APPENDIX 2B

Heat and Mass Balance Calculations
HEAT BALANCE AT PEAK JULY AMBIENT CONDITIONS, 100% BASE LOAD

NOTE:
1. THE SCR TEMPERING AIR FANS OPERATE TO MAINTAIN THE FUEL GAS FLUE GAS TEMPERATURE BELOW 850DEG.
2. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 380PSIG.
3. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED.
4. DILUTION AIR FLOWS FOR SCR ARE NOT SHOWN.
5. DEMINERALIZER REGENERATION WILL BE OFF SITE.
6. AIR COOLED CHILLER POWER UTILIZATION FACTOR=1.36 KW/TON OF REFRIGERATION.

PLANT BATTERY LIMITS
- NUMBER OF GAS TURBINES: 4
- STACK EMISSIONS: 1091134 LB/HR, 15.5 NOx, 93 SO2, 15.5 CO2, 833 DEG F, 31.3 VOC, 1.20 HC, 49883 KW

STACK EMISSION LIMITS:
- NOx: 2.5 PPMVD @ 15% O2
- CO: 6.0 PPMVD @ 15% O2
- VOC: 2.0 PPMVD @ 15% O2

TEMPERING AIR FAN:
- X: 396

PARAMETERS:
- DBT: 93 DEGF
- AMBIENT AIR RH: 26%
- FLOW: 1025369 LB/HR
- PRESS: 14.63 PSIA

WATER CONSUMPTION SUMMARY:
- DEMIN PLANT REJECTS: 0.5%
- COIL CONDENSATE: 229.2 GPM
- EVAPORATOR: 50 75 43.18 114584
- REFURB: 14.63 75 43.18 115159.8
- RECOVERY: 99.5%
- WATER CONSUMPTION: 1660000 WATTS

PLANT PERFORMANCE SUMMARY - ESTIMATE
- TOTAL PLANT FUEL INPUT, MMBTU/HR (HHV): 1925.107
- TOTAL PLANT FUEL INPUT/UNIT, MMBTU/HR (HHV): 481.28
- NUMBER OF GAS TURBINES: 4
- TOTAL GROSS OUTPUT, KW: 199533.4
- PLANT NET OUTPUT, KW: 187994.2
- PLANT AUXILIARY LOSSES, KW: 11514
- 230KV TRANSMISSION LINE LOSSES, KW: 25
- FOR PG&E BID PURPOSE
- 6/26/2008 1. GE'S APPS VERSION 3.7.1
- REV MECH PE PM
- DATE
- INTENT
- DRAWING NO: 114677/MC/03-07-01
- WORKING FILES
- Z:\114677\DD\ENG\Design\Calculations\Heat Balance Diagram\Working Files\Peak July\Base Load\4xLM6000 HBD and WBD at July Peak and Based Load.xls
HEAT BALANCE AT PEAK JULY AMBIENT CONDITIONS, MINIMUM LOAD

1. THE SCR TEMPERING AIR FANS OPERATE TO MAINTAIN THE FUEL GAS FLUE GAS TEMPERATURE BELOW 850 DEG F.
2. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 380 PSIG.
3. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED.
4. DILUTION AIR FLOWS FOR SCR ARE NOT SHOWN.
5. DEMINERALIZER REGENERATION WILL BE OFF SITE.
6. AIR COOLED CHILLER POWER UTILIZATION FACTOR = 1.36 KW/TON OF REFRIGERATION.

PLANT PERFORMANCE SUMMARY - ESTIMATE

- NUMBER OF GAS TURBINES OPERATING: 1
- TOTAL PLANT HEAT RATE, BTU/KWH (HHV): 11698.28
- NET PLANT HEAT RATE, BTU/KWH (LHV): 10556.9
- PLANT BATTERY LIMITS: 749913 LB/HR
- DBT: 93 DEGF
- RH: 26%
- AMBIENT AIR PRESS: 14.63 PSIA
- AMBIENT AIR FLOW: 0.0 LB/HR
- AMBIENT AIR PM-10: 3.0 LB/HR
- AMBIENT AIR TEMPERATURE LIMIT: 60
- FIRE WATER TANK PRESS: 14.63 PSIA
- FIRE WATER TANK FLOW: 0.00 GPM
- EVAPORATOR PRESS: 14.63 PSIA
- EVAPORATOR FLOW: 0.00 GPM
- COIL CONDENSATE PRESS: 14.63 PSIA
- COIL CONDENSATE FLOW: 0.00 GPM
- TOTAL PLANT FUEL INPUT: 275.96 MMBTU/HR (HHV)
- RECOVERY: 99.5%
- REJECTS: 0.5%

