

	Summer	Winter
General Project Description		
Unit Type	Simple Cycle Combustion Turbine	
Capability	175 MW	211 MW ¹
Expected Annual Capacity Factor	10 percent	
Expected Heat Rate	10,395 Btu/kWh (HHV)	9,751 Btu/kWh (HHV)
Expected Efficiency	33 percent	35 percent
Fuel Use		
Fuel Type	Natural gas or fuel oil	
Fuel Use Rate	1,810 Mcf/hr natural gas	15,699 gal/hr fuel oil
Expected Annual Fuel Use	1.45 Mcf natural gas, 1.16 MG fuel oil	
Water Use		
Expected Annual Water Use	1.5 million gallons	
Expected Annual Wastewater Discharge	500-800,000 gallons	

[1] The unit is capable of operating at a maximum of 211 MW during typical winter conditions when firing fuel oil; however, the MISO transmission service request is limited to 200 MW. All reported data is based on 211 MW.

Table 1-1 Operational Characteristics

Characteristic	Project	Oil-Fired Simple-Cycle	MN Rule
Facility Description			
Unit Type	F-Class	F-Class	
Prime Mover	Combustion Turbine	Combustion Turbine	
Number of Units	1	1	
Summer Capability (site specific) ¹	175 MW	158 MW	7849.0250, A(1)
Winter Capability (site specific) ²	211 MW	211 MW	7849.0250, A(1)
Operating Cycle	simple-cycle	simple-cycle	7849.0250, A(2)
Expected Annual Capacity Factor	10.0%	10.0%	7849.0250, A(2)
Expected Heat Rate/Efficiency (Summer site specific) ³	10395 (btu/kWh (HHV)/32.8%	9860 (btu/kWh (HHV)/34.6%	7849.0250, A(4)
Expected Heat Rate/Efficiency (Winter site specific) ³	9751 (btu/kWh (HHV)/35%	9751 (btu/kWh (HHV)/35%	7849.0250, A(4)
Fuel Description			
Fuel source: Natural Gas	Northern Natural Gas Pipeline	---	7849.0320, C(1)
Fuel source: Oil/Ethanol	Regional Refineries	Regional Refineries	
Fuel Requirement: (Summer) ⁴	1810 MCF/hr	11,371 gallons/hr	7849.0320, C(2)
Fuel Requirement: (Winter) ⁴	15,699 gallons/hr	15,699 gallons/hr	7849.0320, C(2)
Expected Annual Fuel Requirement	1,611,532 gallons	10,289,924 gallons	7849.0320, C(2)
Heat Input (Summer - HHV) ⁴	1,819 MMbtu/hr	1,558 MMbtu/hr	7849.0320, C(3)
Heat Input (Winter - HHV) ⁴	2057 MMbtu/hr	2057 MMbtu/hr	7849.0320, C(3)
Fuel Heat Content: Nat Gas	1,005 MMbtu/MCF	---	7849.0320, C(4)
Fuel Heat Content: Oil	0.137 MMbtu/gal	0.137 MMbtu/gal	7849.0320, C(4)
Fuel Sulfur Content: Nat Gas	<20 grains/100cf	---	7849.0320, C(5)
Fuel Sulfur Content: Oil	<0.0015%, weight	<0.0015%, weight	7849.0320, C(5)
Fuel Ash Content: Nat Gas	None / Trace	---	7849.0320, C(5)
Fuel Ash Content: Oil	≤0.01%	≤0.01%	7849.0320, C(5)
Fuel Moisture Content: Nat Gas	<6 lb/10 ³ cf	---	7849.0320, C(5)
Fuel Moisture Content: Oil	<0.05%, volume	<0.05%, volume	7849.0320, C(5)
Water Use³			
Estimated maximum groundwater pumping rate	1,500 gpm	1,500 gpm	7849.0320, E(1)
Estimated maximum surface water appropriation	0 ft ³ /sec	0 ft ³ /sec	7849.0320, E(1)
Estimated annual groundwater appropriation	1.5 million gal/yr	5.3 million gal/yr	7849.0320, E(2)
Annual consumption	0 acre-feet	0 acre-feet	7849.0320, E(3)
Estimated Emission Rates (lbci/hr) (Summer Fuel Rate / Winter Fuel Rate)⁴			
SO ₂	93.7 / 97	79 / 97	7849.0320, D(1)
NO _x	54 / 314	254 / 314	7849.0320, D(1)
PM ₁₀	11 / 23	19 / 23	7849.0320, D(1)
CO	15 / 46	37 / 46	7849.0320, D(1)
VOC	5.7 / 7.1	5.8 / 7.1	7849.0320, D(1)
CO ₂	180290 / 303010	245234 / 303010	7849.0320, D(1)
Formaldehyde	1.16 / 0.54	0.44 / 0.54	7849.0320, D(1)
1,3-Butadiene	0.0007 / 0.031	0.025 / 0.031	7849.0320, D(1)
Naphthalene	0.0021 / 0.068	0.055 / 0.068	7849.0320, D(1)
Polycyclic Aromatic Hydrocarbons	0.0036 / 0.077	0.062 / 0.077	7849.0320, D(1)
Benzene	0.02 / 0.11	0.086 / 0.11	7849.0320, D(1)
Other Information			
Land Requirements	2.5 acres	2.5 acres	
Traffic	Slight increase due to on-site operators	Increased due to fuel deliveries	
Radioactive Releases	None	None	
Solid Wastes Produced	Construction packaging, office waste, waste lubricating oils	Construction packaging, office waste, waste lubricating oils	
Noise	≤ 63 dB(A) @ 400 ft.	≤ 63 dB(A) @ 400 ft.	
Work Force	2 to 3 FTE	2 to 3 FTE	
Transmission Requirements	Upgrade 3 sections of 69-kV lines	Upgrade 3 sections of 69-kV lines	
<p>1) Net Output on natural gas with evaporative cooler in service, 88F Dts, 60% RH.</p> <p>2) Net Output on No 2 Fuel Oil, 6F Dts, 68% RH. Unit is capable of ~211 MW during winter conditions when firing fuel oil; however, MISO transmission service request is limited to 200 MW. All reported data is based on 211 MW.</p> <p>3) Process water for evaporative cooling and combustor water injection will be provided by Elk River Municipal Utilities. The city currently obtains its water from wells and, therefore, there is no surface water appropriations reported.</p> <p>4) More emissions information can be found in Section 2.15 of this document.</p>			

