88 MW Simple Cycle Combustion Turbine - Application for Certificate of Site Compatibility

PU-11-631

Project Overview

Alan Welte - Director of Generation

MONTANA-DAKOTA UTILITIES CO.
A Division of MDU Resources Group, Inc.
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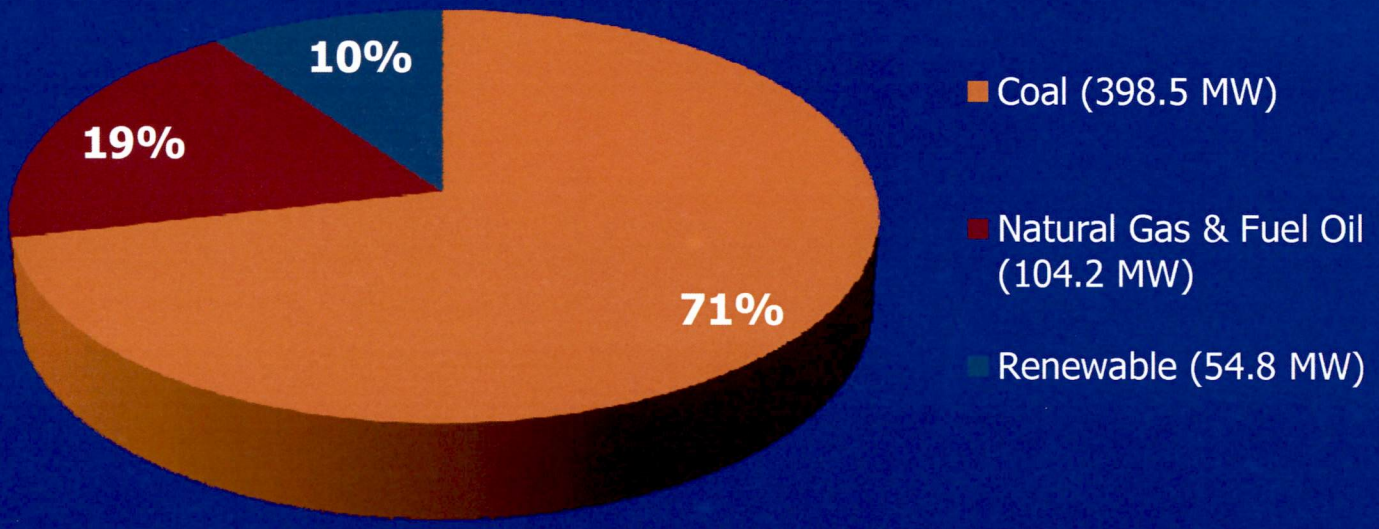
Montana-Dakota Generation Overview

