LEVEL 1 - Well Containment Screening Tool (Complete a separate form for each hole section that has potential hydrocarbon flow zones)

Rev 1.19

1) General Well Information

Well Name:	Raptor
Lease/Block:	DC 491 #1 ST1
Water Depth (ft):	8,169
RKB to Mudline Depth (ft):	8,253
Location (lat/long):	Lat: 28.45269836; Long: -87.60702908
Planned TD (ft):	24,321' MD / 22,684 TVD
Planned Spud Date:	May 27, 2013

2) Offset Well Information

RKB 84

	Well	Distance/Direction
1)	**DC 486 #1 (Fredricksburg)**	13.1 miles W
2)	**DC 269 #1 (Shiloh)**	18.7 miles NNW
3)	**DC 268 #1 (Antietam)**	19.5 miles NW
4)	**DC 353 #1 (Vicksburg)**	20.8 miles WNW
5)	**MC 392 #1 (Appomatox)**	26.5 miles WNW
6)	**DC 535 #1 (Raptor)**	0.9 miles

3) Well Design

Wellhead Description	18-3/4" FMC 15K
Capping Stack Description	18-3/4" 15K (MWCC) - 12.75K psi for temp > 250 degr F

User entry

Calculation cell. Do not input data

Casing Plan

Size/Weight/Grade/Connection	Top (ft-TVD)	Bottom (ft-TVD)
36" Structural Casing	8,253	8,576
28" / 218.2 ppf / X-56 / S60MT conductor	8,253	9,186
22" / 224.28# / X-80 / S-90 MMT	8,253	11,393
18" / 116.09 ppf / Q-125 HP / Hyd 511	10,409	13,780
16"/97 ppf / Q-125 HP / Hyd 513	9,993	16,903
14"/114.48 ppf / T-95 / Hunting SLSF	8,253	15,247
11-7/8" / 71.8 ppf / Q-125 CC / Hyd 513	14,947	19,000

Screening tool results

5) Formation integrity below deepest exposed shoe	PASS
6A) Burst Integrity	PASS
6B) Trapped annuli check	PASS
6C) Collapse Integrity	PASS

4) Productive Formation Information

HOLE SECTION: 10.625" x 12.25" **SHOE DEPTH(FT-TVD):** 19,000

Name	Depth (ft-TVD)	Reservoir Fluid	Reservoir Pressure (ppg)	Reservoir Pressure (psi)	Assumed fluid gradient for calc (psi/ft)	Mud Line Shut in Pressure (psi)	Shut in ppg @ shoe	Comments
Cotton Valley	19,284	Oil	12.330	12,364	0.23	9,827	12.45	
Reservoir 2				-		-	-	
Reservoir 3				-		-	-	
Reservoir 4				-		-	-	
Reservoir 5				-		-	-	
Reservoir 6				-		-	-	
Reservoir 7				-		-	-	

Use standard gradients for Level 1:

Gas = 0.10 psi/ft to 9,000' TVD and 0.15 psi/ft below 11,000' TVD.

Oil/Water/Gas = 0.23 psi/ft

5) Formation Integrity Analysis

Zone of interest	Depth	Frac gradient at depth (ppg)	Max pressure (ppge)	Is shut-in ppge < FG at depth?	Comments
Deepest exposed shoe	19,000	13.10	12.45	YES	
Other (e.g. base of salt or depleted zone)			-	N/A	

<<Insert additional rows as necessary for other zones of interest and copy down formulas - **do NOT delete this line**