Table 3-1 Comparison of Operational Data: Oil-fired vs. Natural Gas

Emission	Natural Gas Modeled Impact (mg/m3)	Fuel Oil Modeled Impact (mg/m3)	EPA Significant Impact Level (mg/m3)	Minnesota Ambient Air Quality Standard (mg/m3)
PM10 24-hr	0.27	1.1	5	150
PM10 Annual	0.011	0.08	1	None
SO ₂ 1-hour	0.025	0.51	25	1300
SO ₂ 3-hour	0.016	.33	NA	1300
SO ₂ 24-hour	0.004	0.08	5	365
SO ₂ Annual	0.0001	0.0027	1	80
NO _x Annual	0.065	0.38	1	100
CO 1-hour	2.8	0.94	2000	35,000
CO 8-hour	40	14	500	10,000

Table 4-6 Preliminary Ambient Air Quality Impacts

Emission	Emission Data Source	Emission Rate while Firing	Emission Rate while Firing	Dual Fuel Annual
		Natural Gas (lb/hr)	Fuel Oil (lb/hr)	Emissions (ton/yr)
SO2	3	93.7	97.0	41.2
NOx	1	54.0	314.0	34
PM10	2	11.0	23.0	5.3
CO	1	15.0	46.0	7.8
VOC	1	5.7	7.1	2.6
CO2	2	180,290	303,010	83,805
Formaldehyde	2	1.16	0.54	0.48
1,3-Butadiene	2	0.00070	0.031	0.0015
Napthalene	2	0.0021	0.068	0.0035
Polycyclic Aromatic Hydrocarbons	2	0.0036	0.077	0.0045
Benzene	2	0.020	0.11	0.012
Acetaldehyde	2	0.066	ND	0.026
Acrolein	2	0.010	ND	0.0040
Ethyl Benzene	2	0.052	ND	0.021
Propylene Oxide	2	0.048	ND	0.019
Toluene	2	0.21	ND	0.084
Xylene	2	0.10	ND	0.040
Arsenic	2	ND	0.021	0.00083
Beryllium	2	ND	0.00060	0.000024
Cadmium	2	ND	0.0093	0.00037
Chromium	2	ND	0.021	0.00083
Lead	2	ND	0.027	0.0011
Manganese	2	ND	1.5	0.059
Mercury	2	ND	0.0023	0.000091
Nickel	2	ND	0.0089	0.00035
Selenium	2	ND	0.048	0.0019

1. Siemens 5000F Data
2. AP-42, Section 3.1 - Stationary Gas Turbines, 04/00, except for SO2 from Natural Gas.
3. SO2 from natural gas based on fuel sulfur content.
ND = No data available.

