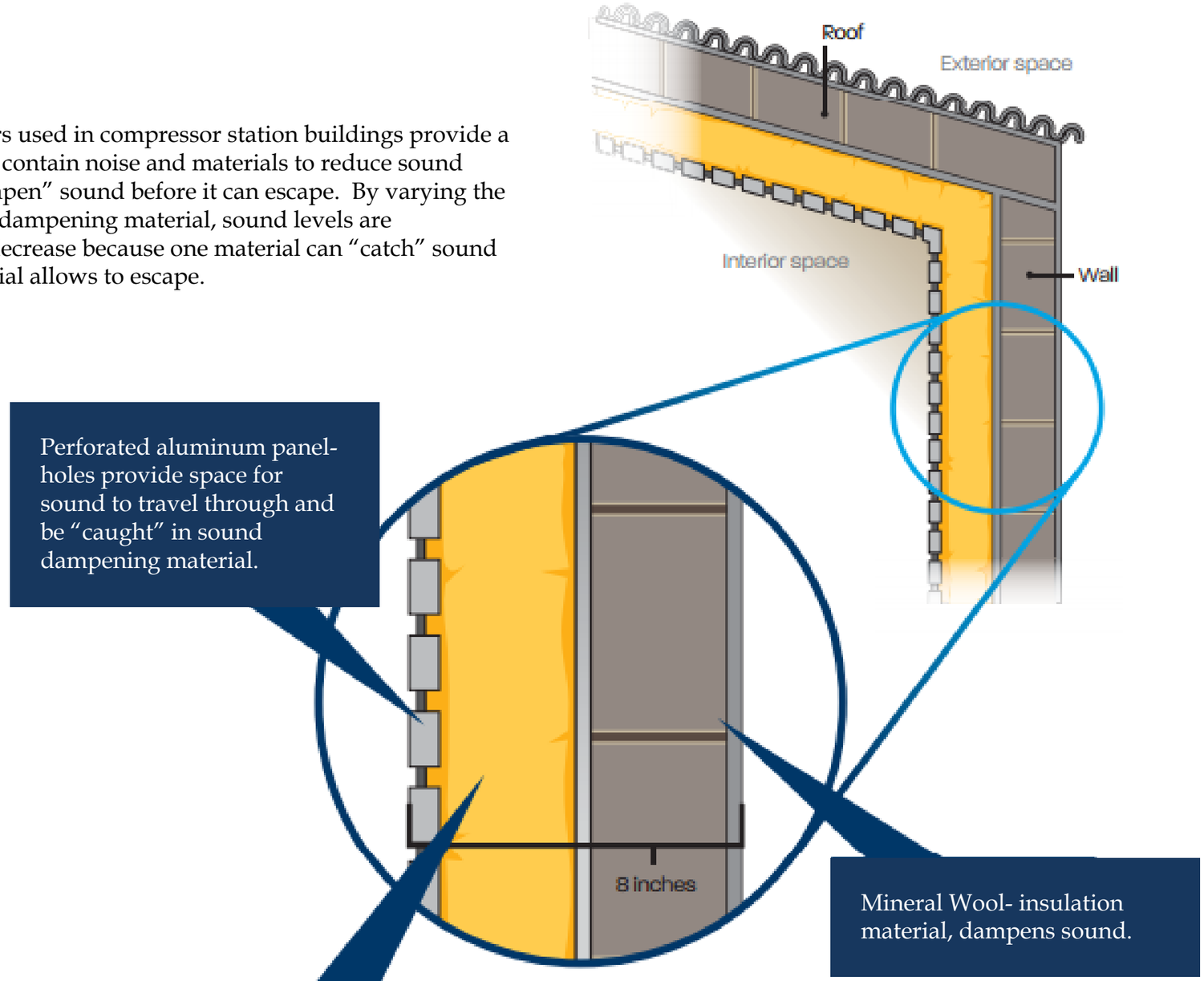

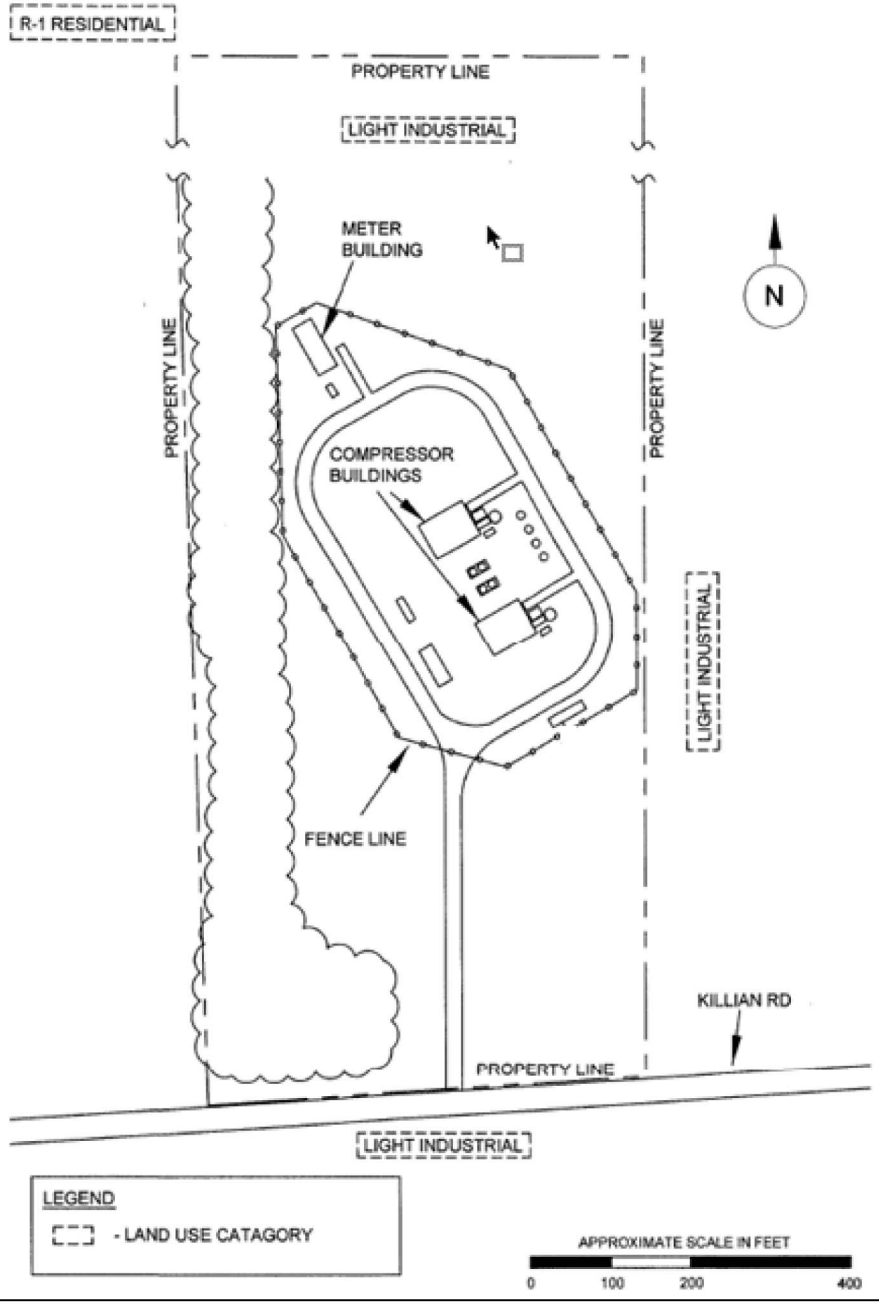
