US House of Representatives
Committee on Science and Technology

TESTIMONY

Benton F. Baugh, Ph.D., P.E., NAE
President
Radoil, Inc.

I have been asked to give testimony as to whether current subsea drilling equipment is sufficiently developed to provide an adequate level of safety for deepwater drilling operations.

It is my opinion that the current state of technology of subsea drilling system is completely adequate to provide an appropriate level of safety to control wells being drilled, protect the environment, and provide safety for personnel. The basis of my opinion is more than 50 years of working in oilfield equipment design and manufacturing, receiving more than 100 U.S. patents, and having personally received a patent on almost every subassembly of a subsea drilling system.

Subsea drilling systems have existed for approximately the same period of time, from the early 60s' when 250' of seawater was considered ultra-deep, until now when we are drilling in 12,000' of seawater. Overall they have an impressive safety record. The BOP or blowout preventer stack is a piece of seafloor equipment approximately 12 foot square by 80 feet tall which typically weigh 600,000 to 800,000 lbs. They are connected to a surface vessel by a 21" outside diameter steel riser pipe with flotation added to give it approximately a four foot diameter.

This subsea equipment business we are discussing is dominated by 3 major first level manufacturers. Each of these suppliers have highly developed and refined systems. Each of these suppliers is ISO quality certified and follows conventional procedures of design, development, testing, and independent verification. You can fully expect that any system in the field has been tested to loads and pressures 50% higher than the loads and pressures ever anticipated to be seen in operations, and that the testing has been verified by independent third parties. You can equally well expect that the equipment is regularly tested to the maximum working pressures to confirm ongoing workability.

The company I work with is a second level company which sells large reels to each of these first level suppliers. On the first slide presented you can see a set of these reels of the type which will hold 10-12,000' of umbilical or hose to send signals and power to the subsea BOP control pods. The second slide on the left hand side shows a copy of the ISO 9001:2008 certification which we have received to certify that we have systems in place to promote the delivery of quality products. The right side of the same slide shows a "Type Approval" which we have received for a design, implying that not only has a 3rd party certifier checked the design, but has approved it as a type of design.

The third slide shows a factory acceptance test or FAT test for a product, in this case a reel. On the left side is the first page of the FAT and on the right side is page number 10 of 15 pages of this FAT test. On the right side you will notice that our personnel have

signed that each step has been successfully accomplished. Each of the small round stamps indicate that our customer's quality control personnel have witnessed and confirmed each requirement. Each of the oval stamps indicates that an independent third party, in this case the American Bureau of Shipping, has witnessed and confirmed each step. This occurs on every performance step, every pressure step, and every load step. All of our products do not require this level of quality and verification, but this is characteristic of what goes offshore.

These are the practices you would expect of the current first level suppliers. Clearly the systems for appropriate design, testing, and verification are in place today.

The well in question does not represent a "pushing of the envelope" in terms of what has been done. It is in 5000' of water and likely the exact rig had drilled other wells in depths greater than 10,000'. There is very little difference in drilling in 1000' of seawater and 10,000' of seawater. Probably the biggest difference is in what happens to the nitrogen charge in the accumulators which is well studied. The actual cause of the current problems is not known, and may well never be known depending on how ultimate closure happens to this well. Clearly it is the confluence of a number of events, none of which may have been the fault of the drilling system.

In spite of the current difficulties with the Maconda well blowout, there have been approximately 4000 offshore wells drilled and the last significant spill from a U.S. offshore well was in the Santa Barbara Channel, about 30 years ago. This is an impressive record of complex systems handling the critical sources of energy upon which our civilization is based.

The present question is whether a work stoppage will improve or reduce safety and technology. There is not a question whether we need fossil fuels in our lifetime. In spite of substantial investments to do so, it is clear that there will be no substitute for fossil fuels in our lifetime. A substantial work stoppage or moratorium will mean:

