APPENDIX 2A

Water Balance Tables

WorleyParsons

Calculation Cover Sheet

Customer	NCPA	**Proj No**	**52007002**
Project Title	Lodi Expansion Combined Cycle Project	**Calc No**	**LODI-0-DC-510-ME-0002**
Calculation Title	NCPA Lodi Water Balance Calculation	**Phase/CTR**	
Elec File Location			
Project File Location		**Page** 2	**of** 2

Rev	Date	By	Checked	Rev	Date	By	Checked
C	**8-Jul-08**	**S. Stern**	**M. Pelletier**	**D**	**20-Aug-08**	**S. Stern**	**M. Pelletier**

	Case (Heat Balance Case)	Duct Burning Status	Evaporative Cooler Status	Dry Bulb Temperature °F	Relative Humidity (%)	Wet Bulb Temperature °F	
Case 1	Annual Average	OFF	ON	61.2	66.8	54.8	
Case 2	Summer Typical	OFF	ON	94.0	27.5	68.9	
Case 3	Summer Maximum	OFF	ON	107.7	18.2	72.9	
Case 4	Winter Typical	OFF	OFF	32.6	74.0	29.7	
Case 5	Winter Minimum	OFF	OFF	23.7	81.0	22.1	
Case 6	Summer Maximum (Fired)	ON	ON	107.7	18.2	72.9	

Flow rates are daily average values in gpm

Stream No.	Stream Description	Case 1 Annual Average	Case 2 Summer Typical	Case 3 Summer Maximum	Case 4 Winter Typical	Case 5 Winter Minimum	Case 6 Summer Maximum (Fired)
1	Influent from WWTP	856	1196	1351	657	586	1528
2	Potable Ground Water Well Inlet	1	1	1	1	1	1
4	Eye Wash/Safety Shower/Drinking Water	1	1	1	1	1	1
6	CTG Evaporative Cooler Makeup	11	40	54	0	0	54
7	CTG Evaporative Cooler Blowdown	2	7	9	0	0	9
8	CTG Evaporative Cooler Evaporation	9	33	45	0	0	45
9	Micro-Filtration Feed	1008	1393	1569	783	704	1784
10	Micro-Filtration Blowdown	101	139	157	78	70	178
11	Micro-Filtration Filtrate	907	1254	1413	705	633	1606
12	Clarifier Feed	846	1186	1341	647	576	1518
13	1st Pass RO Feed	103	108	110	101	102	137
14	1st Pass RO Reject	26	27	27	25	25	34
15	1st Pass RO Permeate	77	81	82	76	76	103
16	Cooling Tower Feed	804	1146	1303	603	532	1469
17	2nd Pass RO Feed	35	34	34	35	35	42
18	2nd Pass RO Reject	3	3	3	4	4	4
19	2nd Pass RO Permeate (EDI Feed)	31	31	31	32	32	38
20	EDI Product	28	28	27	28	28	34
21	EDI Reject	3	3	3	3	3	4
25	Wastewater to Injection Well	103	143	161	80	72	183
26	HRSG Cycle Makeup	28	28	27	28	28	34
27	HRSG Unrecovered Losses	3	3	3	3	3	3
28	HRSG Sampling Losses	5	5	5	5	5	5
29	HRSG Blowdown (before cooling)	20	20	20	21	21	26
30	HRSG Blowdown (after cooling)	48	47	46	48	48	60
31	HRSG Vent Flashing Losses	18	18	18	18	18	23
32	HRSG Blowdown Quench Water	41	40	39	41	41	52
34	Plant Washwater	10	10	10	10	10	10
35	Oil-Water Separator Effluent	11	11	11	11	11	11
36	Cooling Tower Evaporation	788	1091	1229	611	548	1394
37	Cooling Tower Drift	0.3	0.3	0.3	0.3	0.3	0.3
38	Cooling Tower Blowdown	197	272	307	152	137	348
39	Blowdown RO Pre-Filter Waste	10	14	15	8	7	17
40	Blowdown RO Feed	187	259	292	145	130	331
41	Blowdown RO Reject	93	129	146	72	65	165
42	Blowdown RO Permeate	93	129	146	72	65	165
43	Clarified Water	984	1377	1557	754	672	1764
44	Filtered Water	955	1336	1511	731	652	1711
45	Gravity Filter Backwash	39	55	62	30	27	71
46	Clarifier Sludge Blowdown	30	43	48	23	21	55
47	Clarifier Decant	21	30	34	16	15	38
48	Thickener Sludge Blowdown	9	13	14	7	6	16
49	Filter Press Filtrate	7	10	12	6	5	13
50	Filter Cake	1.8	2.6	2.9	1.4	1.2	3.3
51	Clarifier Recycle	68	95	108	52	46	122

Notes

Design Values	
CTG Evaporative Cooler COC	6
Micro-Filtration Blowdown	10%
Clarifier Sludge Blowdown	3%
Gravity Filter Backwash	4%
Thickener Sludge Blowdown	30%
Filter Press Solids	20%
1st Pass RO Reject (% of Feed)	25%
2nd Pass RO Reject (% of Feed)	10%
EDI Reject (10% of Feed Flow)	10%
Number of HRSG	1
Number of Evaporative Coolers	1
Quench Water = HRSG blowdown X factor	2.00
Unrecovered HRSG Losses (% of HRSG Feed)	10%
Blowdown Vent Flash Loss (% of HRSG BD)	40%
Steam requirement	65%
Circ Water COC	5
HRSG Blowdown (% of HRSG Steam Outlet Flow)	2%
Density of water at 87F (lb/gal)	8.3077
Drift % of Circ Water Flow (gal/min)	0.0005%
RO Pre-Filter Waste	5%
Blowdown Sidestream RO Reject (% of Feed)	50%
Clarifier Sludge (1% of Clarifier Feed)	1%
Clarifier Liquid (100% - Clarifier Sludge %)	99%
Filter Press Solids Moisture Content	10%