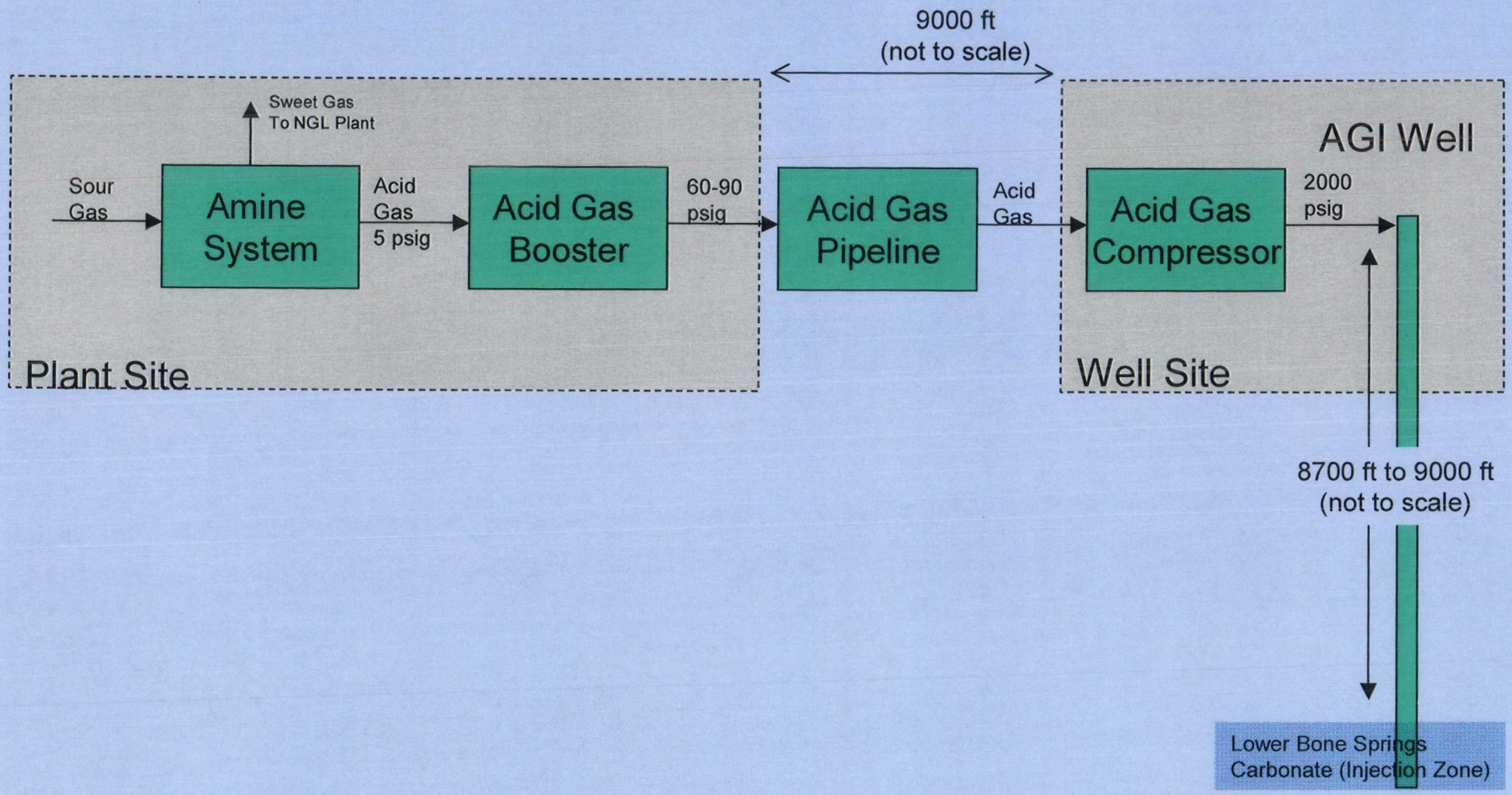
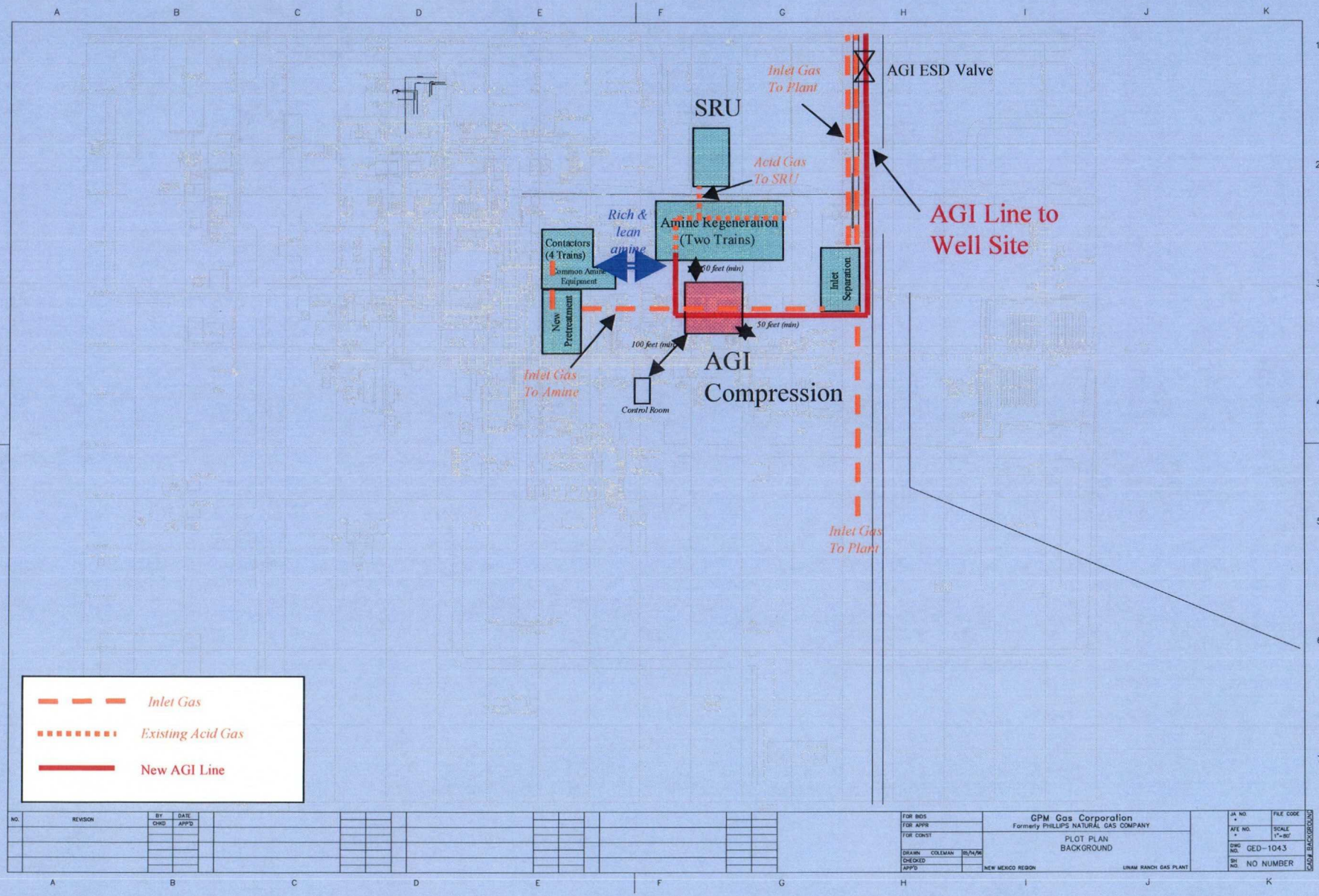
AGI Design Overview

