Pre-Reformer Fired Heater - EPN: PRFMHTR
CASE A:
Methanol Plant Stand Alone Operation (W/O CO2 Addition)

Constituent i	Mol Wt i	Mol% i	No. Of Carbon Atoms	Carbon (= 12.01* No. C)	Carbon Fraction (= Carbon / Mol Wt)
H2	2.016	0.000	0	0.00	0.00
CO	28.01	0.000	1	12.01	0.43
CO2	44.01	1.189	1	12.01	0.27
N2	28.01	0.229	0	0.00	0.00
CH4	16.04	96.189	1	12.01	0.75
ETHANE	30.07	2.037	2	24.02	0.80
PROPANE	44.11	0.219	3	36.03	0.82
N-BUTANE	58.13	0.037	4	48.04	0.83
I-BUTANE	58.13	0.038	4	48.04	0.83
N-PENTANE	72.15	0.008	5	60.05	0.83
I-PENTANE	72.15	0.013	5	60.05	0.83
HEXANES+	86.18	0.041	6	72.06	0.84
H2O	18.02	0.000	0	0.00	0.00

Carbon Content	0.743	kg C/kg fuel (= Σ Carbon Fraction$_i$*Mol%$_i$) / 100

CASE A Continued
Basis

Typical Fuel Gas Rate (Nat Gas)	0.1930	MMscf/hr
Average Molecular Weight	16.82	kg/kg-mol
Average Fuel HHV	1020	Btu/scf
Molar Volume Conversion Factor (MVC)	849.5	scf/kg-mol
Annual Op Hrs	8760	hr/yr
Annual Firing Rate (Nat Gas)	1,724,893	MMBtu/yr

CH4 Emission Factor	0.003	kg/MMBtu
N2O Emission Factor	0.0006	kg/MMBtu

Emissions

CO2 Potential to Emit	91,174.6	Metric Tons CO2/yr
CO2 Potential to Emit	100,502.7	Tons CO2/yr

CH4 Potential to Emit	5.2	Metric Tons CH4/yr
CH4 Potential to Emit	5.7	Tons CH4/yr

N2O Potential to Emit	1.0	Metric Tons N2O/yr
N2O Potential to Emit	1.1	Tons N2O/yr

	Global Warming Potential	CO2e (Metric Tons/yr)	CO2e (Tons/yr)
CO2	1	91174.6	100,502.7
CH4	25	129.4	142.6
N2O	298	308.4	340.0
		Total CO2e	100,985.2

Pre-Reformer Fired Heater - EPN: PRFMHTR
CASE B:
Methanol Plant Stand Alone Operation (With CO2 Addition)

Constituent i	Mol Wt i	Mol% i	No. Of Carbon Atoms	Carbon (= 12.01* No. C)	Carbon Fraction (= Carbon / Mol Wt)
H2	2.016	0.000	0	0.00	0.00
CO	28.01	0.000	1	12.01	0.43
CO2	44.01	1.189	1	12.01	0.27
N2	28.01	0.229	0	0.00	0.00
CH4	16.04	96.189	1	12.01	0.75
ETHANE	30.07	2.037	2	24.02	0.80
PROPANE	44.11	0.219	3	36.03	0.82
N-BUTANE	58.13	0.037	4	48.04	0.83
I-BUTANE	58.13	0.038	4	48.04	0.83
N-PENTANE	72.15	0.008	5	60.05	0.83
I-PENTANE	72.15	0.013	5	60.05	0.83
HEXANES+	86.18	0.041	6	72.06	0.84
H2O	18.02	0.000	0	0.00	0.00
Carbon Content	0.743	kg C/kg fuel (= Σ Carbon Fraction$_i$*Mol%$_i$) / 100			

CASE B Continued

Basis

Typical Fuel Gas Rate (Nat Gas)	0.1501	MMscf/hr
Average Molecular Weight	16.82	kg/kg-mol
Average Fuel HHV	1020	Btu/scf
Molar Volume Conversion Factor (MVC)	849.5	scf/kg-mol
Annual Op Hrs	8760	hr/yr
Annual Firing Rate (Nat Gas)	1,341,345	MMBtu/yr

CH4 Emission Factor	0.003	kg/MMBtu
N2O Emission Factor	0.0006	kg/MMBtu

Emissions

CO2 Potential to Emit	70,901.0	Metric Tons CO2/yr
CO2 Potential to Emit	78,154.9	Tons CO2/yr

CH4 Potential to Emit	4.0	Metric Tons CH4/yr
CH4 Potential to Emit	4.4	Tons CH4/yr

N2O Potential to Emit	0.8	Metric Tons N2O/yr
N2O Potential to Emit	0.9	Tons N2O/yr

	Global Warming Potential	CO2e (Metric Tons/yr)	CO2e (Tons/yr)
CO2	1	70901.0	78,154.9
CH4	25	100.6	110.9
N2O	298	239.8	264.4
		Total CO2e	78,530.1