Table 4-5 Air Emission Estimates

Noise Area Classification	Daytime (dBA)		Nighttime (dBA)	
	L ₅₀	L ₁₀	L ₅₀	L ₁₀
1 (Residential)	60	65	50	55
2 (Commercial)	65	70	65	70
3 (Industrial)	75	80	75	80

dBA = decibels, A-weighted scale; L₁₀ = sound pressure level which is exceeded 10% of the time period; L₅₀ = sound pressure level which is exceeded 50% of the time period.

Table 4-4 State of Minnesota Noise Standards

**Table 4-3
Elk River Peaking Station
Cumulative Economic Benefit (Statewide)**

Construction	
Wages	\$8,243,350
Capital Investment	\$23,473,477
Indirect	\$19,645,064
Subtotal Construction	\$51,361,892
Operation (20 years) NPV	
Wages	\$5,380,358
O&M	\$922,347
Indirect	\$3,228,215
Subtotal Operation	\$9,530,920
Cumulative Impact	\$60,892,811
Source:	

1. Statewide economic benefit is assumed to mean salaries paid to workers employed by companies with offices in MN, and equipment and materials purchased from companies with offices or stores in MN, whether or not manufacturing was done in MN.
2. Construction indirect is assumed to include:
 - Construction overhead, profit, equipment, indirects.
 - Engineering and consulting services.
 - GRE salaries for assigned personnel.
 - Natural gas, fuel oil, demineralized water, electricity and other utility costs or consumables associated with start up and commissioning.
3. Construction capital investment is assumed to mean equipment and materials that form a permanent part of the project.

Table 4-2
Elk River Peaking Station
Estimated Operating Staff by Shift

Personnel	Day Shift (1)	2 nd	3 rd	Total
Supervisor/Manager **	1			1
Plant Engineers **	1			1
Clerk **	1			1
Foreman	1			1
Operators & Mechanics	3			3
Electricians	0			0
Laborers	0			0
Total	7	0	0	7
Source:				

** Positions that split their time between several plants or projects.

Table 4-1
Elk River Peaking Station
Quarterly Peak Employment By Segment During Construction*

Period	Structural/ Civil Craft	Elec.	Mech.	Misc. Craft	Const. Mngt. and Support	Indirect Const. Labor	Oper. Staff	Start Up Labor	Total
Pre-Mobilization	0	0	0	0	2	2	0	0	4
200x 2 nd Quarter	15	5	10	8	6	4	0	0	48
200x 3 rd Quarter	20	30	30	8	6	4	0	0	98
200x 4 th Quarter	10	30	30	0	6	4	3	2	85
200x 1 st Quarter	4	20	10	0	6	4	3	8	55
200x 2 nd Quarter	4	5	5	0	6	4	3	6	33
Peak Employment	20	30	30	8	6	4	3	8	

Source: GRE communication September, 2007.

Approval Type	Authority	Comments
Certificate of Need	Minnesota Public Utilities Commission	Required for construction of the power plant.
Major amendment to the existing Part 70 Operating Permit to add a PSD emission source	Minnesota Pollution Control Agency	The permit must be issued before starting construction.
Water Supply and Wastewater Discharge Permit	Elk River Municipal Utilities	This permit would secure water supply and authorize the discharge of the evaporative cooling water to the city's wastewater treatment plant.
NPDES General Stormwater Construction Permit	Minnesota Pollution Control Agency	A general permit is available for this project.
NPDES General Stormwater Industrial Discharge Permit	Minnesota Pollution Control Agency	Amendment to existing SWPPP only.
License to Cross Public Waters	Minnesota Department of Natural Resources	As required for transmission line upgrades to cross public waters and wetlands.
Gas Pipeline Permits	Federal Energy Regulatory Commission	Northern Natural Gas Company will apply for federal permits as required.
Spill Prevention Control and Countermeasure (SPCC) Plan	Minnesota Pollution Control Agency	GRE must update the existing SPCC Plan within six months of bringing additional oil storage capacity on site.
Permanent Exemption for New Facilities	Department of Energy	Allows the use of natural gas for power production.
Electrical Inspection	Board of Electricity	Permit and inspection of building electrical systems.

Table 5-1 Potential Permits/Approvals