Table 2.3-2 (REVISED, March 2003)

Process Flow Diagram Heat And Material Balance
BP Cherry Point Refinery
Cherry Point Cogeneration Plant

GE PG7241(FA)	**Guarantee Case**	Contract:
Natural Gas	**Ambient Temperature:** **49.3** F	Revision: B
Ambient:	**Oper. Gas Turbines:** **3**	Date: 06-Mar-03
49.3 °F, 44% RH	**Gas Turbine Load:** **Base**	By:
	Gas Turbine Fuel: **Nat. Gas**	Chk:
	STG Operating: **Yes**	Page 1 of 1
Duct Firing: Off	**Steam Export:** **510** kpph	

Rev.		Description	Flow per train kpph	Flow per unit kpph	Flow per train	Flow per unit	Temp. °F	Pressure PSIA	Enthalpy Btu/lbm	Notes:
		Anhydrous Ammonia to HRSGs	0.029	0.088			50.0	150.0		
		Plant air to Mixed Bed Polisher		3.4						Intermittent Flow
		Condensate from Condenser		1,293.3		2,599 gpm	87.0	208.1	55.5	
		Condensate to HRSG	624.8		1,265 gpm		127.1	208.1	95.6	
		FW from LP Drum to HP/IP BFW Pump	555.0		1,212 gpm		306.7	74.1	276.7	
		IP BFW Pump Bleed	113.4		247 gpm		308.3	533.6	279.2	
		HP BFW Pump Discharge to HRSG	438.5		952 gpm		311.8	2,086.7	285.6	
		Hot IP BFW to Fuel Gas Preheater	40.7		98 gpm		441.5	504.2	420.7	
		Cold IP BFW from Fuel Gas Preheater	40.7		82 gpm		86.2	487.6	55.6	
		Condensate to HRSGs		1,874.5		3,796 gpm	127.1	208.1	95.6	
		Gas Turbine Inlet Air	3,592.4		47,159 Mscfh		49.3	14.6		
		Gas Turbine Exhaust	3,669.0		48,938 Mscfh		1,106.0	15.2		
		After HRSG Duct Burners	3,669.0		48,938 Mscfh		1,105.3			
		HRSG Stack Exit	3,669.0		48,938 Mscfh		212.0	14.6		
		Natural Gas to Preheater	76.6		1,751 Mscfh		60.0	490.0		
		Hot Natural Gas from Preheater	76.6		1,751 Mscfh		365.0	480.0		
		Hot Natural Gas to Gas Turbine	76.6		1,751 Mscfh		365.0	450.0		
		Fuel Gas to Duct Burner	0.0		0 Mscfh		60.0	50.0		
		HRSG HP Superheater Exit	438.0				1,052.0	1,960.0	1,507.8	
		HRSG IP Superheater Exit	72.7				585.9	438.8	1,295.8	
		HRSG LP Superheater Exit	69.1				567.0	71.0	1,315.3	
		STG HP Throttle Steam		1,314.0			1,049.0	1,900.0	1,507.7	
		STG Process Steam Extraction		502.7			785.0	707.0	1,394.9	
		HP Letdown to Process		0.0			1,049.0	1,900.0	1,507.7	
		Process Steam to Desuperheater Flow		7.3			311.8	2,086.7	285.6	
		STG HRH Throttle Steam		987.0			1,050.0	400.0	1,550.0	
		STG LP Induction Steam		207.3			565.6	60.4	1,315.3	
		STG LP Exhaust Steam to Condenser		1,238.7			91.7	0.7	1,034.3	
		Process Steam to Refinery		510.0			750.0	650.0	1,377.8	
		Raw Water from Refinery				2,259 gpm				
		Demineralized Water Makeup				146 gpm				
		Oily Water to Refinery				5 gpm				
		Sanitary Waste to Refinery				5 gpm				
		Demineralized Water to Regen. Skid				27 gpm				
		Neutralized Wastewater to Refinery				260 gpm				
		Hot Condensate from Refinery		459.0		973 gpm	250.0	100.0	218.7	
		Closed Loop Cooling Water Supply				12,100 gpm	61.9	100.0		
		Closed Loop Cooling Water Return				12,100 gpm	71.9	90.0		
		Cooling Water to Condenser				132,400 gpm	61.9	100.0		
		Cooling Water from Condenser				132,400 gpm	80.3	90.0		
		HRSG Blowdown				45 gpm				
		HP BFW to Desuperheaters		2.7		6 gpm	311.8	2,086.7	285.6	

Fuel Input Summary (1)

Rev.	Fuel Consumption Description	Each	Total
		MMBtu/hr (LHV)	
	Gas Turbines	1,615.3	4,845.9
	HRSG Duct Burners	0.0	0.0
	Total Heat Consumption	1,615.3	4,845.9

Power Output Summary (1)

Rev.	Component	Each	Total
	Gas Turbine Gross Output, MW	172.3	516.9
	Steam Turbine Gross Output, MW	221.9	221.9
	Gross Power Output, MW		738.8
	Auxiliary Power, MW		17.8
	Net Power, MW (2)		721.0
	Net Plant Heat Rate, Btu/kW-hr (LHV)		6,721
	Net Plant Heat Rate, Btu/kW-hr (HHV)		7,461
	FCP Heat Rate, Btu/kW-hr (HHV) [3]		6,549

Note:
1. The performances are based on all equipment in new and clean condition and do not include any allowances for degradation or commercial margins.
2. Net power output is at the high side of 230kV transformer.
3. FCP Heat Rate = (Total Heat Consumption (HHV) - (Steam Export Heat - Condensate Import Heat)/0.9)/Net Power