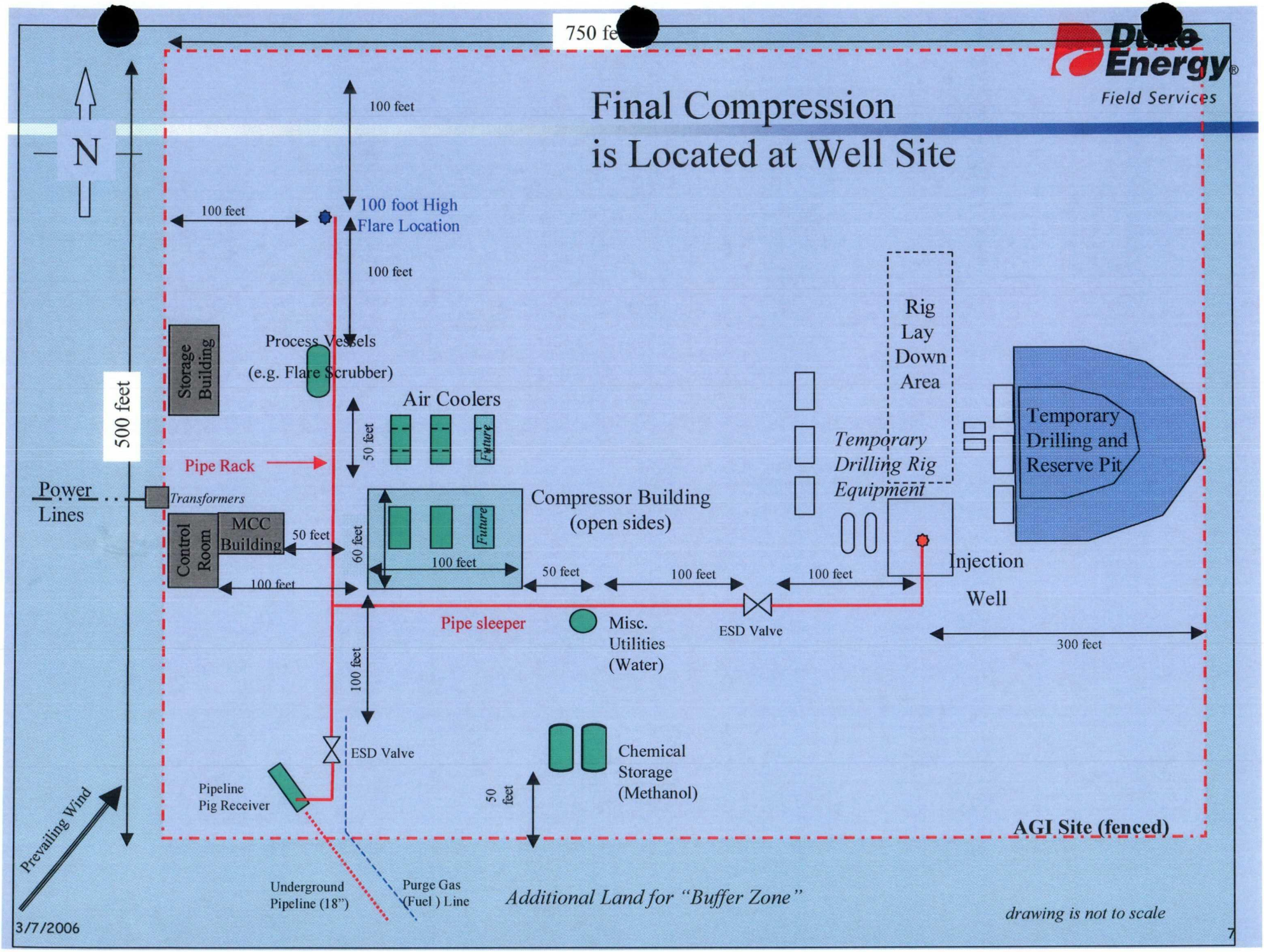
Duke Energy® Field Services



Linam Ranch AGI – Conceptual Layout at Plant

Duke Energy® Field Services




Duke Energy
Field Services
Final Compression
is Located at Well Site
750 fe
N
100 feet
100 foot High
Flare Location
100 feet
100 feet
500 feet
Storage Building
Process Vessels
(e.g. Flare Scrubber)
Air Coolers
50 feet
Future
Pipe Rack
Power
Lines
Transformers
Control Room
MCC Building
50 feet
60 feet
Compressor Building
(open sides)
Future
100 feet
100 feet
50 feet
100 feet
100 feet
Rig
Lay
Down
Area
Temporary
Drilling Rig
Equipment
Temporary
Drilling and
Reserve Pit
Injection
Well
Pipe sleeper
Misc.
Utilities
(Water)
ESD Valve
300 feet
100 feet
ESD Valve
Pipeline
Pig Receiver
Chemical
Storage
(Methanol)
50
feet
AGI Site (fenced)
Prevailing Wind
Underground
Pipeline (18")
Purge Gas
(Fuel) Line
Additional Land for "Buffer Zone"
drawing is not to scale
3/7/2006
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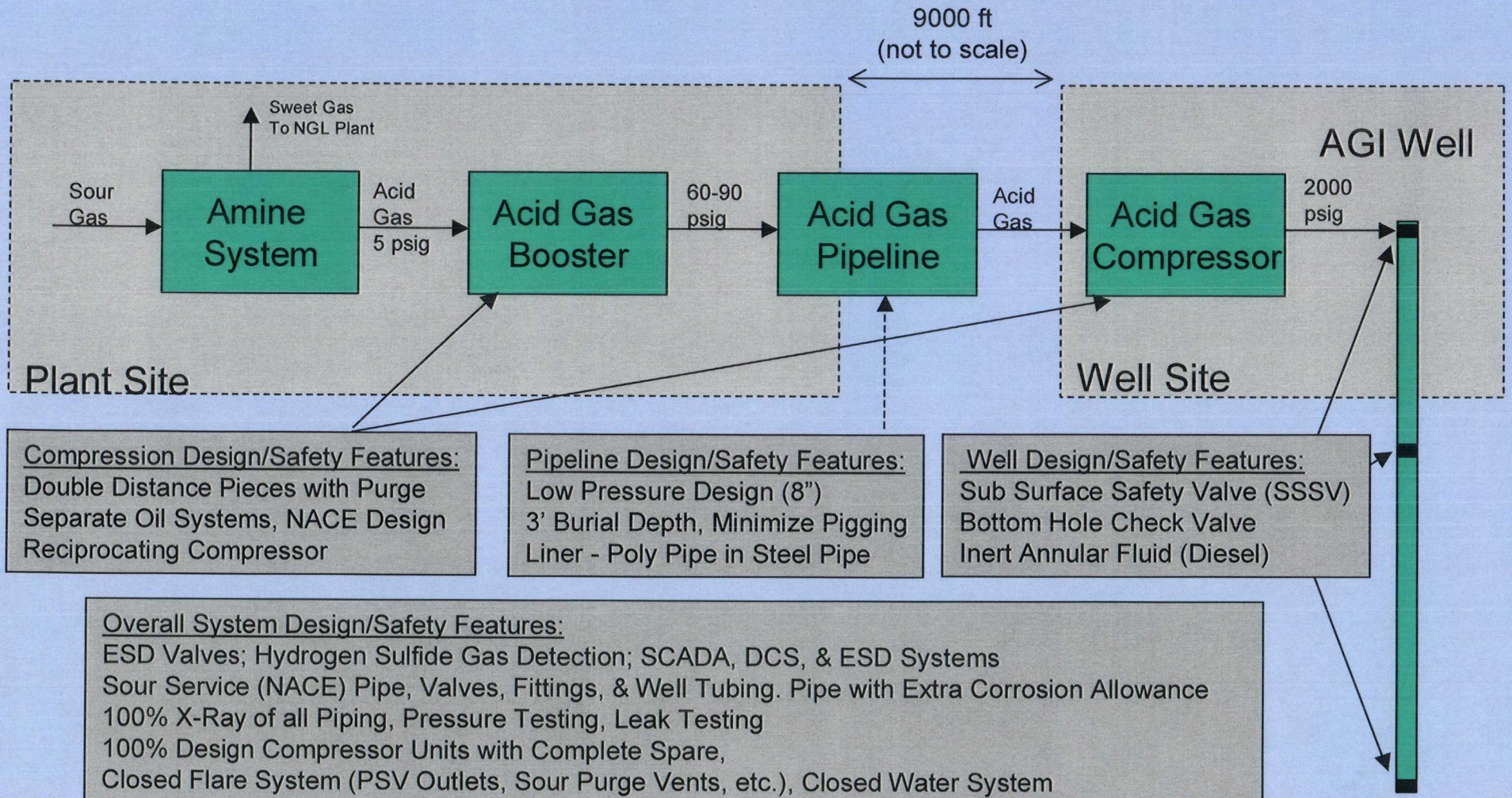
Duke Energy®
Field Services