PLANT BATTERY LIMITS
- NOx: 2.5 PPMVD @ 15% O2
- CO: 6.0 PPMVD @ 15% O2
- VOC: 2.0 PPMVD @ 15% O2
- NH3: 5.0 PPMVD @ 15% O2
- PM10: 3.0 LB/HR

GAS TURBINE GROSS OUTPUT: 24952 KW/UNIT
- POWER AUGMENTATION, PER ENGINE, GPM: 0.00
- RAW WATER SUPPLY TO SITE, GPM: 21.0
- COOLING TOWER MAKEUP, GPM: 0.00
- WASTE WATER FROM SITE, GPM: 0.00
- WATER CONSUMPTION SUMMARY
  - REFUR
  - COIL CONDENSATE
  - EVAPORATOR
  - AQUA AMMONIA
  - FIRE WATER TANK

NOTE:  
- NO TURBINE LINE-CUT COUNTERS INVOLVED IN THIS BALANCE SHEET.
- COOLING COILS ARE FOR SITE BUT NOT SHOWN.
- ALL LOWERS CONDUCTIVITY AT 5000 PPM OF PARAFFIN.
- DILUTION AIR FLOWS FOR SCR ARE NOT SHOWN.

PLANT BATTERY LIMITS
- NOx: 2.468 LB/HR
- SO2: 0.00 LB/HR
- CO: 3.61 LB/HR
- CO2: 32221.33 LB/HR
- HC: 0.69 LB/HR
- PM10: 0.00 LB/HR
- NH3: 5.00 PPMVD

PLANT BATTERY LIMITS
- NOx: 749913 LB/HR
- SO2: 0.00 LB/HR
- CO: 43.18 LB/HR
- CO2: 20,000 LB/HR
- HC: 0.00 LB/HR
- PM10: 0.00 LB/HR
- NH3: 0.00 PPMVD

DIAMOND GENERATING CORPORATION
1490 S. Foothill Boulevard
Redlands, CA 92373
T/A POWER ENGINEERS

DRAWING NO: 114677/MC/03-07-04
DRAWN BY: 6/26/2008
CHECKED BY: 7/10/2008
PROJECT LOCATION: BYRON, CA
FOR PG&E BID PURPOSE

PROJECT TITLE: DGC KELSO CT 4xLM6000 PC SPRINT A/CLD CHLR AMB PRESS 14.63 PSIA
CONF: 4xLM6000 PC SPRINT A/CLD CHLR AMB PRESS 14.63 PSIA
REV MECH PE PM DATE

REFERENCE DOCUMENTS
- GE'S APPS VERSION 3.7.1
- 6/26/2008
- 7/10/2008
- 6/26/2008
- 4xLM6000 PC SPRINT A/CLD CHLR AMB PRESS 14.63 PSIA
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- 4xLM6000 PC SPRINT A/CLD CHLR AMB PRESS 14.63 PSIA

DESIGN CASE:
AT MINIMUM LOAD (1 GTG AT 50% LOAD)
HEAT BALANCE AT ISO AMBIENT CONDITIONS, 100% BASE LOAD

1. THE SCR TEMPERING AIR FANS OPERATE TO MAINTAIN THE FUEL GAS FLUE GAS TEMPERATURE BELOW 850DEGF

2. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 380PSIG

3. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED

4. DILUTION AIR FLOWS FOR SCR ARE NOT SHOWN

5. DEMINERALIZER REGENERATION WILL BE OFF SITE

6. AIR COOLED CHILLER POWER UTILIZATION FACTOR=0.84 KW/TON OF REFRIGERATION

TOTAL PLANT NET OUTPUT, KW 193759.5

TOTAL PLANT FUEL INPUT, MMBTU/HR (HHV) 1925.627

PLANT BATTERY LIMITS

50 60 PLANT NET OUTPUT, KW 193759.5

PLANT BATTERY LIMITS

50 60 50 39.6

AMBIENT AIR AMBIENT AIR

229.3 PRESS 14.63 PSIA

RECOVERY=99.5%

CONF: 4xLM6000 PC SPRINT A/CLD CHLR AMB PRESS 14.63 PSIA

DRY BULB TEMP: 59.00 Deg F WET BULB TEMP: 51.50 DEG F

4 x LM6000 PC SPRINT, AIR COOLED CHILLER

AIR CLD CHILLER AUX POWER: 944KW TOTAL SPRNT INJ: 67.00 GPM

Rev.