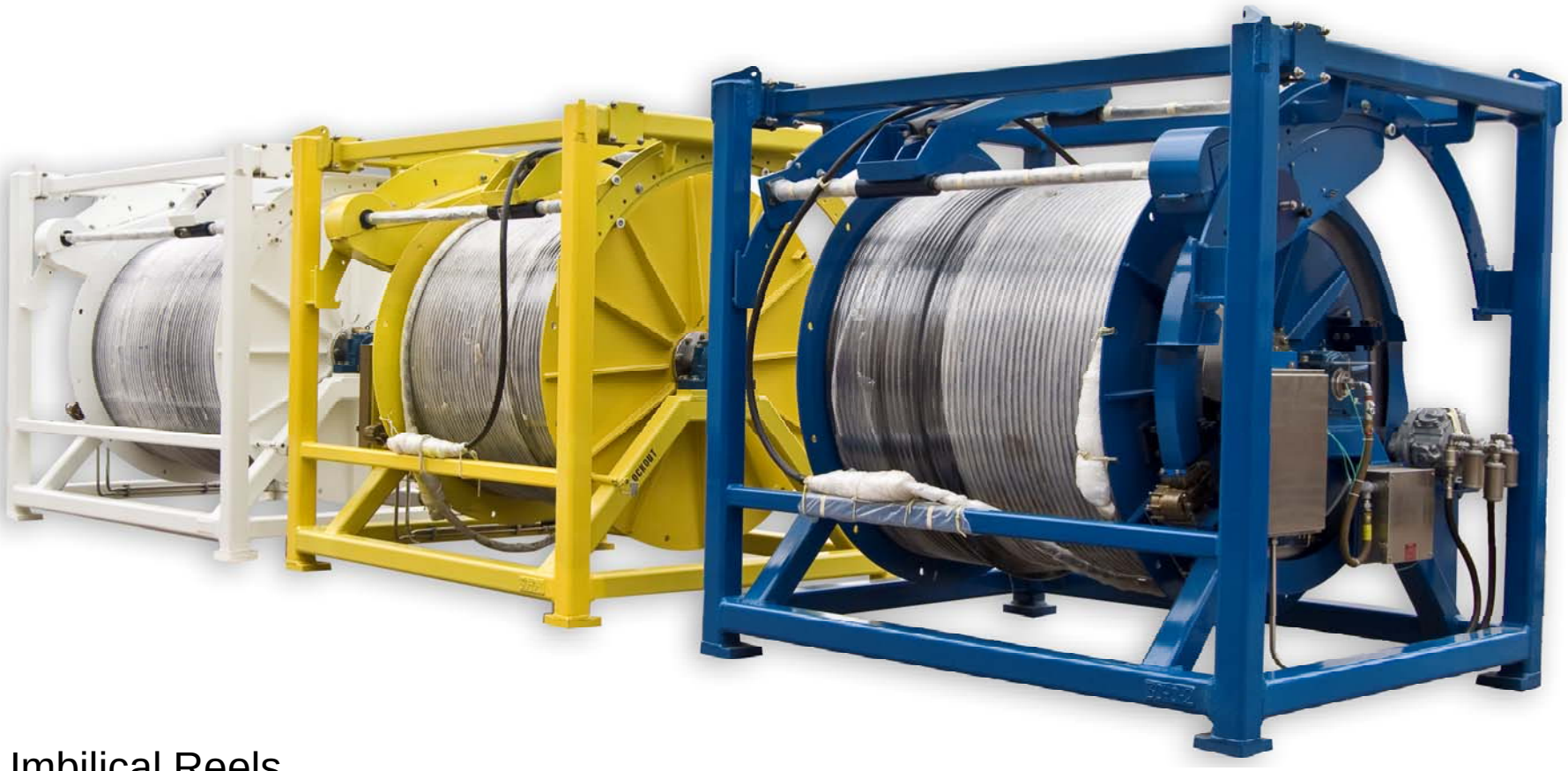
1. A reduction in safety because when the work restarts it will restart with a high percentage of less skilled workers. The most dangerous time for operations is when new workers start up a new task, and that is exactly what this will cause.
2. A reduction in safety because stopping drilling will cause more oil to come from foreign sources by tanker. It is far less safe for oil to be brought to the U.S. by tanker than it is to flow in a passive subsea pipeline to the shore. In fact, the last significant spill oil spill in the U.S. was that of a tanker – the Exxon Valdez.
3. Financial damage to the work force and US companies will likely be more extensive than the oil spill itself, with no one to pay for it.

I assure you that the technology is in place and the systems are in place to do safe deepwater drilling. For these reasons I recommend:

1. The moratorium be lifted as soon as practical.
2. As equipment comes back to the surface, it be retested to confirm compliance with original factory acceptance testing and systems integration testing and have full independent 3rd party verification. If it is, the rig needs to go right back to work and continuity of the work force needs to continue.
2. All equipment and systems fabricated for collecting the present spill be captured and further developed in case another spill happens in the future.

3. Shear rams and shear ram actuators need continuing development as the wall thickness and material strength of the drill pipe is increased.
4. Tertiary back-up systems be commonly defined and implemented.
5. ROV interface systems be further developed for a fourth level of back-up control.
6. To a large extent, if existing rules, regulations and practices are enforced the overall quality and safety of the industry will be approved.

