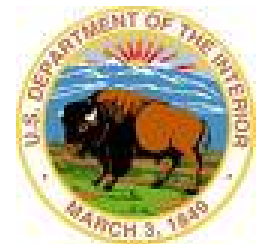


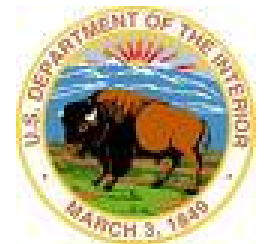
Bureau of Ocean Energy Management, Regulation and Enforcement NTL 2010-N10 and Containment Review Process



NTL 2010-N10 and Statement of Compliance

- NTL 2010-N10 states the following:

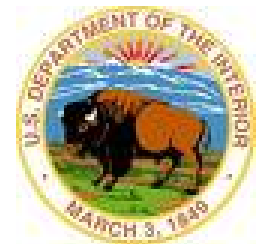
“To ensure that an operator is knowledgeable of and will comply with all applicable regulations when using subsea BOP systems or surface BOPs on a floating facility, the operator must include with every application for a well permit a statement signed by an authorized company official stating that the operator will conduct all authorized activities in compliance with all applicable regulations, including the Increased Safety Measures for Energy Development on the Outer Continental Shelf rulemaking (75 FR 633346) The statement should be submitted along with each application for a well permit...”



NTL 2010-N10 and Containment

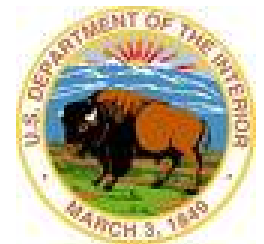
- The section titled “Information Demonstrating Adequate Spill Response and Well Containment Resources” states the following:

“For operations using subsea BOPs or surface BOPs on floating facilities, BOEMRE will evaluate whether each operator has submitted adequate information demonstrating that it has access to and can deploy surface and subsea containment resources that would be adequate to promptly respond to a blowout or other loss of well control....BOEMRE will evaluate whether each operator has provided adequate information in its current OSRP describing the types and quantities of surface and subsea containment equipment that the operator can access in the event of a spill or threat of spill, and the deployment time for each, pursuant to 30 CFR 254.23(d).”



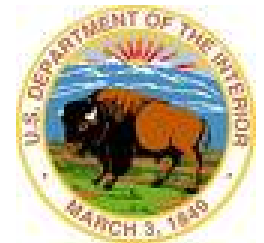
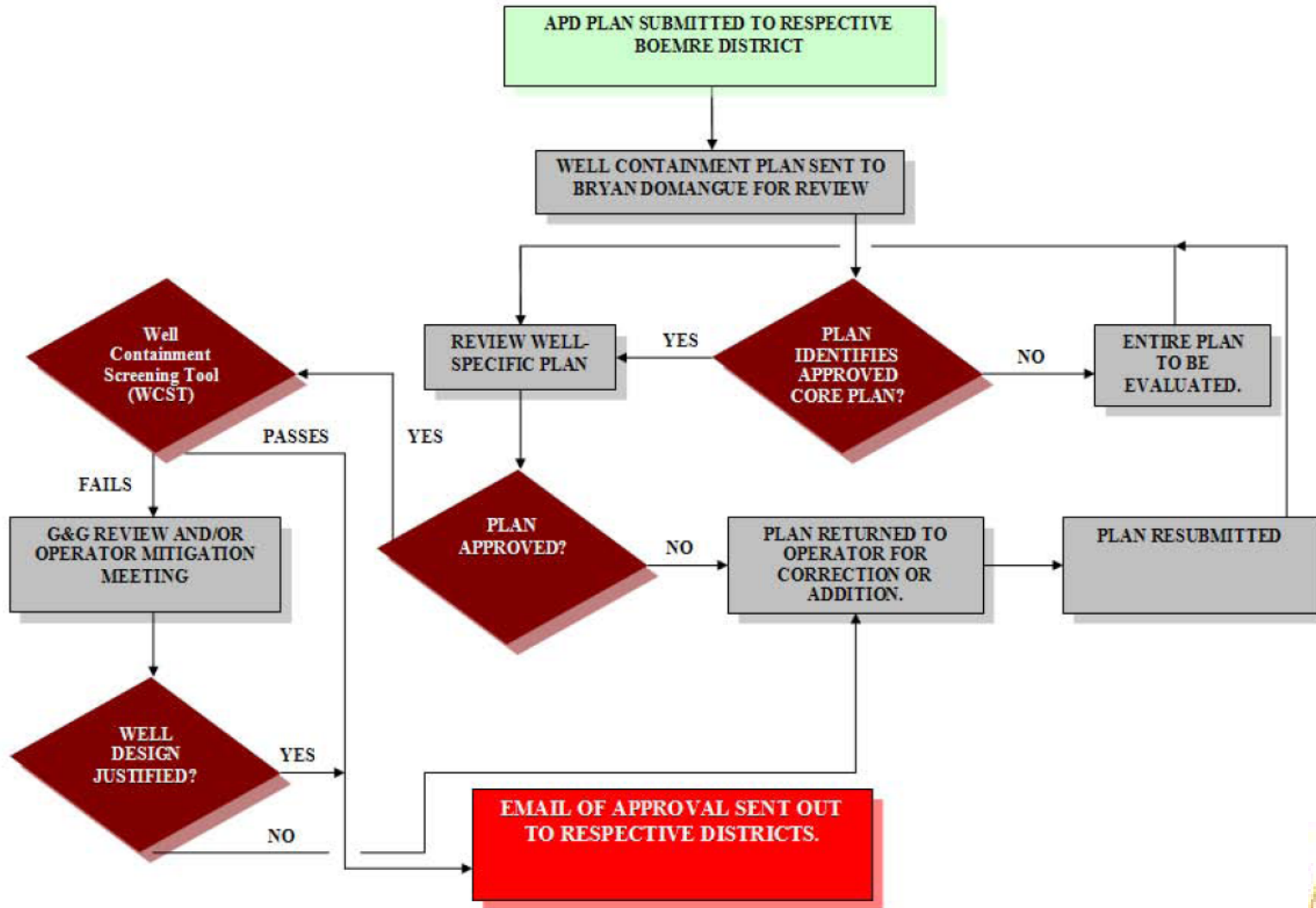
NTL 2010-N10 Containment Review Process

