

**TABLES**



<b>Water Use</b>	<b>Estimated Need Fuel Oil (gpm)</b>	<b>Estimated Need Natural Gas (gpm)</b>
Supply Demineralized Water Skid	0-600	
NOx Control	0-120	
Evaporative Cooler		0-85
Sanitary & Miscellaneous cleaning	0-50	0-50
Fire Suppression	0-1,500	0-1,500

**Table 1-1 Water Use Estimate**

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<b>Source</b>	<b>Wastewater Generation (gpm)</b>
Evaporative Cooler Blow Down	0 – 60 gpm
Turbine Water Wash	2,000 – 4,000 gallons per event
Spill Containment Drains	0 – 80 gpm
Sanitary Waste	0 – 30 gpm
<b>Annual Total (MG)</b>	<b>0.78 (Max rate 100 gpm)</b>

**Table 1-2 Wastewater Generation**

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	Summer	Winter
<b>General Project Description</b>		
Unit Type	Simple Cycle Combustion Turbine	
Capability	175 MW	211 MW <sup>1</sup>
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
<b>Fuel Use</b>		
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	
<b>Water Use</b>		
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 1-3 Operational Characteristics**

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Chemical	Use	Typical Quantity Stored Onsite	Form/Type
Laboratory reagents	Various	Small amounts, generally less than 5 pounds each	Liquid and granular
Mineral insulating oil, C-10	Transformer systems	15,000 gallons	Insulating fluid
Sulfur hexafluoride, (SF <sub>6</sub> )	Substation electrical insulating gas	33 pounds	Insulating gas
Lubrication oil	Rotating equipment	3,500 gallons	CTs bearing lubricating oil
Diesel fuel	Backup fuel for CT	600,000 gallons	Diesel fuel
Various detergents	Combustion turbine on/off line water wash skid	200 gallons stored	Liquid
Compressed gases			
Carbon dioxide (CO <sub>2</sub> )	Fire Protection System	8 tons	Compressed gas
FM200	Fire Protection System	300 pounds	Compressed gas
Welding Gases	Maintenance	4 100-pound cylinders	Compressed gas

\*All chemical types and quantities are preliminary estimates. The chemical types and quantities may change as the project design progresses.

**Table 1-4 List of Chemicals**

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**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 <sup>nd</sup> Quarter	15	5	10	8	6	4	0	0	48
200x 3 <sup>rd</sup> Quarter	20	30	30	8	6	4	0	0	98
200x 4 <sup>th</sup> Quarter	10	30	30	0	6	4	3	2	85
200x 1 <sup>st</sup> Quarter	4	20	10	0	6	4	3	8	55
200x 2 <sup>nd</sup> 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.

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

Personnel	Day Shift (1)	2 <sup>nd</sup>	3 <sup>rd</sup>	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
<b>Total</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>7</b>
Source:				

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

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**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
<b>Subtotal Construction</b>	<b>\$51,361,892</b>
Operation (20 years) NPV	
Wages	\$5,380,358
O&M	\$922,347
Indirect	\$3,228,215
<b>Subtotal Operation</b>	<b>\$9,530,920</b>
<b>Cumulative Impact</b>	<b>\$60,892,811</b>
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.

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

dBA = decibels, A-weighted scale; L<sub>10</sub> = sound pressure level which is exceeded 10% of the time period; L<sub>50</sub> = sound pressure level which is exceeded 50% of the time period.

**Table 4-4 State of Minnesota Noise Standards**

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<b>Criteria Pollutants</b>				
<b>Pollutant</b>	<b>Emission Rate<sup>1</sup></b> Lb/hr at Rated Project Capacity (Worst-case conditions)		<b>Emissions</b> (tons/year)	
	Natural Gas	Fuel Oil	Natural Gas <sup>2</sup>	Fuel Oil <sup>3</sup>
NOx	151	331	109.5	110.4
CO	110	240	80.0	80.0
VOC	28.8	7.5	21.0	2.5
PM <sub>10</sub>	10.8	8.7	47.4	38.2
SO <sub>2</sub>	0.1	3.1	0.7	1.0
<b>Hazardous Air Pollutants</b> (selected list from EPA's AP-42 emission factor database and EPA Combustion Turbine Emissions Database v.5)				
<b>Pollutant</b>	<b>Emissions (tons/year)</b>			
	Natural Gas <sup>2</sup>		Fuel Oil <sup>3</sup>	
Formaldehyde	0.85		0.19	
Toluene	0.15		0.37	
Xylenes	0.08		0.36	
Acetaldehyde	0.05		0.007	
Ethyl benzene	0.04		-	
Propylene oxide	0.04		-	
Benzene	0.01		0.04	
Acrolein	0.008		0.06	
PAH	0.003		0.03	
Naphthalene	0.002		0.02	
1,3-Butadiene	0.0005		0.01	
Lead	0.06		0.01	
Manganese	0.006		0.54	
Selenium	-		0.02	