Equipment Design and Safety

Optimum AGI Configuration

Duke Energy® Field Services

Safety, Design, & Operation



Compression Design/Safety Features:
Double Distance Pieces with Purge
Separate Oil Systems, NACE Design
Reciprocating Compressor

Pipeline Design/Safety Features:
Low Pressure Design (8")
3' Burial Depth, Minimize Pigging
Liner - Poly Pipe in Steel Pipe

Well Design/Safety Features:
Sub Surface Safety Valve (SSSV)
Bottom Hole Check Valve
Inert Annular Fluid (Diesel)

Overall System Design/Safety Features:
ESD Valves; Hydrogen Sulfide Gas Detection; SCADA, DCS, & ESD Systems
Sour Service (NACE) Pipe, Valves, Fittings, & Well Tubing. Pipe with Extra Corrosion Allowance
100% X-Ray of all Piping, Pressure Testing, Leak Testing
100% Design Compressor Units with Complete Spare,
Closed Flare System (PSV Outlets, Sour Purge Vents, etc.), Closed Water System

Compression Equipment

Duke Energy® Field Services

- Flare System
  - All Pressure Safety Valves (PSV's) to Flare
  - Continuous Pilot
- Compressor
- Piping
- Vessels & Coolers
- Electric Motor Drive
  - With Variable Frequency Drive (VFD)
  - 800 HP Plant / 1200 HP Well-Site

Compressor Set-up - Plant

Duke Energy® Field Services

- Plant Equipment 150 psig design (-20/200F suction, -20/350F discharge)
- Well Compressor
  - 150 psig to 3225 psig design (-20/200F suction, -20/350F discharge)
- Scrubber Liquids – Closed System
  - Interstage Liquids Route to Previous Stage
  - First Stage with Pump
  - Liquids to Closed System
- All Bottles, Piping, and Cooler Tubes and Headers
  - Carbon Steel, Sour Service (NACE), 100% X-Ray
  - Hydrotest by Manufacturer and Leak Test On-site

Compressor Purge

Duke Energy® Field Services

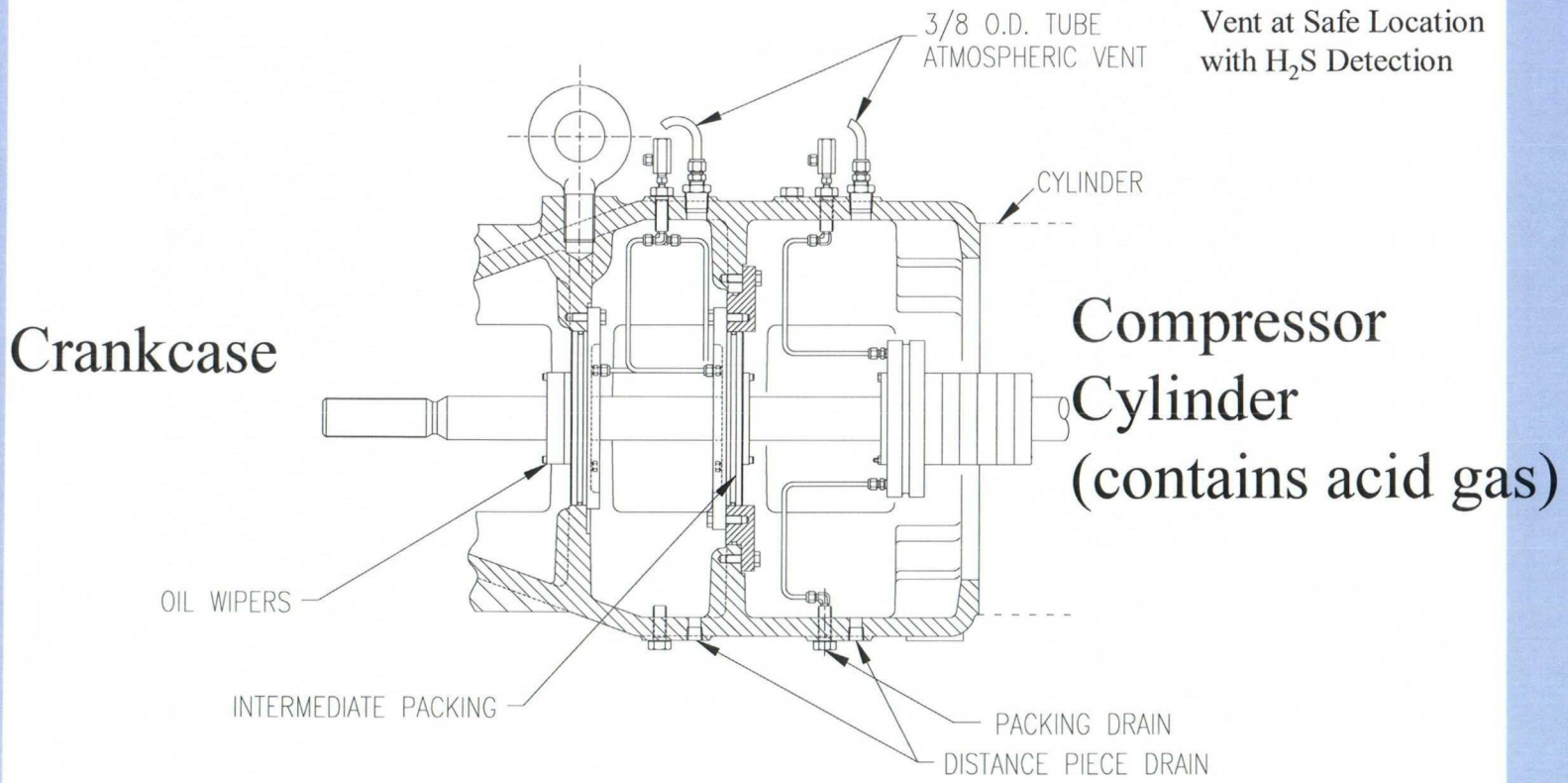
- Double Distance Piece
- Packing Rings
  - Primary Packing
  - Intermediate Packing (Distance Piece)
  - Wiper Packing
- Purged Primary and Intermediate Packing
- Overall Arrangement