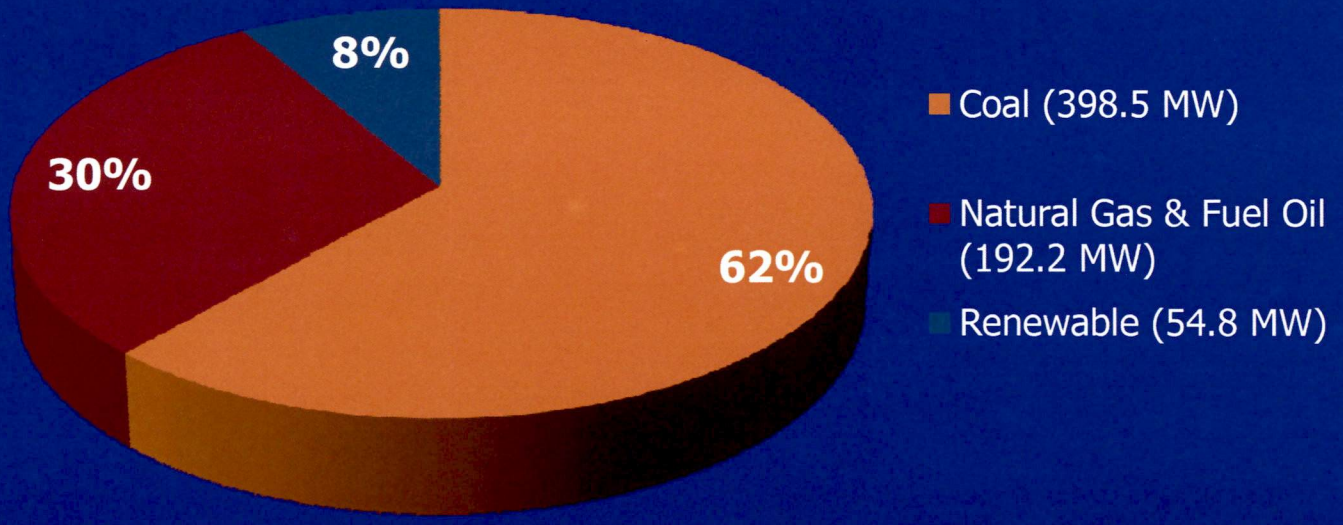
Name	Location	Ownership %	Operator	Net Output MW $_{GVTC}$	Fuel Type(s)	Peaking or Baseload
Coyote	Beulah, ND	25%	Otter Tail Power	106.8	Lignite	Baseload
Big Stone	Big Stone City, SD	22.7%	Otter Tail Power	108.6	Sub-bitum.	Baseload
Heskett 1	Mandan, ND	100%	Montana-Dakota	29.5	Lignite	Baseload
Heskett 2	Mandan, ND	100%	Montana-Dakota	74.8	Lignite	Baseload
Lewis & Clark	Sidney, MT	100%	Montana-Dakota	53.1	Lignite	Baseload
WYGEN 3	Gillette, WY	25%	Black Hills Power	25.7	Sub-bitum.	Baseload
Glendive 1	Glendive, MT	100%	Montana-Dakota	34.8	NG & Oil	Peaking
Glendive 2	Glendive, MT	100%	Montana-Dakota	40.1	NG & Oil	Peaking
Miles City	Miles City, MT	100%	Montana-Dakota	23.6	NG & Oil	Peaking
3 - Portables		100%	Montana-Dakota	5.7	Diesel	Peaking
Diamond Willow	Baker, MT	100%	Montana-Dakota	30	Wind	Intermittent
Cedar Hills	Rhame, ND	100%	Montana-Dakota	19.5	Wind	Intermittent
Glen Ullin CS-6	Glen Ullin, ND	100%	ORMAT	5.3	REG	Baseload
				557.5		

Montana-Dakota
Existing Generation Mixture



Generator Verification Test Capability Values

Montana-Dakota Generation Mixture Including 88 MW Combustion Turbine



Generator Verification Test Capability Values

88 MW Combustion Turbine **Determination of Need**

Integrated Resource Plan (IRP)

- Considers resource options available to meet end-use customer's demand for electricity
- Integrates load forecast, demand and supply side analysis, and risk to determine a future resource plan
- 2011 IRP identified the need for capacity and determined the resources to meet the need