Pre-Reformer Fired Heater - EPN: PRFMHTR
CASE C:
Methanol and Ammonia Plant in Operation (W/O CO2 Addition)

Constituent i	Mol Wt i	Mol% i	No. Of Carbon Atoms	Carbon (= 12.01* No. C)	Carbon Fraction (= Carbon / Mol Wt)
H2	2.016	0.000	0	0.00	0.00
CO	28.01	0.000	1	12.01	0.43
CO2	44.01	1.189	1	12.01	0.27
N2	28.01	0.229	0	0.00	0.00
CH4	16.04	96.189	1	12.01	0.75
ETHANE	30.07	2.037	2	24.02	0.80
PROPANE	44.11	0.219	3	36.03	0.82
N-BUTANE	58.13	0.037	4	48.04	0.83
I-BUTANE	58.13	0.038	4	48.04	0.83
N-PENTANE	72.15	0.008	5	60.05	0.83
I-PENTANE	72.15	0.013	5	60.05	0.83
HEXANES+	86.18	0.041	6	72.06	0.84
H2O	18.02	0.000	0	0.00	0.00
Carbon Content	0.743	kg C/kg fuel (= Σ Carbon Fraction$_i$*Mol%$_i$) / 100			

CASE C Continued
Basis

Typical Fuel Gas Rate (Nat Gas)	0.1932	MMscf/hr
Average Molecular Weight	16.82	kg/kg-mol
Average Fuel HHV	1020	Btu/scf
Molar Volume Conversion Factor (MVC)	849.5	scf/kg-mol
Annual Op Hrs	8760	hr/yr
Annual Firing Rate (Nat Gas)	1,726,070	MMBtu/yr

CH4 Emission Factor	0.003	kg/MMBtu
N2O Emission Factor	0.0006	kg/MMBtu

Emissions

CO2 Potential to Emit	91,236.8	Metric Tons CO2/yr
CO2 Potential to Emit	100,571.27	Tons CO2/yr

CH4 Potential to Emit	5.2	Metric Tons CH4/yr
CH4 Potential to Emit	5.71	Tons CH4/yr

N2O Potential to Emit	1.0	Metric Tons N2O/yr
N2O Potential to Emit	1.14	Tons N2O/yr

	Global Warming Potential	CO2e (Metric Tons/yr)	CO2e (Tons/yr)
CO2	1	91,236.8	100,571.3
CH4	25	129.5	142.7
N2O	298	308.6	340.2
		Total CO2e	101,054.2

Pre-Reformer Fired Heater - EPN: PRFMHTR
CASE D:
Methanol and Ammonia Plant in Operation (With CO2 Addition)

Constituent i	Mol Wt i	Mol% i	No. Of Carbon Atoms	Carbon (= 12.01* No. C)	Carbon Fraction (= Carbon / Mol Wt)
H2	2.016	0.000	0	0.00	0.00
CO	28.01	0.000	1	12.01	0.43
CO2	44.01	1.189	1	12.01	0.27
N2	28.01	0.229	0	0.00	0.00
CH4	16.04	96.189	1	12.01	0.75
ETHANE	30.07	2.037	2	24.02	0.80
PROPANE	44.11	0.219	3	36.03	0.82
N-BUTANE	58.13	0.037	4	48.04	0.83
I-BUTANE	58.13	0.038	4	48.04	0.83
N-PENTANE	72.15	0.008	5	60.05	0.83
I-PENTANE	72.15	0.013	5	60.05	0.83
HEXANES+	86.18	0.041	6	72.06	0.84
H2O	18.02	0.000	0	0.00	0.00
Carbon Content	0.743	kg C/kg fuel (= Σ Carbon Fraction$_i$*Mol%$_i$) / 100			

CASE D Continued
Basis

Typical Fuel Gas Rate (Nat Gas)	0.1501	MMscf/hr
Average Molecular Weight	16.82	kg/kg-mol
Average Fuel HHV	1020	Btu/scf
Molar Volume Conversion Factor (MVC)	849.5	scf/kg-mol
Annual Op Hrs	8760	hr/yr
Annual Firing Rate (Nat Gas)	1,341,345	MMBtu/yr

CH4 Emission Factor	0.003	kg/MMBtu
N2O Emission Factor	0.0006	kg/MMBtu

Emissions

CO2 Potential to Emit	70,901.0	Metric Tons CO2/yr
CO2 Potential to Emit	78,154.9	Tons CO2/yr

CH4 Potential to Emit	4.0	Metric Tons CH4/yr
CH4 Potential to Emit	4.4	Tons CH4/yr

N2O Potential to Emit	0.8	Metric Tons N2O/yr
N2O Potential to Emit	0.9	Tons N2O/yr

	Global Warming Potential	CO2e (Metric Tons/yr)	CO2e (Tons/yr)
CO2	1	70,901.0	78,154.9
CH4	25	100.6	110.9
N2O	298	239.8	264.4
		Total CO2e	78,530.1