- The operator must submit with the Application for Permit to Drill (APD) a written description of their OSRP containment strategy on a well by well basis demonstrating the following to immediately abate the source of the spill (per 30 CFR 254.5(c)):
 - a. Debris removal capability.
 - b. Dispersant injection capability.
 - c. Must have access to and installation capability of a Capping Stack or its functional equivalent.
 - d. Deployment capability of a Top-Hat or its functional equivalent. This will include some collection capability in the range of 8000-12000 bbl/day. As we can recall from Macondo, Top-Hats tend to be inefficient from a sealing perspective thus we consider this a stop-gap measure until a capping stack can be installed.
 - e. Demonstrate well integrity utilizing the Well Containment Screening Tool (WCST) in development by MWCC, HWCG, and BOEMRE or its functional equivalent.

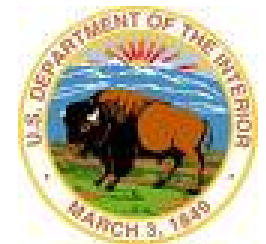
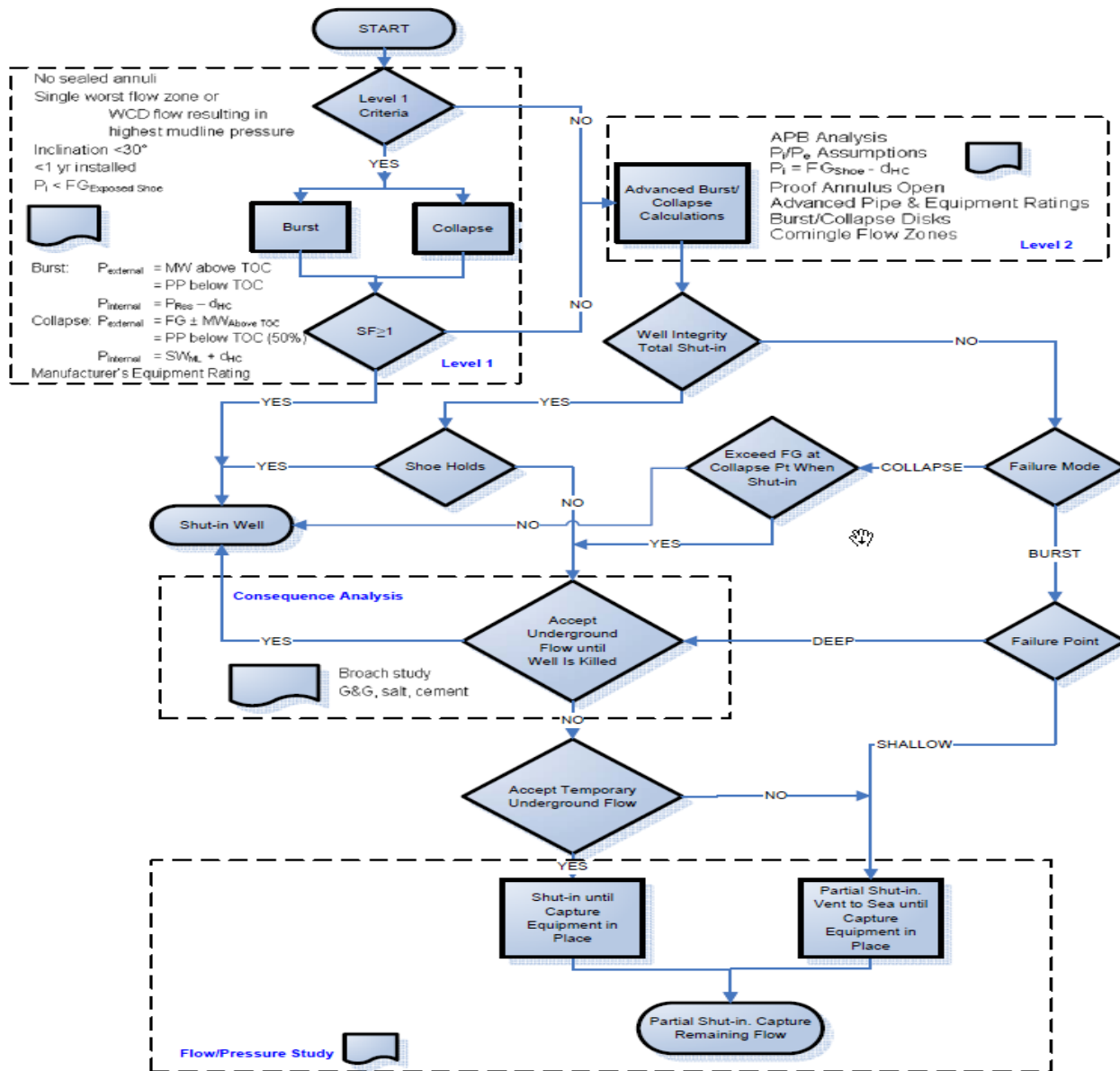


BOEMRE Review Process Flowchart

BOEMRE Well Containment Review Process Flow Chart



Wellbore containment flowchart



NTL 2010-N10 Containment Review Process (cont.)

■ WCST Sections 1-2 screenshot:

THIS WORKSHEET IS VALID FOR WELLS WITH SUBSEA BOP STACKS ONLY.

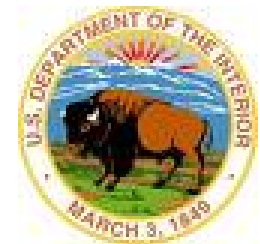
Revision 1.17