88 MW Combustion Turbine **Determination of Need**

2011 IRP

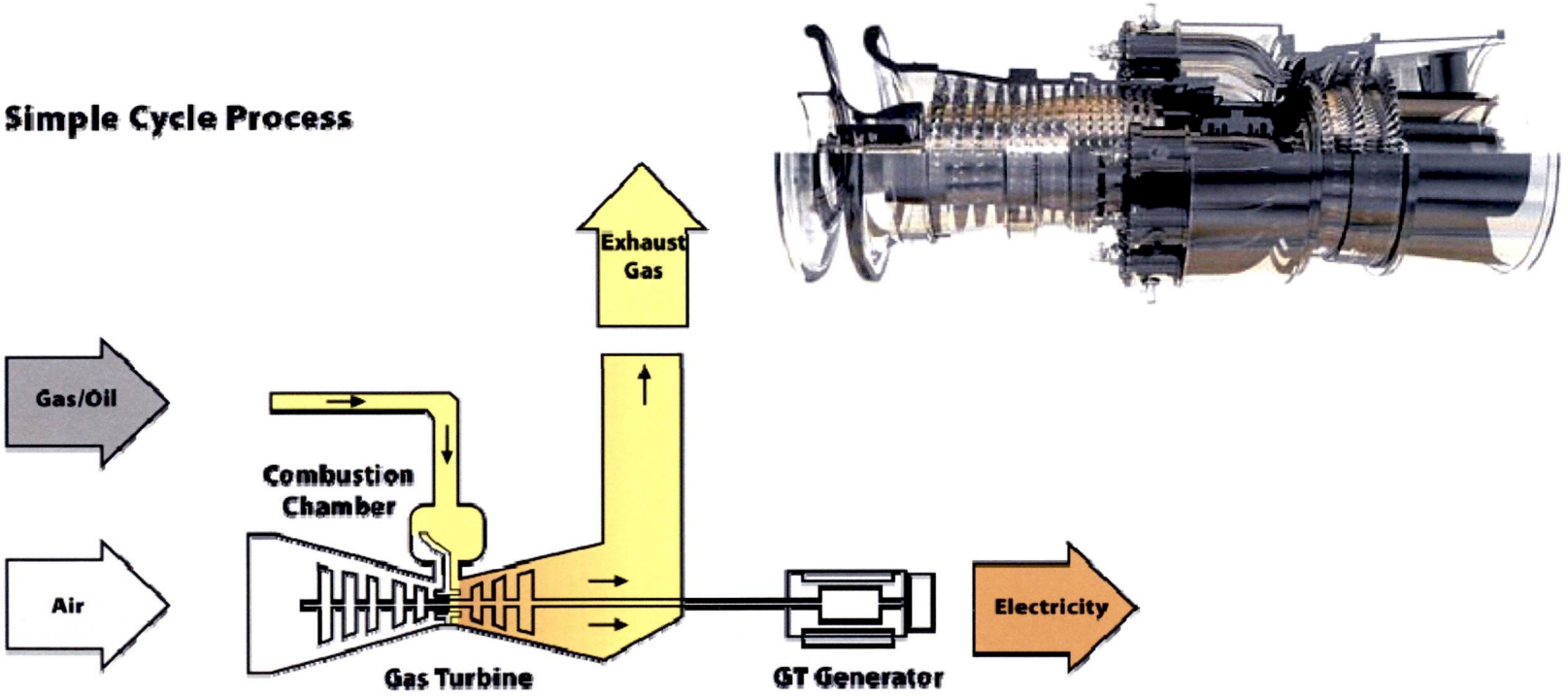
- 88 MW CT selected from supply side resource alternatives (including other CT types)
- Capital and O&M costs, emissions controls, gas pressure required, on-site maintenance, cold weather operation, and company experience were considered in 88 MW CT selection