AGI - Distance Pieces

Duke Energy® Field Services

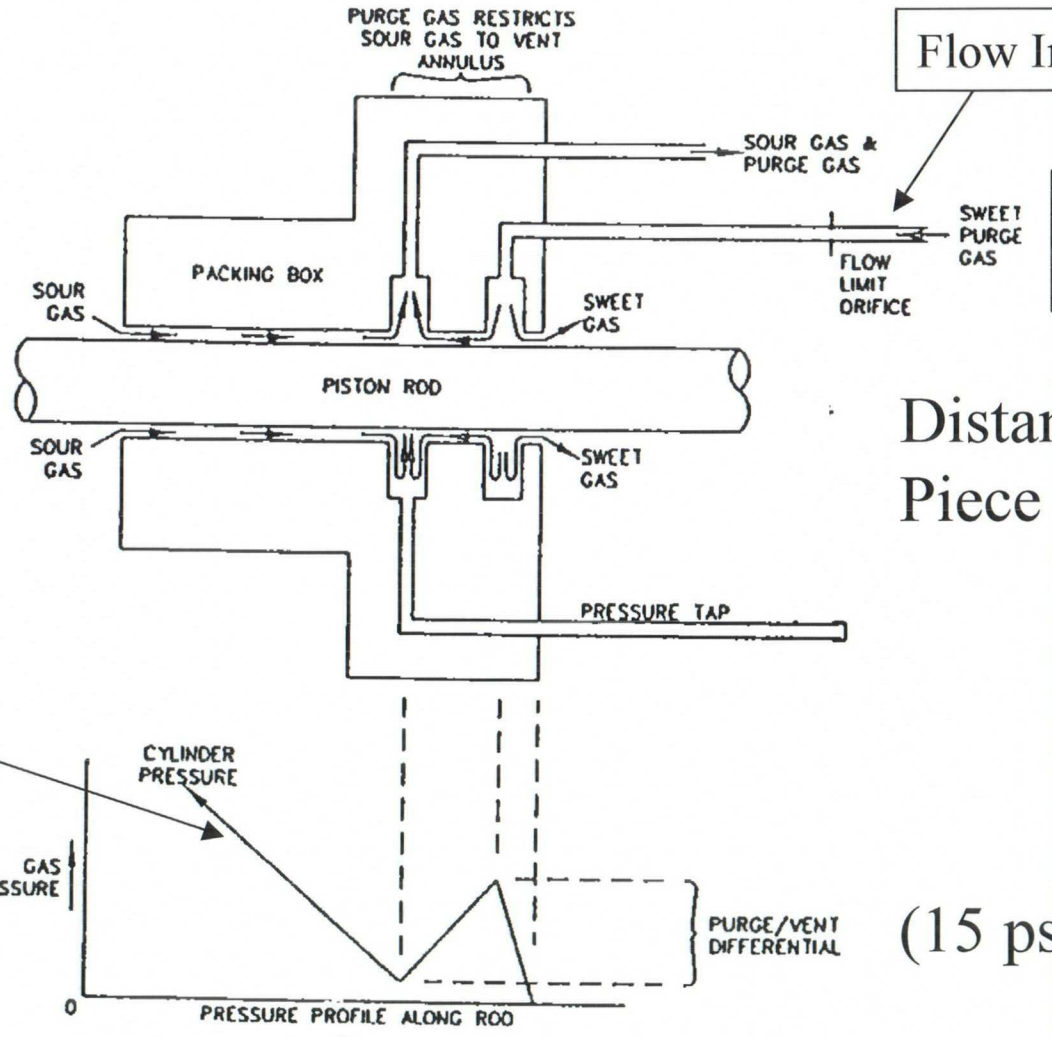
LONG TWO COMPARTMENT
DISTANCE PIECE

API 11P TYPE 3
API 618 TYPE C



Packing – Pressure Profile

Duke Energy® Field Services



Flow Indicators

Supply Regulator Set @ 20 psig

Cylinder Side

Distance Piece Side

Note: 95% of Pressure Loss is across 1st Packing Ring
6 total sets rings

(15 psig minimum)

