APPENDIX H

EFFICIENCY CALCULATIONS

GE LMS100 EFFICIENCY CALCULATIONS

ENGINE: (1) GE LMS100PA GAS TURBINE
FUEL: Natural Gas 21404 Btu/lb (49786 kJ/kg) LHV

DATA FROM GENERAL ELECTRIC SPECIFICATION SHEET

Generator Output	94,289	kilowatts
Fuel Flow	35,765	lb/hr
Fuel LHV	21,404	Btu/lb
Generator Output	97,624	Kilowatts/hr
Maximum Heat Consumption	8084	Btu/kW-hr (Guaranteed)

Calculated Heat Input 765.51 MMBtu/hr, LHV

Heat Input (Btu/hr) = Fuel Input (lb/hr) * Fuel LHV (Btu/lb) = 35,765 * 21,404 = 765,514,060
Heat Input (MMBtu/hr) = Heat Input (Btu/hr) / 1,000,000 = 765,514,060 / 1,000,000 = 765.51

Conversion Factor 0.293255 watts per Btu/hr

Heat Input (watts/hr) = Heat Input (Btu/hr) * 0.293255 (watts/Btu)
Heat Input (watts/hr) = 765,514,060 (Btu/hr) * 0.293255 (watts/Btu) = 224,490,927
Heat Input (KWatts/hr) = Heat Input (Watts/hr) / 1,000 = 224,490,927 / 1,000 = 224,490

Calculated Efficiency

Percent Heat Conversion
Efficiency (%) = Power Output (KW/hr) / Heat Input (KW/hr) * 100
Efficiency (%) = 97,624 (KW/hr) / 224,490 (KW/hr) * 100 = 43.487 %

Heat Consumption
Btu/kW-hr = Heat Input (Btu/hr) / Power Output (KW/hr)
Btu/kW-hr = 765,514,060 (Btu/hr) / 97,624 (KW/hr) = 7841.45

Results from GE's Guaranteed Efficiency

Heat Consumption 8084 Btu/kW-hr
Heat Input (Btu/hr) = Heat Consumption (Btu/KW-hr) * Power Output (KW/hr)
Heat Input (Btu/hr) = 8084 (Btu/KW-hr) * 97,624 (KW/hr) = 789,192,416

Heat Input (watts/hr) = Heat Input (Btu/hr) * 0.293255 (watts/Btu)
Heat Input (watts/hr) = 789,192,416 (Btu/hr) * 0.293255 (watts/Btu) = 231,434,622
Heat Input (KWatts/hr) = Heat Input (Watts/hr) / 1,000 = 231,434,622 / 1,000 = 231,435

Guaranteed Efficiency

Percent Heat Conversion
Efficiency (%) = Power Output (KW/hr) / Heat Input (KW/hr) * 100
Efficiency (%) = 97,624 (KW/hr) / 231,435 (KW/hr) * 100 = 42.182 %