88 MW Combustion Turbine
Site Selection

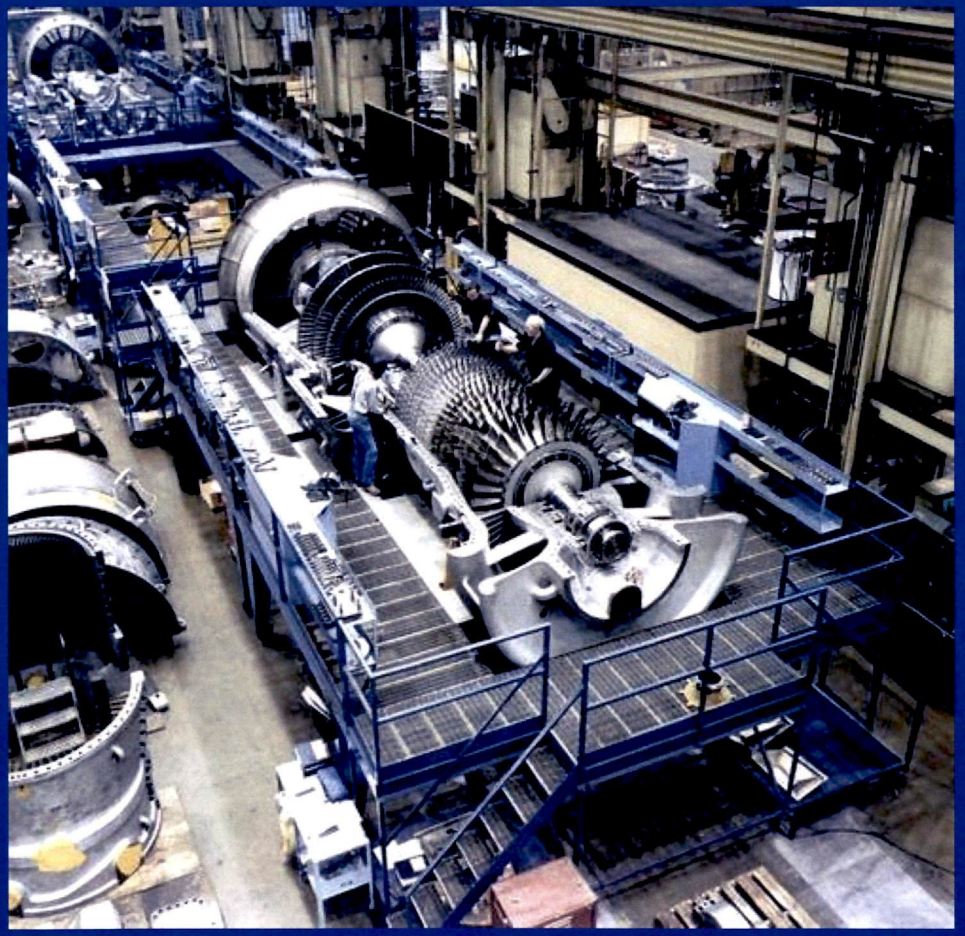
- Locations in MT, SD, and ND screened with Richardton, Linton, and Mandan, ND selected for final consideration
- Sites evaluated for natural gas supply, electric transmission, water supply, environmental permitting, and synergies with existing generating facilities
- Mandan site selected - Lowest capital cost, highest capacity, and lowest operating costs

Heskett Station Site

Simple Cycle Combustion Turbine



General Electric 7EA Combustion Turbine



Equipment Design

- General Electric 7EA heavy duty Simple cycle combustion turbine
- Natural gas-fired
- 88 MW at average ambient site conditions
- DLN 1+, Dry Low NOx Combustion System
- Evaporative inlet air cooling for power augmentation
- Closed cooling water system

Equipment Design

- Totally enclosed water-to-air cooled generator
- Interconnection to Heskett 115 kV substation
- 24 mile natural gas pipeline for interconnect to Northern Border System
- Operation integrated with Heskett Station and General Office Control Center

Combustion Turbine Project Activities

- Preliminary design engineering completed
- Site survey and geo-tech. investigation completed
- Turbine / generator equipment
  - Contract executed - December 9, 2011
  - Full notice to proceed – April 20, 2012
  - Detailed design in progress
- ND PSC ADP / CPCN final order – April 11, 2012

Combustion Turbine Project Activities

- Air Permit to Construct
  - Application Filed – May 4, 2012
  - Modeling & Emissions calculations updated – October & November, 2012
  - Application Deemed Complete – Nov. 7, 2012
  - Anticipate Permit to Construct to be submitted for public comment soon
- MISO Generator Interconnect Agreement
  - Executed – July 30, 2012
  - FERC confirmation of final action – September 27, 2012