1) General Well Information

1 Well Name:	Well XYZ
2 Lease/Block:	WR 123
3 Water Depth (ft):	4,500
4 RKB to Mudline Depth (ft):	4,650
5 Location (lat/long):	
6 Planned TD (ft):	13,900' TVD/18,070' MD
7 Planned Spud Date:	March 30, 2011

2) Offset Well Information

Well	Distance/Direction
1) Exploration Well 1	0.023 NNW
2) Exploration Well 2	0.2 NW
3) Exploration Well 3	1 NW
4) Exploration Well 4	A.A miles NE
5) Exploration Well 5	B.B miles NW
6) Exploration Well 6	C.C miles NW



NTL 2010-N10 Containment Review Process (cont.)

■ WCST Section 3 screenshot:

3) Well Design

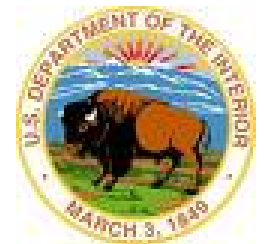
- 1 Wellhead Description
- 2 Capping Stack Description
- 3 Casing Plan

Drill Quip 15 ksi SS-15 Big Bore II
 Helix 10 K(13-5/8" WOM Dual blind Rams)

User entry
 Calculation cell. Do not input data

Size/Weight/Grade/Connection	Top (ft-TVD)	Bottom (ft-TVD)
1 22", 224 ppf, X80	4,314	6,825
2 16", 97 ppf, HC P-110	6,047	10,911
3 13-5/8", 88.2 ppf, HC Q-125	4,314	12,474
4 14", 112.6 ppf, HC Q-125	12,474	19,622
5		
6		
7		
8		
9		
10		

Screening tool results	
5) Shut in Pressure below formation integrity when well shut-in	PASS
6A) Burst Integrity	PASS
6B) Trapped annuli check	PASS
6C) Collapse Integrity	PASS



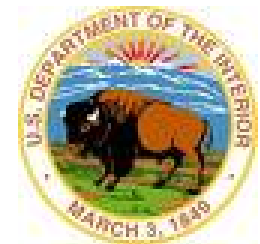
NTL 2010-N10 Containment Review Process (cont.)