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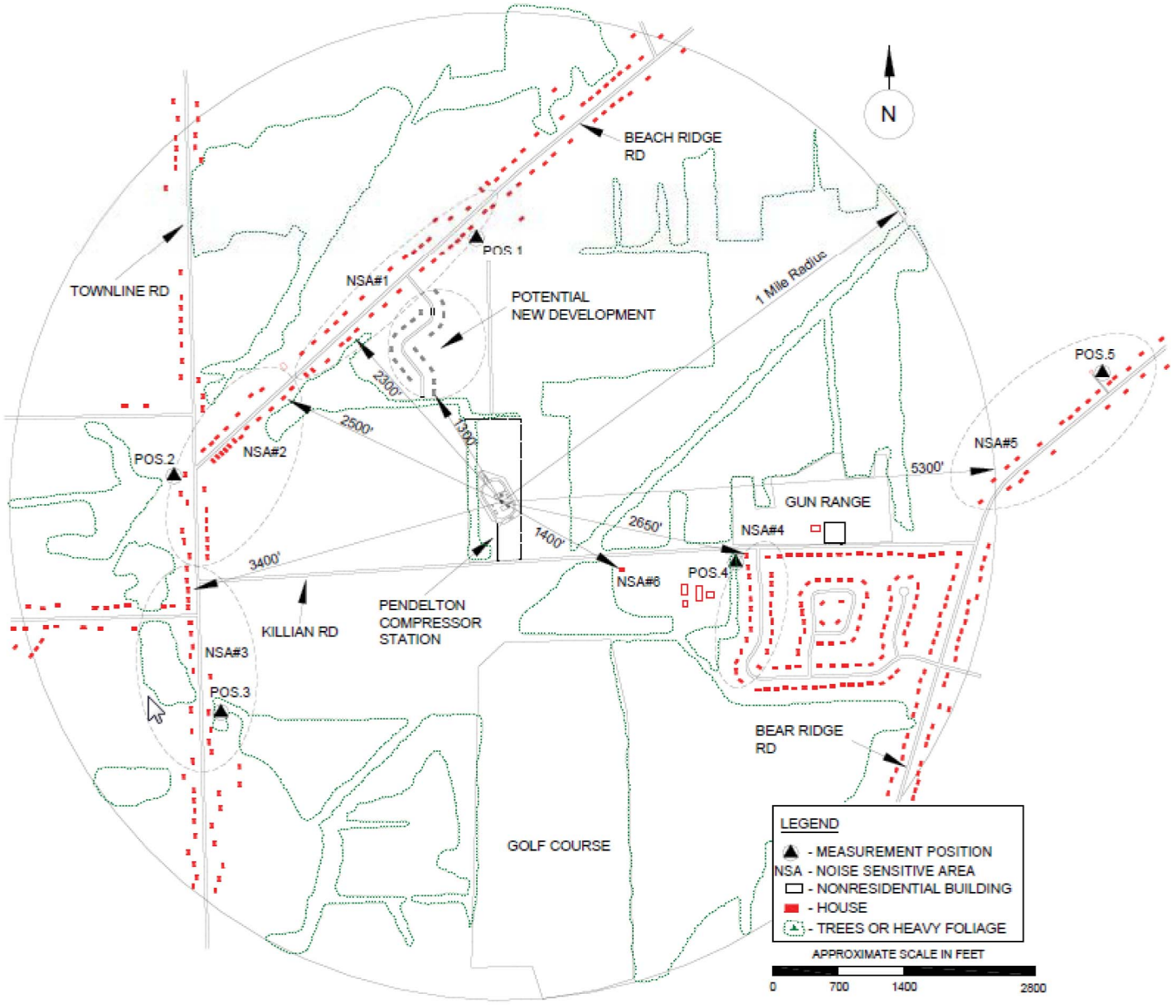