6) MECHANICAL INTEGRITY ANALYSIS

6.1 BURST ANALYSIS

Component	Burst Rating (psi)	Depth to Top of Component (ft)	Setting MW, PP or SW (ppg)	Exposed to SW? (above top hanger)	Internal Shut-in Pressure (psi)	External pressure (psi)	Burst Load (psi)	Design Factor	Comments
18-3/4" 15K MWCC Capping Stack	12,750	8,253	8.55	Y	9,827	3,632	6,195	2.05	15K cap stack derated for temp above 250 degr F. Expected mudline temp is 256 degr F.
18-3/4" 15K HC Collet Connector&Mandrel	15,000	8,253	8.55	Y	9,827	3,632	6,195	2.42	
18-3/4" 15K BOP Stack	15,000	8,253	8.55	Y	9,827	3,632	6,195	2.42	
18-3/4" 15K high pressure wellhead	15,000	8,253	8.55	Y	9,827	3,632	6,195	2.42	
14" Casing Hanger/Seal Ass'y	15,000	8,253	11.00	N	9,827	4,721	5,106	2.93	
14" Casing @ mudline	9,920	8,253	11.00	N	9,827	4,721	5,106	1.94	
14" Casing @ 11-7/8" Liner Top	9,920	14,947	10.44	N	11,367	8,114	3,252	3.05	
11-7/8" X 14" Liner Hanger (Versaflex)	7,864	14,947	11.20	N	11,367	8,705	2,661	2.95	
11-7/8" Casing @ Liner Top	11,910	14,497	11.20	N	11,263	8,443	2,820	4.22	
11-7/8" Casing Above HID	11,910	18,461	10.10	N	12,175	9,696	2,479	4.80	
11-7/8" Casing Below HID	11,910	18,462	10.10	N	12,175	9,696	2,479	4.80	

<<Insert additional rows as necessary for other zones of interest and copy down formulas - **do NOT delete this line**

6.2 TRAPPED ANNULUS SCREENING

Casing / Liner Strings (show all strings exposed to HC flow)	Enter string type	String or liner lap fully cemented?	Liner lap <= 500 ft?	Setting Depth (ft-MD)	Setting Depth (ft-TVD)	Planned TOC (ft-MD)	Planned TOC (ft-TVD)	Previous Shoe Depth (ft-MD)	Max Angle above previous shoe	Idle < 1 year?	Hydraulic Isolation Depth ft-MD	Hydraulic Isolation Depth ft-TVD	Trapped Annulus?
14" intermediate casing	**Casing**	**N**		15,257	15,257	15,257	15,257	16,903	0	Y	15,257	15,257	NO
11-7/8" Liner	**Liner**	**N**	**Y**	20,081	19,000	18,581	17,921	15,257	0	Y	19,331	18,461	NO
											-		N/A
											-		N/A

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6.3 COLLAPSE ANALYSIS

Component	Collapse rating (psi)	Depth of interest (ft TVD)	Hydraulic Isolation Depth (ft-TVD)	Below HID: Pore Pressure @ Depth (ppg)	Above Hydraulic Isolation Depth: Previous Shoe Depth (ft-TVD)	Above Hydraulic Isolation Depth: Fracture Gradient @ Previous Shoe (ppg)	Above Hydraulic Isolation Depth: Setting Mud Weight (ppg)	Internal Pressure (psi)	Un-trapped Annulus Calcs: External Pressure (psi)	Un-trapped Annulus Calcs: Collapse Load (psi)	Un-trapped Annulus Calcs: Design Factor	Comments
14" Casing @ mudline	9,180	8,253	15,257	8.8	16,903	11.30	11.0	3,632	4,984	1,352	6.78	
14" casing @ 11-7/8" liner top	9,180	14,947	15,257	8.8	16,903	11.30	11.0	5,172	8,813	3,642	2.52	
11-7/8" Versaflex Liner Hanger	7,635	14,947	18,461	8.8	15,257	11.70	11.2	5,172	9,102	3,930	1.94	
11-7/8" Casing @ Liner Top	7,190	14,497	18,461	8.8	15,257	11.70	11.2	5,068	8,840	3,772	1.90	
11-7/8" just above HID	7,190	18,461	18,461	10.1	15,257	11.70	11.2	5,980	11,148	5,169	1.39	
11-7/8" just below HID	7,190	18,462	18,461	10.1	15,257	11.70	11.2	5,980	9,696	3,716	1.93	
11-7/8" Shoe	7,190	19,000	18,461	10.7	15,257	11.70	11.2	6,104	10,572	4,468	1.60	
								-	-	-		

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	Well	Distance/Direction
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4)	**DC 353 #1 (Vicksburg)**	20.8 miles WNW
5)	**MC 392 #1 (Appomatox)**	26.5 miles WNW
6)	**DC 535 #1 (Raptor)**	0.9 miles