<sup>1</sup> NOx, CO, VOC, PM<sub>10</sub> emission factors provided by turbine manufacturer; SO<sub>2</sub> emission factor provided by US EPA AP-42, Section 3.1 (assumes ultra low sulfur distillate).

<sup>2</sup> 1,454 hours per year based on a CO limit of 80 tons/yr).

<sup>3</sup> 668 hours per year based on a CO limit of 80 tons/yr).

**Table 4-5 Potential Air Emissions**

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<b>Natural Gas Combustion - Emissions Modeling</b>						
<b>Pollutant</b>	<b>Averaging Period</b>	<b>Significant Impact Level (ug/m<sup>3</sup>)</b>	<b>Maximum Modeled Concentration (ug/m<sup>3</sup>)</b>	<b>Background Concentration (ug/m<sup>3</sup>)</b>	<b>Total Concentration (ug/m<sup>3</sup>)</b>	<b>Ambient Air Quality Standard (ug/m<sup>3</sup>)</b>
PM <sub>10</sub>	24-hour	5	0.27	42	42	150
	Annual	1	0.011	21	21	50
NO <sub>x</sub>	Annual	1	0.065	23	23	100
CO	1-hour	2000	2.8	--	2.8	40,000
	8-hour	500	0.94	--	0.94	10,000
SO <sub>2</sub>	1-hour	25	0.025	181	181	1,300
	3-hour	25	0.016	128	128	1,300
	24-hour	5	0.004	60	60	365
	Annual	1	0.0001	5	5	80

  

<b>Fuel Oil Combustion – Emissions Modeling</b>						
<b>Pollutant</b>	<b>Averaging Period</b>	<b>Significant Impact Level (ug/m<sup>3</sup>)</b>	<b>Maximum Modeled Concentration (ug/m<sup>3</sup>)</b>	<b>Background Concentration (ug/m<sup>3</sup>)</b>	<b>Total Concentration (ug/m<sup>3</sup>)</b>	<b>Ambient Air Quality Standard (ug/m<sup>3</sup>)</b>
PM <sub>10</sub>	24-hour	5	1.9	42	44	150
	Annual	1	0.08	21	21	50
NO <sub>x</sub>	Annual	1	0.38	23	23	100
CO	1-hour	2000	40	--	40	40,000
	8-hour	500	14	--	14	10,000
SO <sub>2</sub>	1-hour	25	0.51	181	182	1,300
	3-hour	25	0.33	128	128	1,300
	24-hour	5	0.08	60	60	365
	Annual	1	0.0027	5	5	80

**Table 4-6 Preferred Site: Impacts to Ambient Air Quality**

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Air Toxics Screen [1]											
Total Inhalation Screening Hazard Indices and Cancer Risks				Total Indirect Pathway Screening Hazard Indices and Cancer Risks				Total Multipathway Screening Hazard Indices and Cancer Risks			
Acute	Subchronic Noncancer	Chronic Non-cancer	Cancer	Farmer Non-cancer [2]	Farmer Cancer [2]	Resident Non-cancer	Resident Cancer	Farmer Non-cancer [2]	Farmer Cancer [2]	Resident Non-cancer	Resident Cancer
3.7E-01	4.2E-03	2.4E-02	8.E-07	1.2E-04	3.E-04		1.E-06	2.4E-02	3.E-04	2.4E-02	2.E-06
1.0E+00	1.0E+00	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05	1.0E+00	1.0E-05
OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK

[1] Cancer risks rounded to one significant figure per U.S. EPA guidance (1989; 2005).

[2] Farmer risks reported but farming is not a current land use at the Elk River Station property boundary. Reasonably foreseeable future land use indicates it is highly unlikely for a farmer to be located at the property boundary.