Combustion Turbine Project Activities

Engineering and Procurement

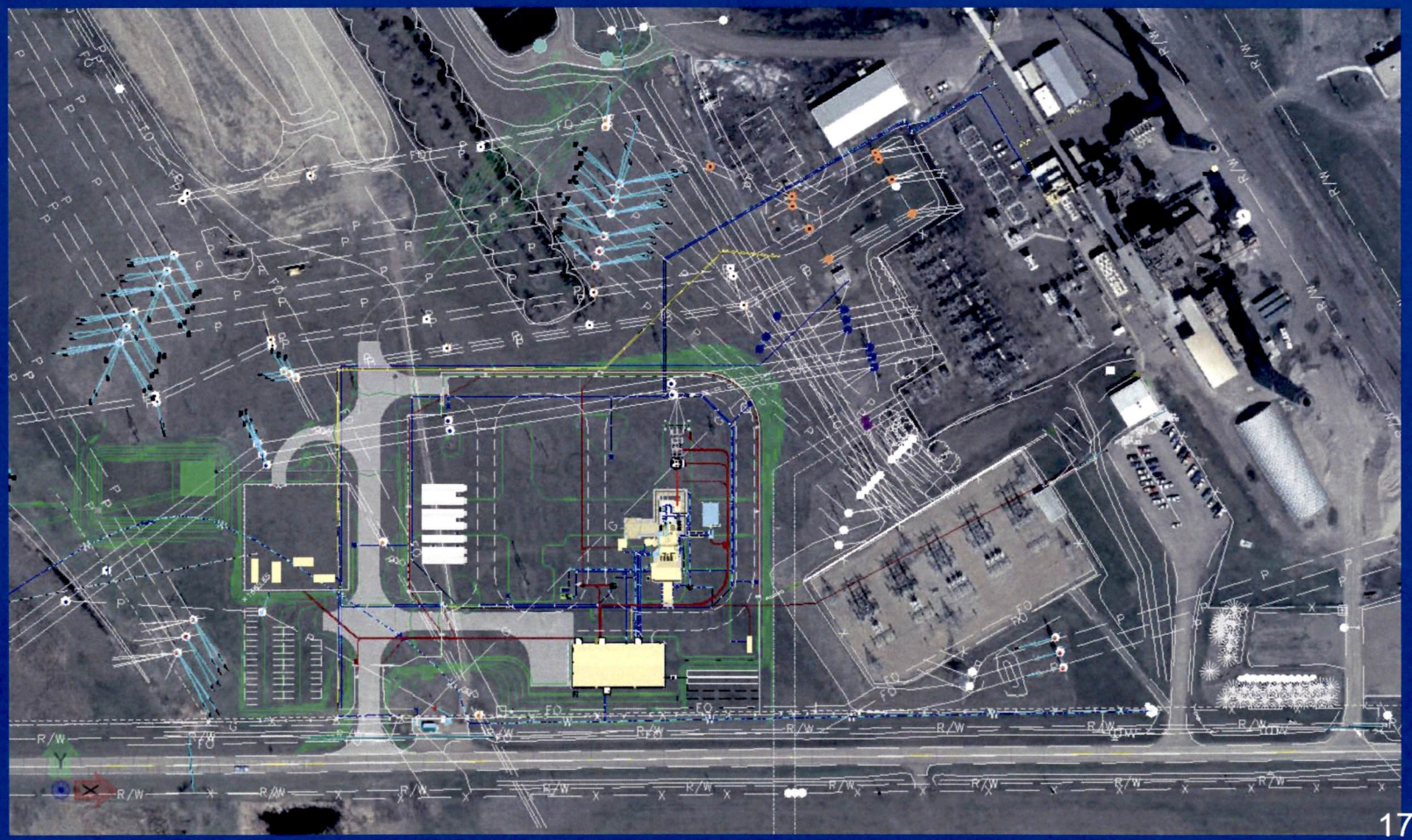
- Design layout of service building and site complete
- Control system architecture complete
- Equipment contract execution anticipated in December 2012 for
  - Generator step up and Unit Auxiliary Transformers
  - Exhaust Stack & Silencing
  - Medium and 480V electrical equipment