3) Well Design

Wellhead Description	18-3/4" FMC 15K
Capping Stack Description	18-3/4" 15K (MWCC) - 12.75K psi for temp > 250 degr F

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Casing Plan

Size/Weight/Grade/Connection	Top (ft-TVD)	Bottom (ft-TVD)
36" Structural Casing	8,253	8,576
28" / 218.2 ppf / X-56 / S60MT conductor	8,253	9,186
22" / 224.28# / X-80 / S-90 MMT	8,253	11,393
18" / 116.09 ppf / Q-125 HP / Hyd 511	10,409	13,780
16"/97 ppf / Q-125 HP / Hyd 513	9,993	16,903
14"/114.48 ppf / T-95 / Hunting SLSF	8,253	15,247
11-7/8" / 71.8 ppf / Q-125 CC / Hyd 513	14,947	19,000
9-7/8" / 62.8 ppf / Q-125 HP / Hydril 523	18,434	21,200

Screening tool results

5) Formation integrity below deepest exposed shoe	PASS
6A) Burst Integrity	PASS
6B) Trapped annuli check	PASS
6C) Collapse Integrity	PASS

4) Productive Formation Information

HOLE SECTION: 8.5 **SHOE DEPTH(FT-TVD):** 21,200

Name	Depth (ft-TVD)	Reservoir Fluid	Reservoir Pressure (ppg)	Reservoir Pressure (psi)	Assumed fluid gradient for calc (psi/ft)	Mud Line Shut in Pressure (psi)	Shut in ppg @ shoe	Comments
Norphlet Sandstone	21,550	Oil	13.480	15,106	0.23	12,047	13.63	Based on the DC 535 #1, the expected Norphlet pore press gradient = 11.3 ppg. A higher value of Norphlet pore press gradient of 13.480 ppg is used here to account for geologic uncertainty and to be conservative.
Reservoir 2				-		-	-	
Reservoir 3				-		-	-	
Reservoir 4				-		-	-	
Reservoir 5				-		-	-	
Reservoir 6				-		-	-	
Reservoir 7				-		-	-	

Use standard gradients for Level 1:

Gas = 0.10 psi/ft to 9,000' TVD and 0.15 psi/ft below 11,000' TVD.

Oil/Water/Gas = 0.23 psi/ft

5) Formation Integrity Analysis

Zone of interest	Depth	Frac gradient at depth (ppg)	Max pressure (ppge)	Is shut-in ppge < FG at depth?	Comments
Deepest exposed shoe	21,200	14.47	13.63	YES	
Other (e.g. base of salt or depleted zone)			-	N/A	

<<Insert additional rows as necessary for other zones of interest and copy down formulas - **do NOT delete this line**

6) MECHANICAL INTEGRITY ANALYSIS

6.1 BURST ANALYSIS

Component	Burst Rating (psi)	Depth to Top of Component (ft)	Setting MW, PP or SW (ppg)	Exposed to SW? (above top hanger)	Internal Shut-in Pressure (psi)	External pressure (psi)	Burst Load (psi)	Design Factor	Comments
18-3/4" 15K MWCC Capping Stack	12,750	8,253	8.55	Y	12,047	3,632	8,415	1.51	15K cap stack derated for temp above 250 degr F. Expected mudline temp is 256 degr F.
18-3/4" 15K HC Collet Connector&Mandrel	15,000	8,253	8.55	Y	12,047	3,632	8,415	1.78	
18-3/4" 15K BOP Stack	15,000	8,253	8.55	Y	12,047	3,632	8,415	1.78	
18-3/4" 15K high pressure wellhead	15,000	8,253	8.55	Y	12,047	3,632	8,415	1.78	
14" Casing Hanger/Seal Ass'y	15,000	8,253	11.00	N	12,047	4,721	7,327	2.04	
14" Casing @ mudline	9,920	8,253	11.00	N	12,047	4,721	7,327	1.35	
14" Casing @ 11-7/8" Liner Top	9,920	14,947	10.44	N	13,587	8,114	5,473	1.81	
11-7/8" X 14" Liner Hanger (Versaflex)	7,864	14,947	11.20	N	13,587	8,705	4,882	1.61	
11-7/8" Casing @ Liner Top	11,910	14,947	11.20	N	13,587	8,705	4,882	2.43	
11-7/8" Casing above HID	11,910	18,461	11.20	N	14,395	10,752	3,644	3.26	
11-7/8" Casing below HID	11,910	18,462	10.10	N	14,395	9,696	4,699	2.53	
11-7/8" Casing at 9-7/8" Liner Top	11,910	18,784	10.25	N	14,470	10,012	4,458	2.67	
9-7/8" X 11-7/8" Liner Hanger (Baker)	5,987	18,784	12.50	N	14,470	12,210	2,260	2.64	
9-7/8" Casing @ Liner Top	14,960	18,784	12.50	N	14,470	12,210	2,260	6.61	
9-7/8 Casing above HID	14,960	20,947	12.50	N	14,967	13,616	1,351	11.06	
9-7/8 Casing Below HID	14,960	20,947	11.50	N	14,967	12,526	2,441	6.12	

