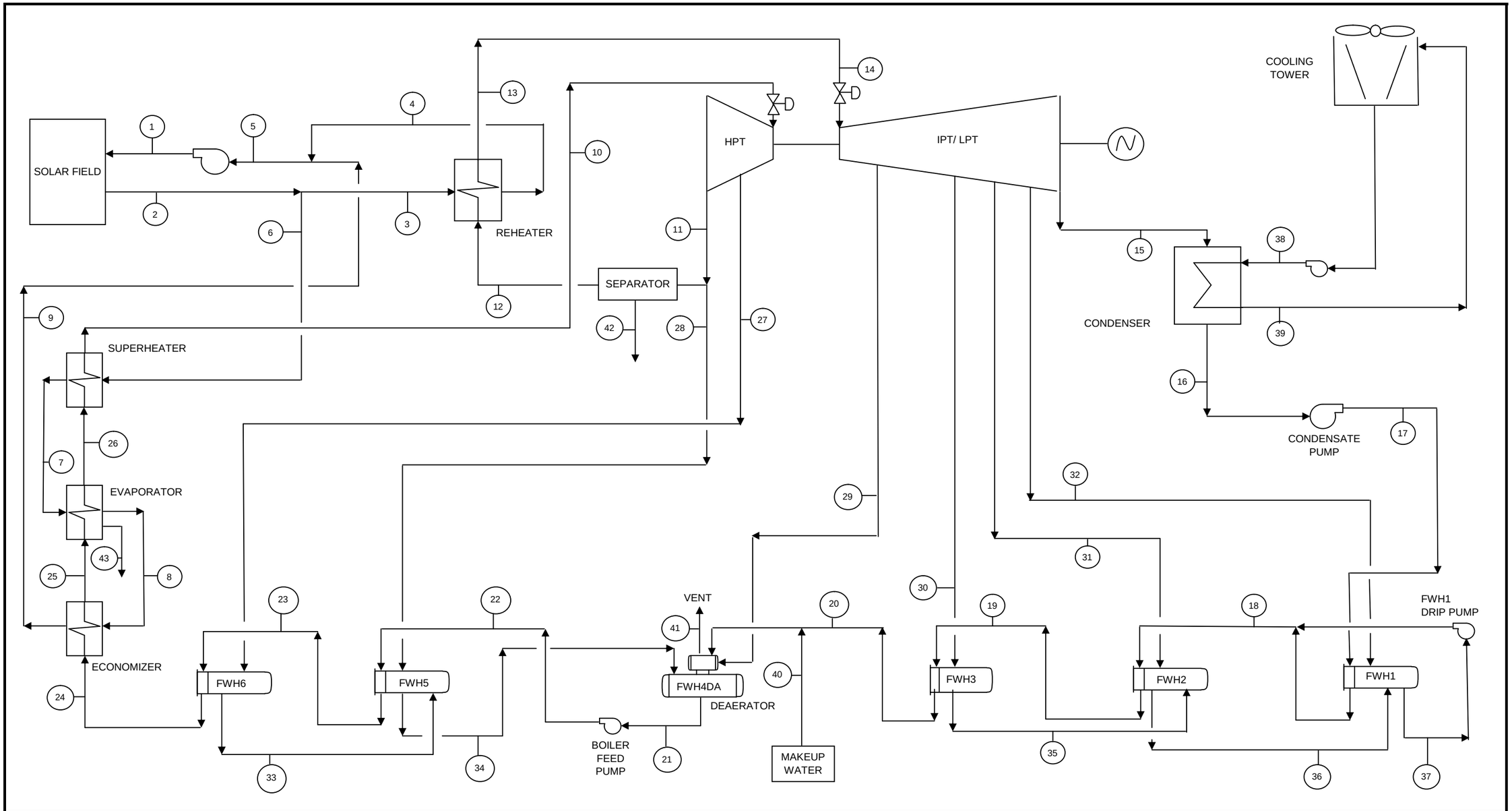

Rev B	BD	08/11/09
Rev A	BD	04/06/09
Description	By	Date

EXPECTED PERFORMANCE
FOR INFORMATION ONLY

	Name	Signature	Date
Engineer:	B. Doar		8/11/2009
Checked:	G.Pratt		8/11/2009
Approved:			

Figure 3.4-6

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HEAT BALANCE DIAGRAM

Genesis Solar, LLC - Genesis Solar Energy Project
125 MW Solar Thermal Plant

Rev B

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Genesis Solar, LLC - Genesis Solar Energy Project
125 MW Solar Thermal Plant
Rev B
Date 8/11/2009
Heat Balance Data