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REFERENCE DOCUMENTS

CPR AMPS VERSION 3.7.1

DIA MNS HR

A PR GH ML

DIAMOND GENERATING CORPORATION

PROJECT LOCATION: BYRON, CA

PROJECT TITLE: DGC KELSO CT

CONF: 4xLM6000 PC SPRINT A/CLD CHLR AMB PRESS 14.63 PSIA

DRY BULB TEMP: 59.00 Deg F WET BULB TEMP: 51.50 DEG F

4 x LM6000 PC SPRINT, AIR COOLED CHILLER

AIR CLD CHILLER AUX POWER: 944KW TOTAL SPRNT INJ: 67.00 GPM

Rev.

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REFERENCE DOCUMENTS

CPR AMPS VERSION 3.7.1

DIA MNS HR

A PR GH ML

DIAMOND GENERATING CORPORATION

PROJECT LOCATION: BYRON, CA

PROJECT TITLE: DGC KELSO CT

CONF: 4xLM6000 PC SPRINT A/CLD CHLR AMB PRESS 14.63 PSIA

DRY BULB TEMP: 59.00 Deg F WET BULB TEMP: 51.50 DEG F

4 x LM6000 PC SPRINT, AIR COOLED CHILLER

AIR CLD CHILLER AUX POWER: 944KW TOTAL SPRNT INJ: 67.00 GPM

Rev.

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HEAT BALANCE AT ISO AMBIENT CONDITIONS, MINIMUM LOAD

NOTE:
1. TEMPERING AIR FANS OPERATE TO MAINTAIN THE FUEL GAS/FLUE GAS TEMPERATURE BELOW 850°F.
2. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 380 PSIG.
3. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED.
4. DILUTION AIR FLOWS FOR SCR ARE NOT SHOWN.
5. DEMINERALIZER REGENERATION WILL BE OFF SITE.

- TEMPERING AIR FANS OPERATE TO MAINTAIN THE FUEL GAS/FLUE GAS TEMPERATURE BELOW 850°F.
- FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 380 PSIG.
- GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED.
- DILUTION AIR FLOWS FOR SCR ARE NOT SHOWN.
- DEMINERALIZER REGENERATION WILL BE OFF SITE.

**PLANT PERFORMANCE SUMMARY-ESTIMATE**

- NUMBER OF GAS TURBINES OPERATING: 1
- NET PLANT HEAT RATE, BTU/KWH (HHV): 11754.07
- TOTAL GROSS OUTPUT, KW: 24944.13
- PLANT NET OUTPUT, KW: 23579.7
- NET PLANT HEAT RATE, BTU/KWH (LHV): 10607.3
- FUEL INPUT/UNIT, MMBTU/HR (HHV): 277.16
- Refueling Efficiency=99.5%
- Recovery=0.5%
- FIRE WATER TANK: 19.3 GPM
- DEWIN\-WATER: 19.3 GPM
- EVAPORATOR: 19.3 GPM
- COIL CONDENSATE: 19.3 GPM

**PLANT PARAMETERS**

- REFRAIG. COMP.: 19.3 GPM
- AIR COOLED CONDENSER: 28.1 GPM
- WATER CONSUMPTION SUMMARY:
  - REFRAIG. COMP.: 26.12 GPM
  - EVAPORATOR: 19.3 GPM
  - M: 0.00 GPM

**REFERENCES**

- **REFERENCE DOCUMENTS**
  - **PROJECT LOCATION:** BYRON, CA
  - **PROJECT TITLE:** DGC KELSO CT

**DRAWING NO:** 114677/MC/03-00-04

**DIAMOND GENERATING CORPORATION**

**DRAWING NO:** 114677/MC/03-00-04