■ WCST Section 4 screenshot:

4) Productive Formation Information

HOLE SECTION: 12-1/4" SHOE DEPTH(FT-TVD): 19,622

Name	Depth (ft-TVD)	Reservoir Fluid	Reservoir Pressure		Assumed fluid gradient for calc (psi/ft)	Mud Line Shut in Pressure (psi)	Shut in ppg @ shoe	Comments
			(ppg)	(psi)				
1) Reservoir 1	21,096	water	10.1	11,080	0.23	7,297	10.53	
2) Reservoir 2	22,476	gas	10.1	11,804	0.23	7,704	10.93	
3) Reservoir 3	23,281	water	10.1	12,227	0.23	7,942	11.16	
4) Reservoir 4	24,271	oil	11.1	14,009	0.23	9,496	12.68	
5) Reservoir 5				-		-	-	
6) Reservoir 6				-		-	-	
7) Reservoir 7				-		-	-	



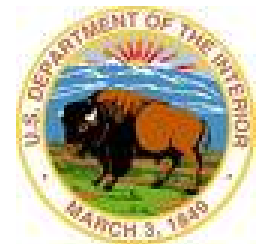
NTL 2010-N10 Containment Review Process (cont.)

■ WCST Section 5 screenshot:

5) Formation Integrity Analysis

Zone of interest	Depth	Frac gradient at depth (ppg)	Max pressure (ppge)	Is shut-in ppg < FG at depth?	Comments
Casing Shoe	19,622	15.10	12.68	YES	casing shoe set in salt
Other (e.g. base of salt or depleted zone)			-	N/A	

<<Insert additional rows as necessary for other zones of interest - do NOT delete this line



NTL 2010-N10 Containment Review Process (cont.)

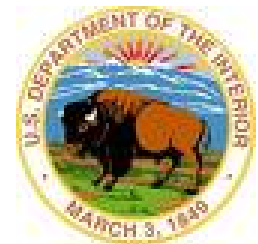
■ WCST Section 6A screenshot:

6) Capping Analysis

6A) BURST MECHANICAL INTEGRITY AT GIVEN DEPTH

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	Comment
Capping BOP stack	10,000	4295	8.55	Y	9,415	1,843	7,572	1.32	
LMRP connector	10,000	4300	8.55	Y	9,416	1,845	7,571	1.32	
Drilling BOP stack	15,000	4300	8.55	Y	9,416	1,845	7,571	1.98	
Subsea Wellhead	15,000	4305	8.55	Y	9,417	1,847	7,570	1.98	
13-5/8" Casing Hanger/Seal Assembly	10,000	4314	14.30	N	9,419	3,208	6,211	1.60	
13-5/8" Casing	10,030	4320	14.30	N	9,420	3,212	6,208	1.61	
14" Casing	12,450	12474	14.30	N	11,296	9,276	2,020	6.16	
					-	-	-		
					-	-	-		
					-	-	-		

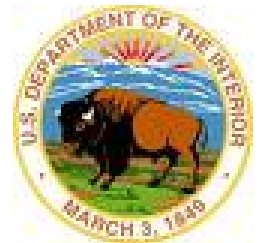
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NTL 2010-N10 Containment Review Process (cont.)

■ WCST Section 6B screenshot:

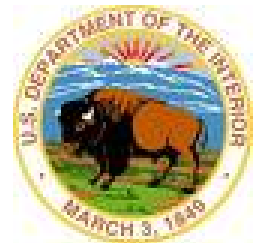
6B) TRAPPED ANNULUS SCREENING												
Casing / Liner Strings (Show all strings exposed to HC flow)	Liner with		Setting Depth (ft- TVD)	Setting Depth (ft- MD)	Planned TOC (ft- TVD)	Planned TOC (ft-MD)	Previous Shoe Depth (ft-TVD)	Shoe Depth (ft- MD)	Hydraulic isolation depth (ft TVD)	Max Angle above previous shoe	Idle < 1 year?	Trapped Annulus?
	22"/20", or Tieback?	lap < 500 ft or cmt to TOL										
13-5/8" Casing	No	N	19,622	19,783	17,690	17,801	10,911	10,911	18,675	1	Y	NO
												N/A
												N/A
												N/A
												N/A
												N/A
												N/A
												N/A
												N/A



NTL 2010-N10 Containment Review Process (cont.)