EXPECTED PERFORMANCE FOR INFORMATION

#	Description		HOT DAY	ANNUAL AVERAGE
-	Ambient Conditions	Ambient DB Temperature (F)	112.9	83.2
-	Ambient Conditions	Ambient DB Temperature (F)	78.6	57.8
-	Ambient Conditions	Ambient Relative Humidity	22%	18%
-	System Performance	Gross Power Output (kW)	139,985	142,021
-	System Performance	Power Factor	0.90	0.90
-	System Performance	Gross Steam Cycle Efficiency	38.0%	38.6%
-	System Performance	Aux Loads (kW)	14,993	14,990
-	System Performance	Net Output (MW)	124.99	127.03
-	System Performance	Net Steam Cycle Efficiency	34.0%	34.5%
1	HTF to Solar Field	Flow (lb/hr)	12,280,000	12,280,000
		Temp (F)	565.0	565.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	234.7	234.7
2	HTF from Solar Field	Flow (lb/hr)	12,280,000	12,280,000
		Temp (F)	740.0	740.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	336.9	336.9
3	HTF to Reheater	Flow (lb/hr)	2,060,990	2,061,156
		Temp (F)	740.0	740.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	336.9	336.9
4	HTF from Reheater	Flow (lb/hr)	2,060,990	2,061,156
		Temp (F)	565.0	565.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	234.7	234.7
5	HTF to Pump	Flow (lb/hr)	12,280,000	12,280,000
		Temp (F)	565.0	565.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	234.7	234.7
6	HTF to Superheater	Flow (lb/hr)	10,219,010	10,218,844
		Temp (F)	740.0	740.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	336.9	336.9
7	HTF Supply to Boiler	Flow (lb/hr)	10,219,010	10,218,844
		Temp (F)	-	-
		Press (psia)	-	-
		Enthalpy (BTU/lb)	-	-
8	HTF to Economizer	Flow (lb/hr)	10,219,010	10,218,844
		Temp (F)	-	-
		Press (psia)	-	-
		Enthalpy (BTU/lb)	-	-
9	HTF from Economizer	Flow (lb/hr)	10,219,010	10,218,844
		Temp (F)	565.0	565.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	234.7	234.7
10	HP Steam to STG	Flow (lb/hr)	1,204,624	1,204,624
		Temp (F)	709.5	709.5
		Press (psia)	1465.1	1465.3

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Genesis Solar, LLC - Genesis Solar Energy Project
125 MW Solar Thermal Plant
Rev B
Date 8/11/2009
Heat Balance Data

EXPECTED PERFORMANCE FOR INFORMATION

#	Description		HOT DAY	ANNUAL AVERAGE
		Enthalpy (BTU/lb)	1298.8	1298.7
11	CRH Steam from STG	Flow (lb/hr)	1,168,328	1,168,340
		Temp (F)	409.2	409.2
		Press (psia)	274.3	274.3
		Enthalpy (BTU/lb)	1168.3	1168.3
12	CRH Steam to Reheater	Flow (lb/hr)	1,023,916	1,023,945
		Temp (F)	405.0	405.1
		Press (psia)	261.8	261.8
		Enthalpy (BTU/lb)	1201.4	1201.4
13	HRH Steam from Reheater	Flow (lb/hr)	1,023,916	1,023,945
		Temp (F)	704.0	704.0
		Press (psia)	243.8	243.8
		Enthalpy (BTU/lb)	1374.0	1374.0
14	HRH Steam to STG	Flow (lb/hr)	1,023,916	1,023,945
		Temp (F)	703.3	703.3
		Press (psia)	236.8	236.8
		Enthalpy (BTU/lb)	1374.0	1374.0
15	STG Exhaust	Flow (lb/hr)	816,175	806,908
		Temp (F)	110.3	97.9
		Press (psia)	1.29	0.89
		Enthalpy (BTU/lb)	1010.4	999.9
16	From Condenser Hotwell	Flow (lb/hr)	816,175	806,908
		Temp (F)	110.3	97.9
		Press (psia)	1.3	0.9
		Enthalpy (BTU/lb)	78.3	65.9
17	Condensate Pump Discharge to FWH1	Flow (lb/hr)	816,175	806,908
		Temp (F)	110.5	98.2
		Press (psia)	-	-
		Enthalpy (BTU/lb)	79.1	66.8
18	Condensate to FWH2	Flow (lb/hr)	960,496	960,441
		Temp (F)	196.9	195.0
		Press (psia)	-	-
		Enthalpy (BTU/lb)	165.4	163.5
19	Condensate to FWH3	Flow (lb/hr)	960,496	960,441
		Temp (F)	237.6	237.1
		Press (psia)	-	-
		Enthalpy (BTU/lb)	206.4	205.9
20	Condensate to FWH4/Deaerator	Flow (lb/hr)	960,496	960,441
		Temp (F)	272.3	272.2
		Press (psia)	-	-
		Enthalpy (BTU/lb)	241.5	241.4
21	Boiler Feed Pump Suction	Flow (lb/hr)	1,229,205	1,229,208
		Temp (F)	332.3	332.4
		Press (psia)	106.4	106.5
		Enthalpy (BTU/lb)	303.3	303.3
22	Feedwater to FWH5	Flow (lb/hr)	1,229,205	1,229,208
		Temp (F)	335.8	335.8
		Press (psia)	-	-

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Genesis Solar, LLC - Genesis Solar Energy Project
125 MW Solar Thermal Plant
Rev B
Date 8/11/2009
Heat Balance Data