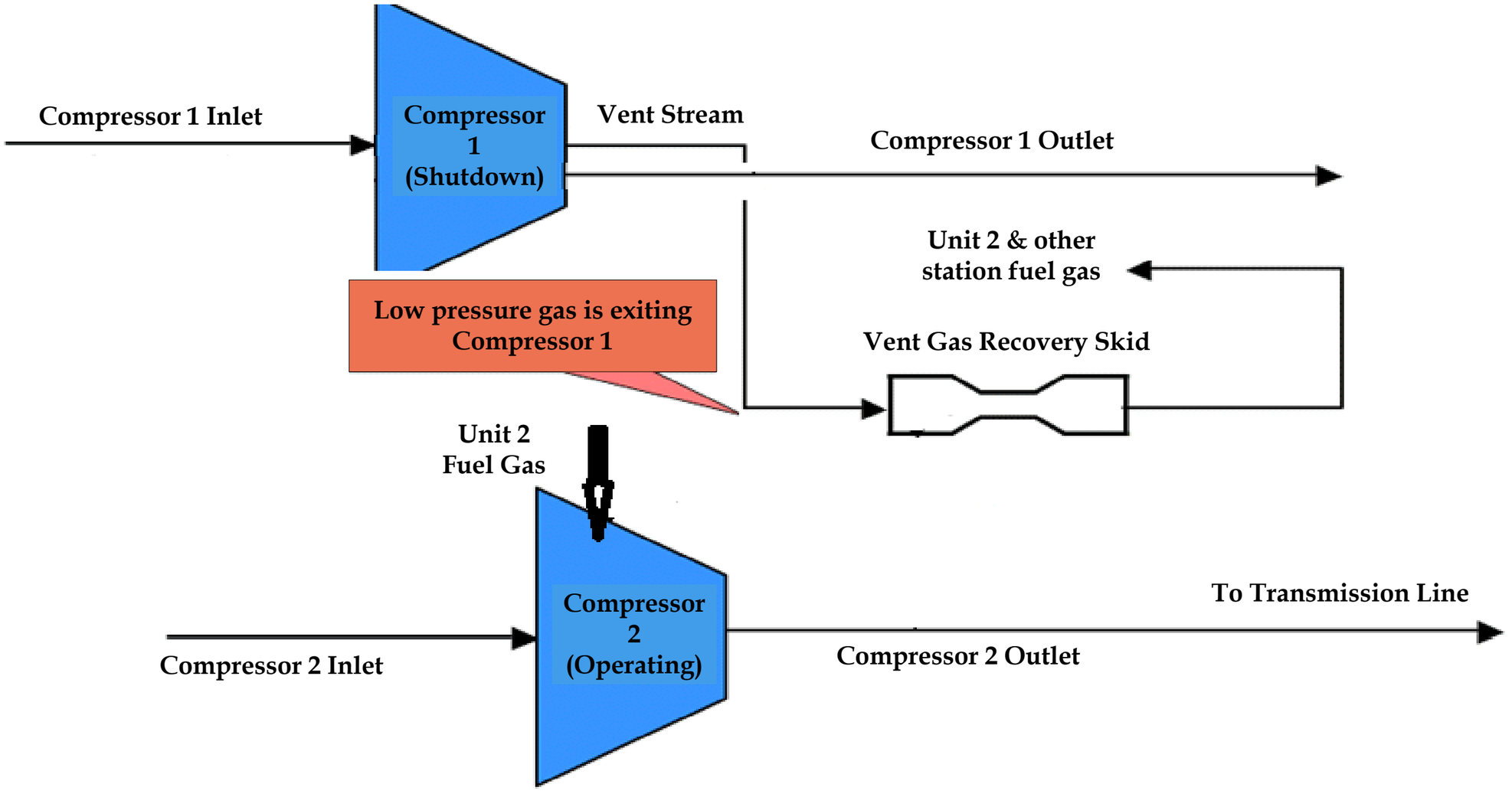
Hoover & Keith Inc. (Consultants in Acoustics) 11391 Meadowglen, Suite I Houston, Texas 77082	-- 0 --			

