

Process Area	P&I Diagram Reference	Notes	Control System Inputs/Outputs					Field Devices					
			TE's	DI's	DO's	AI's	AO's	TOTAL	On/Off Vlvs	Motors	Heaters	Heat Trace	
Block 1: Bulk Supplies	1-01 – CO2 Bulk Tank	Shared	3	2	1	7		13			1	1	1
	1-02 – O2 Bulk Tank	Shared/Existing		2	1	9		12			1		
	1-03 – N2 Bulk Tank	Shared/Existing		2	1	7		10			1		
	1-04 – Nat. Gas Compressor Station	Shared		3	5	9		17	2		1		
	1-05 – Main Water Supply	No controls equired						0					
	1-06 – Produced Water Supply			4	10	4	8	2	28			4	
Block 2: Feed Preparation	2-01 – Gas Supply System		3	1	18	24	11	57	18	22			1
	2-02 – Nat. Gas Supply			7	4	6	3	20	4				
	2-03 – Slurry Supply System	From Existing		6	4	4	2	16	1	15	2		
	2-04 – Liquid Fuel Supply System	From Existing	1	2	1	5	1	10			1	1	1
	2-05 – Water Supply System			2	3	2	1	8	3				
	2-06 – High Press Water Supply System		2	5	12	14	7	40	11		3		
Block 3: Process	3-01 – Combustor & Quench Vessel		73		1	3		77	1	21			
	3-01 – Combustor - Heat Flux Sensors	Added 4 Dec 2014	12					12					
	3-02 – Scrubber & Gas Filters		19		21	9	2	51	15			1	4
	3-03 – Liquid Filters and Level Control				4	6	2	12	4				
	3-04 – Blowdown and Flashback Seal Drum		2		2	2	1	7	1				
Block 4: Utilities	4-01 – Low Press Cooling Water Supply			0	6	5	5	16	6	7			
	4-02 – High Press Cooling Water Supply			0	1	2	2	5	1				
	4-03 – Combustor Cooling Loop		5	3	1	4	3	16	1		1		
	4-04 – Water Recycle System		1	3	2	3	2	11	0	21	1		
	4-05 – Packaged Glycol System	Looking at surplus sys in bldg 1	3	4	3	1	1	12			4		
Block 5: Sampling	5-01 – Gas Sampling		20		21	12	6	59	6		3		9
	5-02 – Gas Sampling (Part 2)		1		3			4	1		2		
	5-03 – Liquid Sampling		6		14			20	14				
	5-04 – Analyzer Rack	4 Racks, 6 signals ea.				24		24					
TOTAL I/O's			155	52	133	166	51	557	89		25	3	16
Module Number of Points			8 pt	16 pt	16 pt	8 pt	8 pt		8 pt		8 pt	8 pt	8 pt
I/O Multiplied by 25%			193.8	65.0	166.3	207.5	63.8		89		25	3	16
I/O Divided by 8/16			24.2	4.1	10.4	25.9	8.0		11.125		3.125	0.375	2
Modules Rounded Up			25	5	11	26	8	728	12		4	1	2
Spare I/O			45	28	43	42	13	171	7		7	5	0
I/O Modules adjusted			21	5	9	24	9	68					
Points per Module Type			168	80	144	192	72	656					
Spare I/O			13	28	11	26	21	99					
DC Amps - Max				0.48	10.8	3.84	1.44	16.56					
				6mA per pt	0.078A per pt	20mA per pt	20mA per pt						