EXPECTED PERFORMANCE FOR INFORMATION

#	Description		HOT DAY	ANNUAL AVERAGE
		Enthalpy (BTU/lb)	309.3	309.3
23	Feedwater to FWH6	Flow (lb/hr)	1,229,201	1,229,208
		Temp (F)	403.6	403.6
		Press (psia)	-	-
		Enthalpy (BTU/lb)	380.4	380.4
24	Feedwater to Economizer	Flow (lb/hr)	1,229,201	1,229,208
		Temp (F)	425.3	425.3
		Press (psia)	-	-
		Enthalpy (BTU/lb)	403.8	403.8
25	Feedwater to Evaporator	Flow (lb/hr)	1,229,201	1,229,208
		Temp (F)	-	-
		Press (psia)	-	-
		Enthalpy (BTU/lb)	-	-
26	HP Steam to Superheater	Flow (lb/hr)	1,204,624	1,204,624
		Temp (F)	-	-
		Press (psia)	-	-
		Enthalpy (BTU/lb)	-	-
27	Extraction Steam to FWH6	Flow (lb/hr)	36,292	36,284
		Temp (F)	436.5	436.5
		Press (psia)	367.8	367.8
		Enthalpy (BTU/lb)	1189.3	1189.3
28	Extraction Steam to FWH5	Flow (lb/hr)	100,635	100,599
		Temp (F)	409.2	409.2
		Press (psia)	274.3	274.3
		Enthalpy (BTU/lb)	1168.3	1168.3
29	IP/LP Steam Extraction to FWH4 / Deaearator	Flow (lb/hr)	63,420	63,504
		Temp (F)	543.7	545.2
		Press (psia)	106.4	106.5
		Enthalpy (BTU/lb)	1300.9	1301.6
30	IP/LP Steam Extraction to FWH3	Flow (lb/hr)	33,572	33,939
		Temp (F)	389.2	391.4
		Press (psia)	50.6	50.7
		Enthalpy (BTU/lb)	1229.5	1230.6
31	IP/LP Steam Extraction to FWH2	Flow (lb/hr)	37,914	39,067
		Temp (F)	295.7	298.1
		Press (psia)	29.1	29.1
		Enthalpy (BTU/lb)	1187.1	1188.3
32	IP/LP Steam Extraction to FWH1	Flow (lb/hr)	72,834	80,527
		Temp (F)	205.1	204.5
		Press (psia)	12.8	12.6
		Enthalpy (BTU/lb)	1131.7	1132.3
33	Drain from FWH6	Flow (lb/hr)	36,292	36,284
		Temp (F)	412.6	412.6
		Press (psia)	365.8	365.8
		Enthalpy (BTU/lb)	388.8	388.8
34	Drain from FWH5	Flow (lb/hr)	136,928	136,883
		Temp (F)	344.8	344.8
		Press (psia)	272.3	272.3

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Genesis Solar, LLC - Genesis Solar Energy Project
125 MW Solar Thermal Plant
Rev B
Date 8/11/2009
Heat Balance Data

EXPECTED PERFORMANCE FOR INFORMATION

#	Description		HOT DAY	ANNUAL AVERAGE
		Enthalpy (BTU/lb)	316.5	316.5
35	Drain from FWH3	Flow (lb/hr)	33,572	33,939
		Temp (F)	246.7	246.3
		Press (psia)	48.6	48.6
		Enthalpy (BTU/lb)	215.2	214.9
36	Drain from FWH2	Flow (lb/hr)	71,487	73,006
		Temp (F)	205.9	204.5
		Press (psia)	27.1	27.0
		Enthalpy (BTU/lb)	174.0	172.6
37	Drain from FWH1	Flow (lb/hr)	144,320	153,533
		Temp (F)	201.1	199.6
		Press (psia)	11.8	11.4
		Enthalpy (BTU/lb)	169.2	167.6
38	Circ Water to Condenser	Flow (lb/hr)	44,890,132	44,890,132
		Temp (F)	88.3	75.8
		Press (psia)	45.0	45.0
		Enthalpy (BTU/lb)	56.4	43.9
39	Circ Water from Condenser	Flow (lb/hr)	44,890,132	44,890,132
		Temp (F)	105.3	92.6
		Press (psia)	37.7	37.5
		Enthalpy (BTU/lb)	73.4	60.7
40	Makeup Water	Flow (lb/hr)	26,985	26,985
		Temp (F)	70.0	70.0
		Press (psia)	160.0	160.0
		Enthalpy (BTU/lb)	38.5	38.5
41	Vent from FWH4 / Deaearator	Flow (lb/hr)	2,401	2,401
		Temp (F)	332.3	332.4
		Press (psia)	106.4	106.5
		Enthalpy (BTU/lb)	1,188.3	1,188.3
42	Water Drain from Separator	Flow (lb/hr)	43,777	43,796
		Temp (F)	407.4	407.4
		Press (psia)	268.8	268.8
		Enthalpy (BTU/lb)	383.1	383.1
43	Blowdown	Flow (lb/hr)	24,584	24,584
		Temp (F)	-	-
		Press (psia)	-	-
		Enthalpy (BTU/lb)	-	-