

Augustus Energy Partners II  
BHR Fed O23-14-397-4RH  
Casing Design Sheet

Surface Casing

Bit Program	Interval	TVD	Casing Program	Max Mud Weight			Safety Factor			1.1			1.2			1.8		
				10.0 lb/gal			Collapse (psi)	Max pressure w/ SF (psi)	Max Pressure w/ Mud Weight (psi)	Burst (psi)	Max Pressure w/ SF (psi)	Max Pressure w/ Mud Weight (psi)	JT Strength (1000 lbs)	Max Weight w/ SF (1000 lbs)	Max Weight without Bouancy (1000 lbs)			
17 1/2"	PDC	0 - 3300	3300	Surface Casing	13 3/8"	68	HTC	J55 BTC	1950	1716	1716	3450	2059	1716	1069	404	224	

Surface 0 - 3300

Collapse Calculations	Burst Calculations	Yield Strength Calculations
Minimum Safety Factor = 1.0 Max Mud Weight = 10.0 lb/gal Max Pressure = 1,716 psi MW * 0.052 * Total Vertical Depth 10.0 * 0.052 * 3,300 = 1,716  Calculated Safety Factor 1.14 SF Casing Collapse / Max pressure = SF 5440 psi / 4958 psi = 1.14  Casing Collapse Rating 1,950 psi  Casing design is OK due to Casing collapse SF being higher than anticipated mud weight hydrostatic pressures with safety factor.	Min Safety Factor = 1.2 Max Mud Weight = 10.0 lb/gal Max Pressure = 1,716 psi MW * 0.052 * Total depth 10.0 * 0.052 * 3300 = 1,716  Calculated Safety Factor 2.01 SF Casing Collapse / Max pressure = SF 3450 / 1,716 = 2.01  Casing Burst Rating 3,450 psi  Casing design is OK due to Casing Burst Calculated SF being higher than needed SF.	Min Safety Factor = 1.8  Max Weight without Bouancy plus ov 224 1000 lbs (Depth * Casing weight) / 1,000 lbs + 100K 3300 * 68.0 / 1000 + 100,000 = 324  Calculated Safety Factor 3.3 SF Casing Tension / Max Tension = SF 1,069 / 324 = 3.3  Casing Connection Yield Strength 1,140 1000 lbs Casing Body Strength 1,069 1000 lbs Casing design is OK due to Casing yield strength rating being higher than total casing weight not including bouancy with 100K overpull and safety factor.

Intermediate Casing

Bit Program	Interval	TVD	Casing Program	Max Mud Weight			Safety Factor			1.0			1.2			1.8		
				10.0 lb/gal			Collapse (psi)	Max pressure w/ SF (psi)	Max Pressure w/ Mud Weight (psi)	Burst (psi)	Max Pressure w/ SF (psi)	Max Pressure w/ Mud Weight (psi)	JT Strength (1000 lbs)	Max Weight w/ SF (1000 lbs)	Max Weight without Bouancy (1000 lbs)			
12 1/4"	PDC	3300 - 10130	10037	Production Casing	9 5/8"	43.5	HTC	HCP110 BTC	5940	5219	5219	9850	6263	5219	1388	793	441	

Intermediate 0 - 10037

Collapse Calculations	Burst Calculations	Yield Strength Calculations
Minimum Safety Factor = 1.0 Max Mud Weight = 10.0 lb/gal Max Pressure = 5,219 psi MW * 0.052 * Total Vertical Depth 10.0 * 0.052 * 10,037 = 5,219  Calculated Safety Factor 1.14 SF Casing Collapse / Max pressure = SF 5440 psi / 4958 psi = 1.14  Casing Collapse Rating 5,940 psi  Casing design is OK due to Casing collapse SF being higher than anticipated mud weight hydrostatic pressures with safety factor.	Min Safety Factor = 1.2 Max Mud Weight = 10.0 lb/gal Max Pressure = 5,219 psi MW * 0.052 * Total depth 10.0 * 0.052 * 10037 = 5,219  Calculated Safety Factor 1.89 SF Casing Collapse / Max pressure = SF 9850 / 5,219 = 1.89  Casing Burst Rating 9,850 psi  Casing design is OK due to Casing Burst Calculated SF being higher than needed SF.	Min Safety Factor = 1.8  Max Weight without Bouancy = 437 1000 lbs (Depth * Casing weight) / 1,000 lbs + 100K overpull 10037 * 43.5 / 1000 + 100K = 537  Calculated Safety Factor 2.6 SF Casing Tension / Max Tension = SF 1,388 / 537 = 2.6  Casing Connection Yield Strength 1,388 1000 lbs Casing Body Strength 1,570 1000 lbs Casing design is OK due to Casing yield strength rating being higher than total casing weight not including bouancy with 100K overpull and safety factor.

Liner Casing

Bit Program	Interval	TVD	Casing Program	Max Mud Weight			Safety Factor			1.0			1.2			1.8		
				14.0 lb/gal			Collapse (psi)	Max pressure w/ SF (psi)	Max Pressure w/ Mud Weight (psi)	Burst (psi)	Max Pressure w/ SF (psi)	Max Pressure w/ Mud Weight (psi)	JT Strength (1000 lbs)	Max Weight w/ SF (1000 lbs)	Max Weight without Bouancy (1000 lbs)			
8 1/2"	PDC	10130 - 20707	11000	Liner	5 1/2"	20	HTC	P210 HTG BTC	11100	8008	8008	12530	9610	8008	641	384	214	

Liner 9930 - 20707

Collapse Calculations	Burst Calculations	Yield Strength Calculations
Minimum Safety Factor = 1.0 Max Mud Weight = 14.0 lb/gal Max Pressure = 8,008 psi MW * 0.052 * Total Vertical Depth 10.0 * 0.052 * 11,000 = 8,008  Calculated Safety Factor 1.39 SF Casing Collapse / Max pressure = SF 11,100 / 8,008 = 1.39  Casing Collapse Rating 11,100 psi  Casing design is OK due to Casing collapse SF being higher than anticipated mud weight hydrostatic pressures with safety factor.	Min Safety Factor = 1.2 Max Mud Weight = 14.0 lb/gal Max Pressure = 8,008 psi MW * 0.052 * Total depth 14.0 * 0.052 * 11000 = 8,008  Calculated Safety Factor 1.56 SF Casing Collapse / Max pressure = SF 12530 / 8,008 = 1.56  Casing Burst Rating 12,530 psi  Casing design is OK due to Casing Burst Calculated SF being higher than needed SF.	Min Safety Factor = 1.8  Max Weight liner in vertical = 303 1000 lbs ((Depth * Casing weight) / 1,000 lbs) + 100K 10130 * 20.0 / 1000 + 100K = 303  Calculated Safety Factor 2.1 SF Casing Tension / Max Tension = SF 641 / 303 = 2.1  Casing Connection Yield Strength 667 1000 lbs Casing Body Strength 641 1000 lbs Casing design is OK due to Casing yield strength rating being higher than total casing weight not including bouancy with 100K overpull and safety factor.