



NATIONAL INSTITUTES OF HEALTH COGENERATION PROJECT

2010 CHP Partnership Meeting



Pepco Energy Services
1300 North 17th St.
Suite 1600
Arlington, VA 22209
PepcoEnergy.com

November 2, 2010

Pepco Energy Services, Inc.

Overview

Pepco Energy Services, Inc.

- Diversified Energy Services Company
 - Implement variety of energy projects
 - Build/own/operate/finance CHP plants
- \$2.3 billion 2009 Revenue
- 490+ employees
- Unregulated Subsidiary of Pepco Holdings, Inc.

Pepco Holdings, Inc.

- Investment grade rating
 - \$15.8 billion Assets
 - \$4.3 billion Net Worth
 - \$9.3 billion 2009 Revenue

1 Rated MD DGS

More than \$850 million
in projects since 1995

Experience in PA, VA,
NC, NY, D.C., NJ, MD

Full-service ESCo

NAESCO Accredited
in 2006

NAESCO Re-accredited
in 2007

Over 100-year history



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Background & Overview

- Bethesda, Maryland
 - NW of Washington, DC
- Medical Research and Hospital
 - 27 Institutes
- 75 Buildings
 - Laboratories
 - Research hospital rooms
 - Teaching facilities
 - Offices
- 9 Million sq.ft. on 300 Acres
- 15,000 Employees



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Project Drivers

- Over 1 M sq.ft. expansion
 - New steam capacity required to meet master plan
- Air Quality
 - Close proximity to neighborhoods
- Efficiency Improvement
- Existing NIH Central Plant
 - 5 Dual Fired Boiler Units
 - 800,000 pph Steam
 - 60,000 Tons Chiller Capacity
 - Steam Driven Auxiliary Capable

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Challenges

- No Disruption to NIH Central Plant
- No Disruption to NIH Mission
- Extremely Congested
 - Limited Lay Down Area
- Relocation of existing natural gas service
- NIH Required No Ammonia Based SCR



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Technical Solution – Major Equipment

- GT 10B Gas Turbine: 23 MW
 - Inlet Air Cooling System
- Applied Thermal Systems (ATS) Heat Recovery Steam Generator (HRSG)
 - 100,000 pph Steam
 - 165 psig
- Coen Auxiliary Duct Burner
 - Dual Fuel
 - 80,000 pph Steam



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Technical Solution – Major Equipment

- Toromont 1,200 Hp Gas Compressor
- Air Inlet Cooling System



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Technical Solution – Electrical Interconnection

- Major Electrical Equipment
 - New Circuit Breakers
 - Metering
 - Relay Protection
 - Isolation Transformer
- Interconnection
 - New Duct Bank
 - Complex Tunnel & Shoring



- Alstom AEV Combustion System
 - 1st 10 B Model with with AEV dry-NOx burner system
 - Continuous Emissions Monitoring System



Basic combustion kinetics

ALSTOM

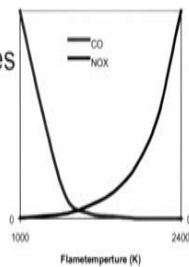
ALSTOM

Hydro Carbon combustion in air

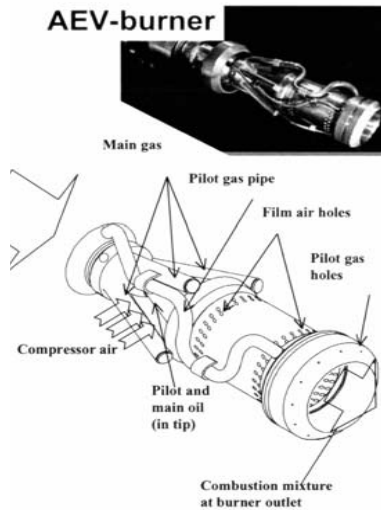


HEAT

NOx formation in high temp. flames



AEV-burner



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Technical Solution – Natural Gas Line Relocation