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6.2 TRAPPED ANNULUS SCREENING

Casing / Liner Strings (show all strings exposed to HC flow)	Enter string type	String or liner lap fully cemented?	Liner lap <= 500 ft?	Setting Depth (ft-MD)	Setting Depth (ft-TVD)	Planned TOC (ft-MD)	Planned TOC (ft-TVD)	Previous Shoe Depth (ft-MD)	Max Angle above previous shoe	Idle < 1 year?	Hydraulic Isolation Depth ft-MD	Hydraulic Isolation Depth ft-TVD	Trapped Annulus?
14" intermediate casing	**Casing**	**N**		15,257	15,257	15,257	15,257	16,903	0	Y	15,257	15,257	NO
11-7/8" Liner	**Liner**	**N**	**Y**	20,081	19,000	18,581	17,921	15,257	0	Y	19,331	18,461	NO
9-7/8" Liner	**Liner**	**Y**	**Y**	22,743	21,200	19,781	18,784	19,000	44	Y	21,262	19,864	NO - Cement model reqd
											-		N/A

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6.3 COLLAPSE ANALYSIS

Component	Collapse rating (psi)	Depth of interest (ft TVD)	Hydraulic Isolation Depth (ft-TVD)	Below HID: Pore Pressure @ Depth (ppg)	Above Hydraulic Isolation Depth: Previous Shoe Depth (ft-TVD)	Fracture Gradient @ Previous Shoe (ppg)	Setting Mud Weight (ppg)	Internal Pressure (psi)	Un-trapped Annulus Calcs: External Pressure (psi)	Collapse Load (psi)	Design Factor	Comments
14" Casing @ mudline	9,180	8,253	15,257	8.8	16,903	11.30	11.0	3,632	4,984	1,352	6.78	
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11-7/8" Versaflex Liner Hanger	7,635	14,947	18,461	8.8	15,257	11.70	11.2	5,172	9,102	3,930	1.94	
11-7/8" Casing @ Liner Top	7,190	14,497	18,461	8.8	15,257	11.70	11.2	5,068	8,840	3,772	1.90	
11-7/8" just above HID	7,190	18,461	18,461	10.1	15,257	11.70	11.2	5,980	11,148	5,169	1.39	
11-7/8" just below HID	7,190	18,462	18,461	10.1	15,257	11.70	11.2	5,980	9,696	3,716	1.93	
11-7/8" Casing at 9-7/8" Liner Top	7,190	18,784	18,461	10.25	15,257	11.70	11.2	6,054	10,012	3,958	1.81	
9-7/8" X 11-7/8" Liner Hanger (Baker)	7,667	18,784	20,947	10.25	19,000	13.10	12.5	6,054	12,802	6,748	1.13	
9-7/8" Casing @ Liner Top	12,910	18,784	20,947	10.25	19,000	13.10	12.5	6,054	12,802	6,748	1.91	
9-7/8 Casing above HID	12,910	20,947	20,947	11.5	19,000	13.10	12.5	6,552	14,208	7,657	1.68	
9-7/8 Casing Below HID	12,910	20,948	20,947	11.5	19,000	13.10	12.5	6,552	12,527	5,975	2.16	

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