Lubrication

Duke Energy®
Field Services

- Two Separate Oils – Minimize Sour Contamination
- Crankcase Oil
- Cylinder Oil
  - Supplied to Cylinders
  - Supplied to Packing
    - Pressure Packing
    - Intermediate Packing
    - Wiper
  - Flushing Oil Supplied to Gas at Inlet to Valves

Piping

Duke Energy® Field Services

- Industry Specifications and NACE MR-0175 Compliance for Sour Service
- DEFS Specifications or Requirements
  - Welded Connections on Small Lines
  - 100% X-Ray of Welds
  - Greater Piping Wall Thickness versus Industry Specifications (Many Typical Line Sizes)
  - Ring Joint Flanges on 1500/2500 ANSI Pipe
- Paint Color (Yellow for Sour Gas Line Visibility)
- Hydrotest all Piping
- Leak Test all Piping

Pipeline Design

Duke Energy® Field Services

- Eight-Inch Diameter, 9000 feet length
- Low Pressure Operation 60 to 80 psig
  - Design for 150 psig (minimum)
  - Design in extra Wall Thickness (corrosion)
- Carbon Steel Sour Service (NACE) Design
- High Density Polyethylene (HDPE) Liner
  - Corrosion Resistant
  - Leak Monitoring Connections between Liner/steel Pipe
- Hydrotest Line, Leak Test Line

Pipeline - External

Duke Energy® Field Services

- External Corrosion Prevention
  - Coat & Wrap Line
  - Cathodic Protection
- Burial Depth below 3 feet
- Line Survey/Patrol
  - approx. 2 week intervals
- Pipeline Markers
- Other Lines
  - Fuel Supply Line (Steel)
  - and Water Disposal Line (Steel with HDPE Liner)