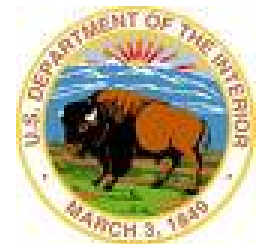
■ WCST Section 6C screenshot:

6C) COLLAPSE ANALYSIS				Below HID	Above Hydr Isolation Depth			Un-trapped Annulus Calcs				Comment
Component	Collapse rating (psi)	Depth of interest (ft TVD)	Hydraulic Isolation Depth (ft-TVD)	Pore Pressure @ Depth (ppg)	Previous Shoe Depth (ft-TVD)	Fracture Gradient @ Previous Shoe (ppg)	Setting Mud Weight (ppg)	Internal Pressure (psi)	External Pressure (psi)	Collapse Load (psi)	Design Factor	
13-5/8" Casing	6370	12474	12,474		10,911.00	15.5	14.3	3,800	9,957	6,156	1.03	
14" Casing	11350	19622	18,675	12.3	10,911	15.5	14.3	5,444	12,550	7,106	1.59	
14" Casing	11350	18675	18,675		10,911	15.5	14.3	5,226	14,568	9,341	1.21	
								-	-	-		
								-	-	-		
								-	-	-		
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								-	-	-		
<<Insert additional rows as necessary for other zones of interest - do NOT delete this line												



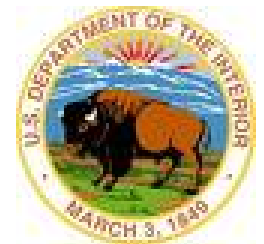
NTL 2010-N10 Containment Review Process (cont.)

- BOEMRE will then evaluate the well design to determine which of the following categories a well falls into:
 - a. **Can the well be shut in with full well bore integrity?**
 - This means that if the well is shut-in, will the casing burst and/or will shut-in pressure break down a casing shoe and cause an underground flow? .
 - If the well bore passes this evaluation, containment can be approved if all of the other items mentioned previously (items a through e) are in place.
 - b. If well bore integrity cannot be demonstrated and it is determined that a casing shoe will breakdown causing underground flow, **will the underground flow eventually broach the sea floor?**
 - This evaluation will require BOEM Resource Evaluation Section (G&G) to evaluate local faulting capable of transmitting flow to the surface. This is an evaluation of seismic data, and an operator's latest interpreted volume of seismic data should be submitted.
 - If seismic data indicates that the underground flow **will not** broach to the seafloor, containment can be approved if all of the other items mentioned previously (items a through e) are in place.



NTL 2010-N10 Containment Review Process (cont.)

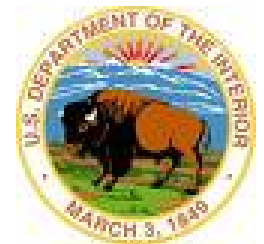
- BOEMRE will then evaluate the well design to determine which of the following categories the well falls into:
 - c. **If well bore integrity is not capable of being achieved or if a shut-in will result in an underground flow that breaches the sea floor, containment can only be approved if an operator can demonstrate cap, flow, and collection capability in additions to the other items mentioned previously (items a through e).**
 - At this time, no operator has approached BOEMRE with a suggestion that cap, flow, and collect is a preferred option.
 - This option requires a complete flow analysis by the operator to determine the required surface process flow capacity.
 - Industry appears ready to design wells that can be shut in at the sea floor without compromising well bore integrity; however, our well analysis will ultimately determine this outcome.
 - This flow analysis will ultimately drive how much flow capacity the containment organization and/or operators acquire.



NTL 2010-N10 Containment Review Process (cont.)

- How the well containment plan is submitted?
 - At this time the well containment plan is to be submitted two ways:
 1. A copy is to be submitted to the Houma District to Bryan Domangue's attention.

Bryan Domangue
BOEMRE Houma District
3804 Country Drive
Bourg, Louisiana 70343
 2. A copy should also be submitted along with the APD.



QUESTIONS???