Proposed Pendleton Compressor Station & Surrounding Area



Methane Emission Reduction



Vent Gas Recovery

When compressors are taken out of service for operational or maintenance purposes, it is a common practice to depressurize the natural gas to the atmosphere. The above sketch depicts reducing methane emissions by routing depressurizing vent gas to other low-pressure fuel systems within the station to be consumed rather than vented to the atmosphere.

PROPOSED PENDLETON CS
EMP-03 ALTERNATE (2.01 miles)
XM10 PIPELINE
POTENTIAL ACCESS ROAD #1
POTENTIAL ACCESS ROAD #2
EXISTING NFG PIPELINE
ROAD
RAILROAD
RIVER
STREAM
PROPOSED CS BOUNDARY
PARCEL BOUNDARY
WATERBODY
WETLAND
OTHER WATERS

DOCUMENTS COMPILED UTILIZING PUBLICLY AVAILABLE GIS RESOURCES AND MINIMAL ON THE GROUND RECONNAISSANCE

NATIONAL FUEL GAS EMPIRE PIPELINE, INC. LINE EMP-03 AERIAL OVERVIEW

Feet
1,200 600 0 1,200 2,400 3,600 4,800 6,000

N W E S

REFERENCE SCALE: 1:7,200	
ABSOLUTE SCALE: 1 IN = 600 FT	
PAGE: 1 of 1	
DRAWN BY:	HMM
CHECKED BY:	HMM
APPROVED BY:	HMM
PROJECT:	337050
DATE:	10/2/2015
REV:	20150929-2436-AMS-001

National Fuel

Hatch Mott MacDonald

PROPRIETARY
NATIONAL FUEL

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PROPOSED PENDLETON CS
EMP-03 ALTERNATE (2.01 miles)
XM10 PIPELINE
POTENTIAL ACCESS ROAD #1
POTENTIAL ACCESS ROAD #2
EXISTING NFG PIPELINE
ROAD
RAILROAD
RIVER
STREAM
PROPOSED CS BOUNDARY
WATERBODY
WETLAND
OTHER WATERS

DOCUMENTS COMPILED UTILIZING PUBLICLY AVAILABLE GIS RESOURCES AND MINIMAL ON THE GROUND RECONNAISSANCE

NATIONAL FUEL GAS
EMPIRE PIPELINE, INC.
LINE EMP-03
AERIAL OVERVIEW

Feet
1,200 600 0 1,200 2,400 3,600 4,800 6,000

N W E S

DRAWN BY:	HMM
CHECKED BY:	HMM
APPROVED BY:	HMM
REFERENCE SCALE: 1:7,200	PROJECT: 337050
ABSOLUTE SCALE: 1 IN = 600 FT	DATE: 10/2/2015
PAGE: 1 of 1	REV: 20150929-2436-AMS-001