**Table 4-7 Preliminary Screening-Level Incremental Air Emissions Risk Analysis**

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<b>Natural Gas Combustion - Emissions Modeling</b>						
<b>Pollutant</b>	<b>Averaging Period</b>	<b>Significant Impact Level (ug/m<sup>3</sup>)</b>	<b>Maximum Modeled Concentration (ug/m<sup>3</sup>)</b>	<b>Background Concentration (ug/m<sup>3</sup>)</b>	<b>Total Concentration (ug/m<sup>3</sup>)</b>	<b>Ambient Air Quality Standard (ug/m<sup>3</sup>)</b>
PM <sub>10</sub>	24-hour	5		42		150
	Annual	1		21		50
NO <sub>x</sub>	Annual	1		82		100
CO	1-hour	2000		664		40,000
	8-hour	500		349		10,000
SO <sub>2</sub>	1-hour	25		56		1,300
	3-hour	25		27		1,300
	24-hour	5		13		365
	Annual	1		2.7		80
<b>Fuel Oil Combustion – Emissions Modeling</b>						
<b>Pollutant</b>	<b>Averaging Period</b>	<b>Significant Impact Level (ug/m<sup>3</sup>)</b>	<b>Maximum Modeled Concentration (ug/m<sup>3</sup>)</b>	<b>Background Concentration (ug/m<sup>3</sup>)</b>	<b>Total Concentration (ug/m<sup>3</sup>)</b>	<b>Ambient Air Quality Standard (ug/m<sup>3</sup>)</b>
PM <sub>10</sub>	24-hour	5		42		150
	Annual	1		21		50
NO <sub>x</sub>	Annual	1		82		100
CO	1-hour	2000		664		40,000
	8-hour	500		349		10,000
SO <sub>2</sub>	1-hour	25		56		1,300
	3-hour	25		27		1,300
	24-hour	5		13		365
	Annual	1		2.7		80

**Table 4-8 Alternative Site: Potential Impacts to Ambient Air Quality**

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Major Watershed USGS/MNDNR Number	Major Watershed Name	Major Watershed Drainage Area (square miles)	Minor Watershed Number	Minor Watershed Area (square miles)
17	Mississippi River (St. Cloud)	1128	1700100	16
21	Rum River	1559	2105200	30
20	Mississippi River (Metro)	1016	2004100	18

**Table 4-9 Preferred Site: Transmission Line Upgrade Major/Minor Watersheds**

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Distance and Direction from Project Site	Cowardin Code	Area (acres)	Cowardin Classification
1000 ft N	PEMC	3.5	Palustrine emergent wetland, seasonally flooded
600 feet E	PEMC	~14	Palustrine emergent wetland, seasonally flooded
900 feet SSE	PEMC	1.8	Palustrine emergent wetland, seasonally flooded
1200 ft S	PEMC	4.6	Palustrine emergent wetland, seasonally flooded

**Table 4-10 Preferred Site: Wetlands**

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Cowardin Classification of Wetland Crossed <sup>1</sup>	Length of Crossing(s) <sup>2</sup> in Feet
PEM	50
PEM	230
PEM	416
PEM	780,520
PEM	885,192,565,867
PSS	302,259,142,164
PSS/EM	1060
PEM	997
PFO/SS	252

1 PEM – Palustrine emergent wetland; PSS – Palustrine scrub-shrub wetland;  
PFO – Palustrine forested wetland

2 – Several wetlands have multiple crossings

**Table 4-11 Alternative Site: (Transmission Line) Wetlands**

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Distance and Direction from Alternative Plant Location	Method of Identifying Wetland	Cowardin Code	Area (acres)	Cowardin Classification
500' NNW	Delineation	PEMH	9.6	Palustrine emergent wetland, permanently flooded
1200' NW	Delineation	PSSF	6.4	Palustrine scrub-shrub wetland, semipermanently flooded
2800' WNW	Delineation	PEMC	1.8	Palustrine emergent wetland, seasonally flooded
1500' N	NWI	PEMF	2.5	Palustrine emergent wetland, semipermanently flooded
2100' N	NWI	PEMF	1.8	Palustrine emergent wetland, semipermanently flooded
5500'NW	NWI	PEMC	0.6	Palustrine emergent wetland, seasonally flooded
6000' NW	NWI	PEMA	0.5	Palustrine emergent wetland, temporarily flooded
6000' NE	NWI	PEMA	0.5	Palustrine emergent wetland, temporarily flooded
6000' NE	NWI	PEMA	0.4	Palustrine emergent wetland, temporarily flooded
6300' NE	NWI	PEMA	0.2	Palustrine emergent wetland, temporarily flooded

**Table 4-12 Alternative Site: Wetlands**

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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**

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