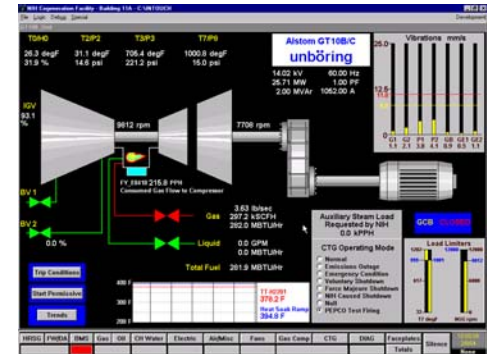
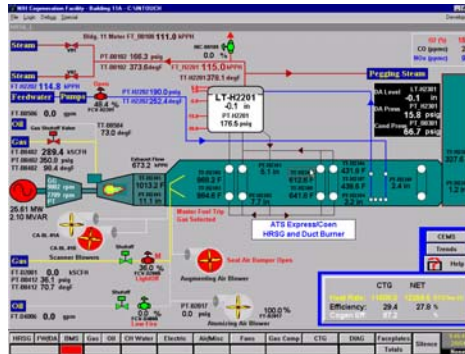
- Temporary gas pilot system Used to Keep CUP on line during relocation.
- 150,000 pph Temporary Boiler Capacity



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Ongoing CHP Plant Operations

- Guarantees:
 - Production
 - Availability
 - Efficiency
 - Emissions
- 24 Hour/Day Staffing
 - 1 Plant Manager
 - 4 Full Time Operators
 - 1 Instrument Control Technician
- Major Modifications & Upgrades



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Project Contract & Economics

- Implemented through a Utility Energy Services Contract (UESC)
 - Guaranteed performance
 - PES Operate and Maintain CHP
 - 10 Year term
 - 3rd Party Financed
 - 15 Year financed term
- Total Project Cost: \$38M
- Energy Savings pay for project over the financed term

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Project Acceptance Testing & Verification

- Emissions Requirements
 - MDE Required Testing
 - NO_x
 - SO₂
 - NIH Required Testing
 - CO
- Performance Requirements
 - CT Only-Firing Gas-24 Hour Test
 - Net Electric Output (NEO)
 - Net Steam Output (NSO)
 - Net Heat Rate (NHR)
 - CT Auxiliary Burner-Firing Gas- 3 Hour Test
 - Net Steam Output (NSO_{gas})
 - CT Auxiliary Burner-Firing Oil-3 Hour Test
 - Net Steam Output (NSO_{oil})

- Noise
 - Near Field
 - Far Field
 - No Detectable Increase at NIH Property Line + 400'
 - Start Up/Full Load/Shutdown
- Seven-Day Availability
- Operation at Full Load for Seven Days
- Comply with Emissions

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Project Acceptance Testing & Verification - RESULTS

Guarantee:

Emissions

NOx: 12ppmdv
SO2: 0.16 lb/hr
CO: 10 ppmdv

Performance

NEO: 21,725 kW
NHR: 12,303 BTU/kwh
NSO: 104,900 pph
NSOgas: 180,000 pph
NSOoil: 180,000 pph

Noise

Noise: 45 dB(A) @ Property Line

Availability

Seven Day Availability: Pass

Result:

Emissions

NOx: 10 ppmdv
SO2: 0.08 lb/hr
CO: 8 ppmdv

Performance

NEO: 22,115 kW
NHR: 12,207 BTU/kwh
NSO: 107,434 pph
NSOgas: 180,688 pph
NSOoil: 181,000 pph

Noise

Noise: 43 dB(A)

Availability

Seven Day Availability: Pass

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Project Highlights

- Guaranteed Energy Efficiency
- Guaranteed 94% Availability
 - Annual kWh & Steam Production
- Most Effective Reduction of NOx Emissions w/o a scrubber by a commercially available Combustion Turbine in 2004
- Construction Highlights
 - Over 100,000 Manhours w/o a Lost Time Accident
 - No major disruptions to NIH Operations

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Placement of the Turbine Generator



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Placement of the HRSG Modules



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Installation of the Building Shell



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Cogeneration Plant



Contact Information

Bob Albertini
Pepco Energy Services
1300 N. 17th Street
Arlington, VA 22209
1.708.482.4896
balbertini@pepcoenergy.com
www.pepcoenergy.com