Instruments and Controls

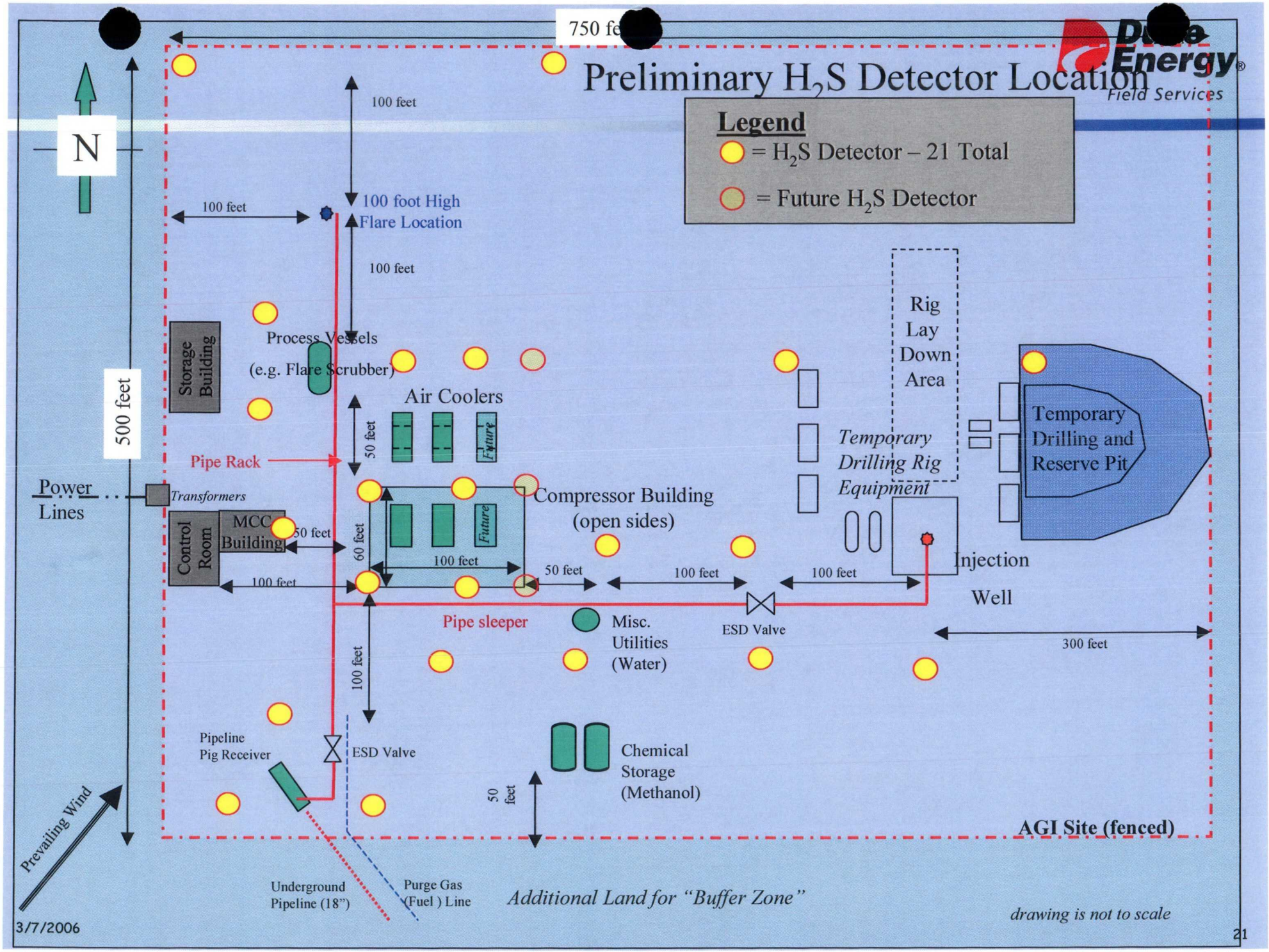
Duke Energy® Field Services

- Hydrogen Sulfide Detection
- Acid Gas Measurement
  - Acid Gas Plant Flow to Compressor, SRU, and Flare
  - Acid Gas to/from Pipeline and to Well
- Compressor Control and ESD System
  - Compressor Alarm and Shutdown
  - Emergency Shutdown (ESD) Valves
  - Pumps Start/Stop and Alarms
- Distributed Control System (DCS)
  - Key Plant Controls (Pressure & Temperature Control)
- Wellhead Control Panel

Controls (Continued)

Duke Energy® Field Services

- Emergency Shutdown (ESD) Valves
  - Well-Site Inlet
  - Compressed Gas to Well
  - Automatic Fail Closed Valves
- Wellhead Control Panel Controls
  - Subsurface Safety Valve (SSSV)
  - Master Valve
  - Wing Valve
  - Fail Safe Panel Design


Preliminary H_2S Detector Location
Duke Energy Field Services
Legend