National Fuel

Hatch Mott MacDonald

PROPRIETARY
NATIONAL FUEL

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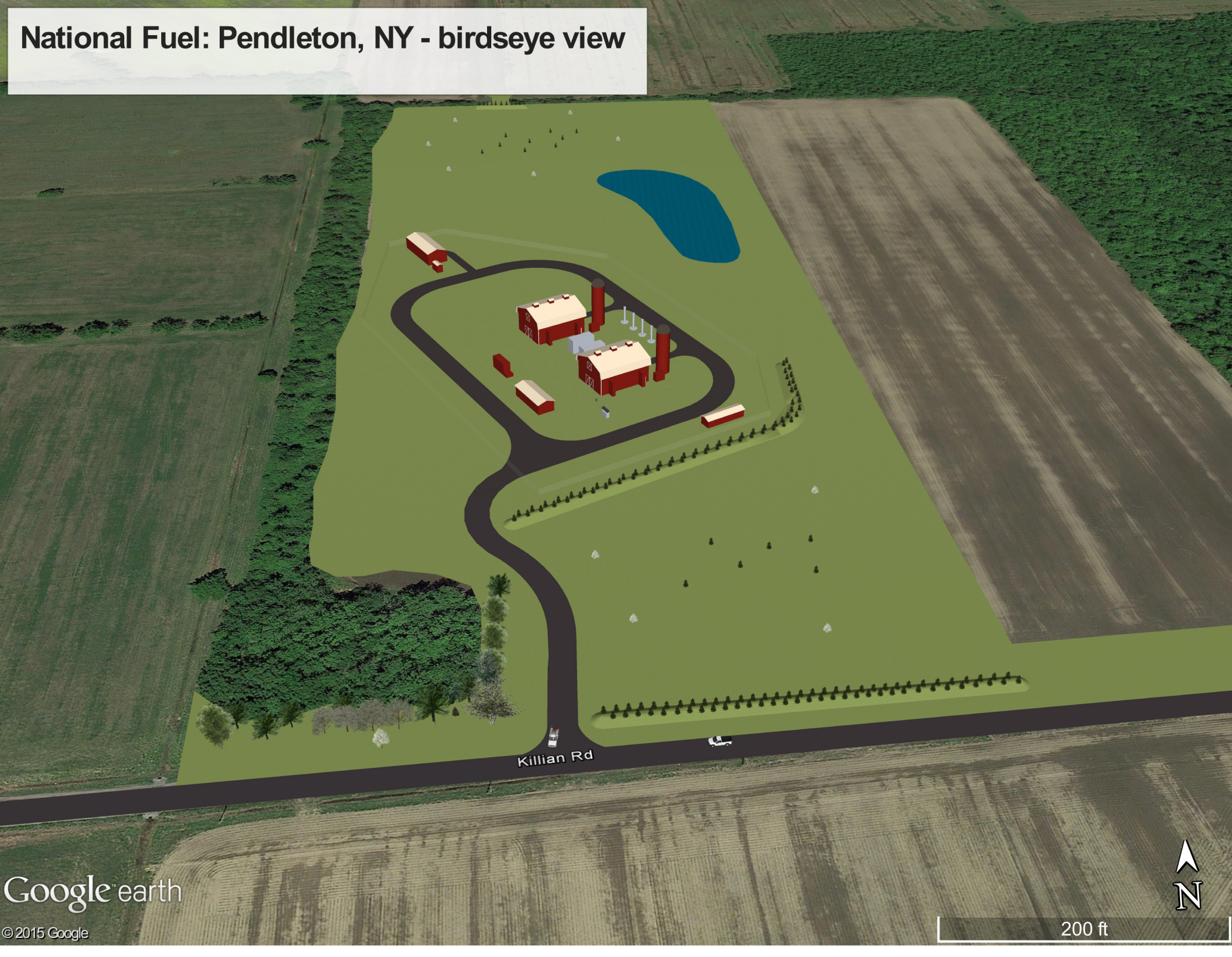
National Fuel: Pendleton, NY - birdseye view