Combustion Turbine Project Activities

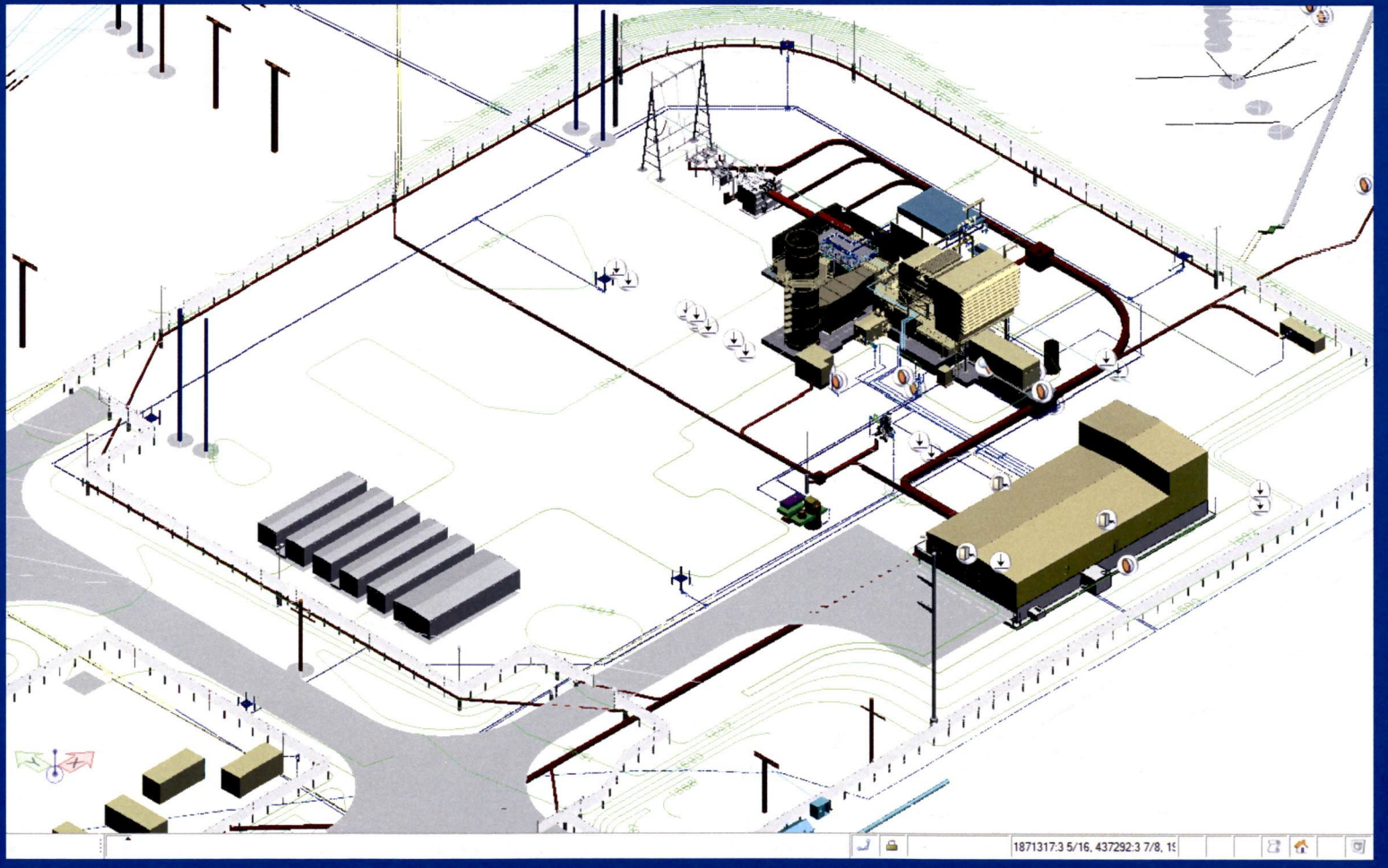
Engineering and Procurement

- Remaining Contracts
  - Fuel gas equipment – Coalescing Filter
  - Continuous Emissions Monitoring System
  - Site preparation, Foundations, & Underground work
  - Mechanical & Electrical installation
  - Platforms, Painting, Final paving & grading

R.M. Heskett Station - Unit 3 Combustion Turbine



R.M. Heskett Station - Unit 3 Combustion Turbine



R.M. Heskett Station - Unit 3

Milestone Dates	
Combustion Turbine / Generator Contract Full Notice to Proceed	April 20,2012
Air Permit to Construct Application Submitted	May 4,2012
Combustion Turbine / Generator Customer Kick-off Meeting	May 22-23,2012
Certificate of Site Compatibility Submittal	Sept. 8, 2012
Certificate of Corridor Compatibility and Energy Transmission Facility Route Permit, Anticipated submittal	Dec. 2012
Pipeline Construction	Summer 2013
Start of Combustion Turbine Construction	Qtr 2, 2013
Back feed	Nov. 8, 2014
Commercial Operation	Qtr 3, 2014