= H_2S Detector – 21 Total
= Future H_2S Detector
750 fe
N
100 feet
100 foot High Flare Location
100 feet
100 feet
500 feet
Storage Building
Process Vessels
(e.g. Flare Scrubber)
Air Coolers
50 feet
Future
Pipe Rack
Power Lines
Transformers
Control Room
MCC Building
50 feet
100 feet
60 feet
Compressor Building (open sides)
Future
100 feet
50 feet
100 feet
100 feet
Rig Lay Down Area
Temporary Drilling Rig Equipment
Temporary Drilling and Reserve Pit
Injection Well
Pipe sleeper
Misc. Utilities (Water)
ESD Valve
300 feet
100 feet
Pipeline Pig Receiver
ESD Valve
Chemical Storage (Methanol)
50 feet
Prevailing Wind
AGI Site (fenced)
Underground Pipeline (18")
Purge Gas (Fuel) Line
Additional Land for "Buffer Zone"
drawing is not to scale
3/7/2006
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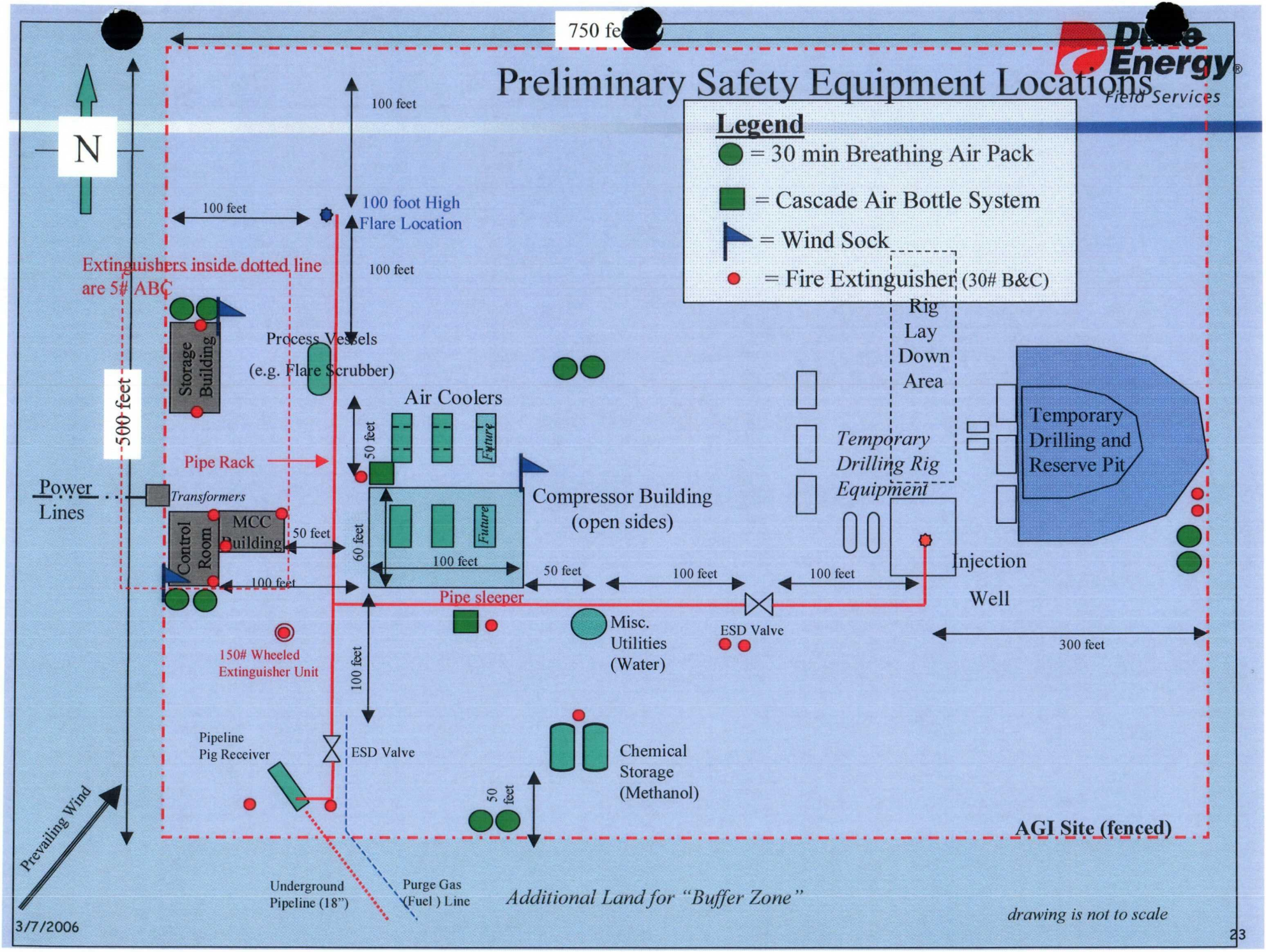
Safety Equipment