National Fuel: Pendleton, NY - view from field near Beach Ridge Road

National Fuel: Pendleton, NY - view from Killian Road

National Fuel: Pendleton, NY - view from northwest

ENVIRONMENTAL

THREATENED & ENDANGERED SPECIES

Bat Survey

Northern Long-eared

CULTURAL RESOURCES

Prehistoric Sites

Historical Sites

STREAMS & WETLANDS

During Construction

After Installation

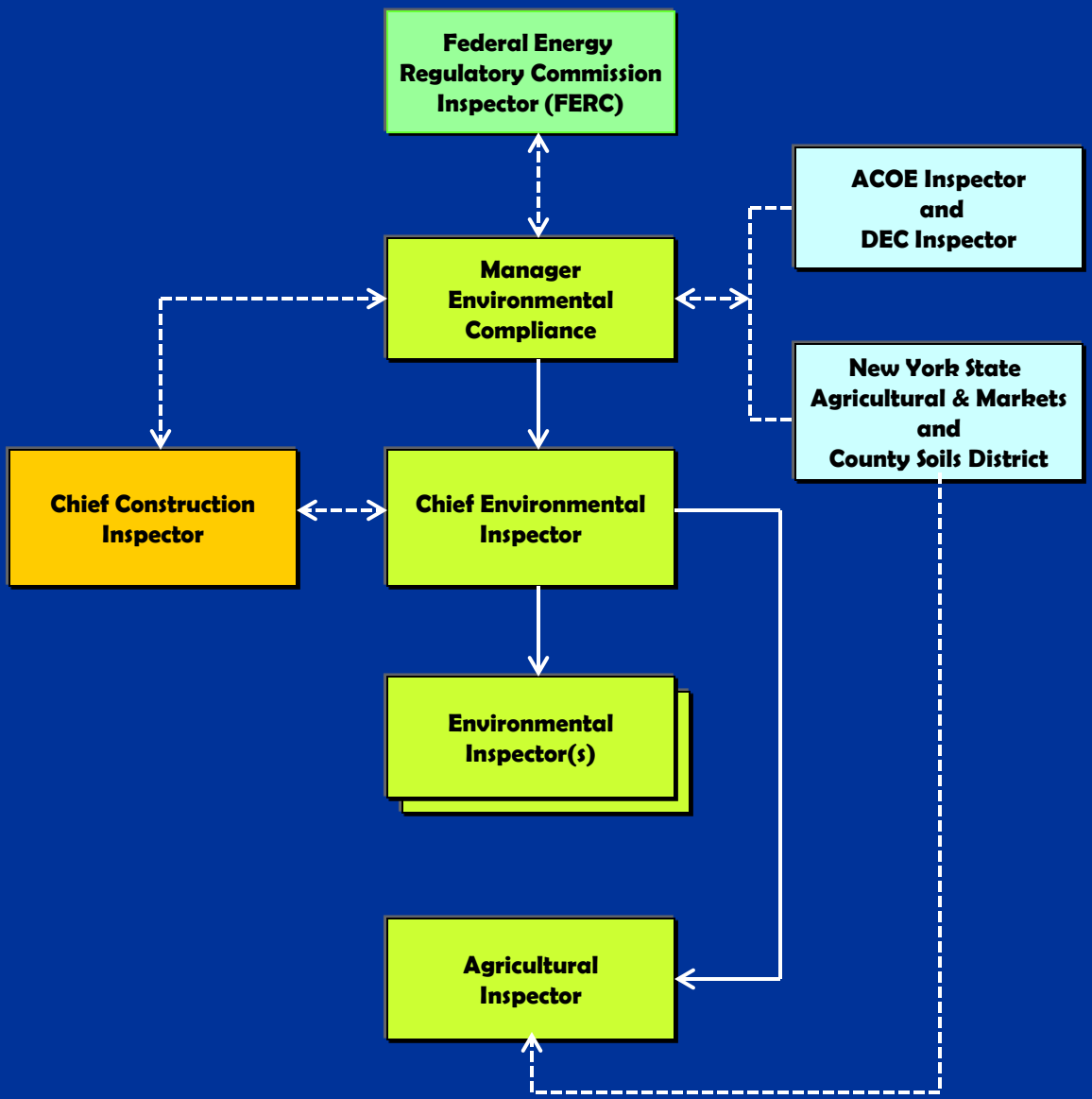
AGRICULTURAL

Topsoil Segregation

First Year Crop

ENVIRONMENTAL

ENVIRONMENTAL INSPECTION



DESIGN PRACTICES

High Strength Steel Pipe

Modern Welding Techniques

Tough Pipe Coating plus 100% Coating Inspection

Complete X-Rays of All Welds

Routing Along Existing Utility Corridors

Protective "Rockshield" Layer and/or Select Backfill

Extra Depth At Crossings

Obtain Federal, State, Local Road Permits

OPERATING & MAINTENANCE

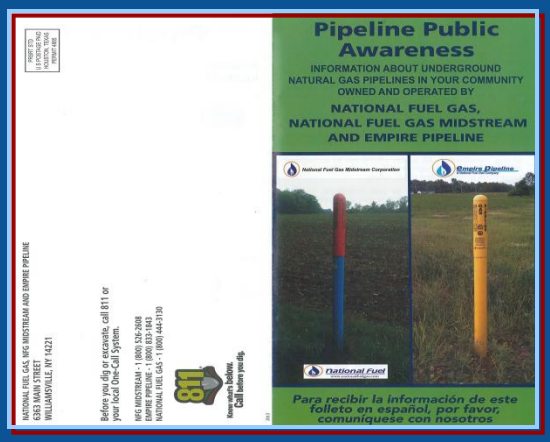
Dig Safely. New York
Call 811
before you dig

Cathodic Protection

"Call Before You Dig" Participation

Right-of-Way Patrols

Public Awareness Program



Pipe Integrity Monitoring In Line Inspection

Valve & Equipment Inspections

Pipelines Clearly Marked

Compliance With All Federal Standards

CONSTRUCTION INSPECTION