Duke Energy®
Field Services

- All Required Safety Equipment
  - OCD Rule 118, API RP-55, & OSHA Regulations
- Windsocks
- Breathing Air Packs
- Breathing Air System (Cascade Air Bottles)
- Typical Equipment
  - First Aid Kits, Eye Wash Stations, etc.
  - Fire Extinguishers


Preliminary Safety Equipment Locations
Duke Energy Field Services
750 fe
N
Legend
= 30 min Breathing Air Pack
= Cascade Air Bottle System
= Wind Sock
= Fire Extinguisher (30# B&C)
100 feet
100 foot High Flare Location
100 feet
100 feet
Extinguishers inside dotted line are 5# ABC
500 feet
Storage Building
Process Vessels (e.g. Flare Scrubber)
Air Coolers
50 feet
Future
Pipe Rack
Power Lines
Transformers
Control Room
MCC Building
50 feet
60 feet
Compressor Building (open sides)
Future
100 feet
100 feet
Rig Lay Down Area
Temporary Drilling Rig Equipment
Temporary Drilling and Reserve Pit
50 feet
100 feet
100 feet
Injection Well
Pipe sleeper
Misc. Utilities (Water)
ESD Valve
300 feet
150# Wheeled Extinguisher Unit
100 feet
Pipeline Pig Receiver
ESD Valve
Chemical Storage (Methanol)
50 feet
AGI Site (fenced)
Prevailing Wind
Underground Pipeline (18")
Purge Gas (Fuel) Line
Additional Land for "Buffer Zone"
drawing is not to scale
3/7/2006
23

Summary

Duke Energy® Field Services

- Design Features – Primary Safety Features
  - Compressors, Piping and Equipment, Pipeline, and Well
  - Meet all requirements of OCD Rule 118 & API RP-55
- Secondary Features – Pressure & Leak Testing
- Third Level -
  - Instrumentation, Purges, etc.
  - Alarms and Shutdowns
  - Plant Operators, Operating Procedures, and Training
- Fourth Level Features
  - Hydrogen Sulfide Monitors
  - Alarm and Shutdown Injection
  - H_2S Contingency Plan
- Safe Design so we can all sleep at night

Linam Ranch Gas Plant

Duke Energy®
Field Services

Acid Gas Injection

Design and Safety Features Review

Duke Energy®
Field Services

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 13589 Exhibit No. 13
Submitted by:
DUKE ENERGY FIELD SERVICES, LP
Hearing Date: March 13, 2006

Summary – AGI Design/Safety

Duke Energy® Field Services

Linam Ranch AGI

- Design Features – Primary Safety Features
  - Compressors, Piping and Equipment, Pipeline, and Well
- Secondary Features – Pressure & Leak Testing
- Third Level Features -
  - Instrumentation, Purges, etc.
  - Alarms and Shutdowns
  - Plant Operators, Operating Procedures, and Training
- Fourth Level Features
  - Hydrogen Sulfide Monitors
  - Alarm and Shutdown Injection
  - H_2S Contingency Plan
- Safe Design so we can all sleep at night

Duke Energy®
Field Services

Project Overview of Acid Gas Injection

Project Overview

Duke Energy® Field Services

Scope:

- Drill/Complete injection well in Lower Bone Springs formation (~8,700')
- Install 2-stage 800 HP electric-drive compressor(s) at Linam Ranch Plant
- Install 8-inch diameter acid gas pipeline with HDPE liner, 9000 feet to well-site
- Install 4-stage injection unit(s) @ well-site
- Inject H_2S/CO_2 stream into well
- Idle Existing sulfur recovery plant

Drivers:

- Improve Overall Safety for DEFS and Public
- Increase Plant Reliability for Customers
- Environmental Concerns
  - Reduce SO_2 Emissions
  - Sequester CO_2
- Age & Capability of Existing SRU