I encourage and promote ongoing and aggressive new product development and systems upgrade, not for 6 months but forever. At this time, in the past, and in the future it has been or will be appropriate to pursue upgrades in safety and technology. We will never reach perfection except in the smallest areas. We need to put our people and the country back in business now, not after some future arbitrary date.



Umbilical Reels

PERRY JOHNSON REGISTRARS, INC.

Certificate of Registration

Perry Johnson Registrars, Inc., has assessed the Quality Management System of:

Radoil Inc
12251 FM 529, Houston, TX 77041 United States

(Hereinafter called the Organization) and hereby declares that Organization is in conformance with:

ISO 9001:2008

This Registration is in respect to the following scope of supply:

Design, Manufacture and Sales of Oilfield Equipment

Such products shall be manufactured by the Organization at, or such processes or services shall be offered at or from, only the address given above. This Registration is granted subject to the system rules governing the Registration referred to above, and the Organization hereby covenants with the Assessment body duty to observe and comply with the said rules.

For PJR:

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)
26555 Evergreen, Suite 1340
Southfield, Michigan 48076
(248) 358-3388

UKAS QUALITY MANAGEMENT 105

ANAB ACCREDITED

PERRY JOHNSON REGISTRARS, INC.

The validity of this certificate is dependent upon ongoing surveillance.

Effective Date:	Expiration Date:	Certificate No:
December 22, 2009	December 21, 2012	C2009-03135

DNV

DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. D- 3219
This Certificate consists of 5 pages

This is to certify that the
Vertical Hot Stabs

with type designation(s)
Vertical Hot Stabs (P/N: 190,689-27-01; 190,689-21-01)

Manufactured by
Radoil, Inc.
HOUSTON, TX 77041 2805, United States

is found to comply with

DNV's Offshore Standard DNV-OS-E101 "Drilling Plant" October 2006
and Det Norske Veritas' understanding of the implementation and interpretation of:
PSA's "*Regulations relating to the Design and Outfitting of Facilities etc. in the Petroleum Activities (the Facilities Regulations)*", Chapter IV, last amended 12 February 2007.

Application
See design limitations on page 2

Place and date
Houston, 8 January 2008
for DET NORSKE VERITAS (USA) INC.
Brandon Caraway
Senior Engineer

Local Office
DNV Houston

This Certificate is valid until
29 February 2012
Alexander Vidal
Project Engineer

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million.In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

DET NORSKE VERITAS AS · VERITASVEIEN 1, 1322 HØVIK, NORWAY · TEL: (+47) 67 57 99 00 · FAX: (+47) 67 57 99 11
Form No.: 20.90a Issue: January 98 Page 1 of 5

12251 FM 529, HOUSTON, TEXAS 77041 (713) 937-4494, FAX (713) 937-4624, E-MAIL: radoil@radoil.com

GEAR DRIVE MUX UMBILICAL REEL
(LOCAL CONTROLS W/ REMOTE CONTROL CAPABILITY)

Factory Acceptance Test (FAT) Procedure

REEL SERIAL NO. 3820-1 S/H: S.S.Y

RCP SERIAL NO. 3657-01-02

SLING SERIAL NO. N/A

REEL PART NO. 190,810-26-01 LH

REEL PART NO. 190,810-26-02 RH

CUSTOMER: NOV NOV QC FAT

CUSTOMER PART NUMBER: 20032257

CUSTOMER P.O. NUMBER: MTS 396607

PROCEDURE NO. 190,810-26-91

REVISION HISTORY

REV	DATE	ORIG	CHK	APR	DESCRIPTION OF CHANGE	REASON FOR CHANGE
A1	07/05/07	EC	CB	BB	INITIAL REVISION	INITIAL REVISION
A2	12/24/07	EC	CB	BB	UPDATE TEST PROCEDURE	ADDITIONAL COMPONENT TESTING AND POST TEST PROCEDURE
A3	3/12/08	EC	CB	BB	OPENED RADIAL RUNOUT TOLERANCE TO 0.015"	TO REDUCE TIME NEEDED FOR ADJUSTING THE MAIN GEAR
A4	8/28/08	MA	RO	BB	GENERAL UPDATE	GENERAL UPDATE
A5	1/12/09	MA	RO	BB	INCREASED AXIAL RUNOUT	GENERAL UPDATE
A6	03/09/09	MA	RO		ADDED INFO FOR RH REEL	

MUX REEL FAT RADOIL P/N: 190,810-26-XX Radoil, Inc.
12251 FM 529, HOUSTON, TEXAS 77041 (713) 937-4494, FAX (713) 937-4624, E-MAIL: radoil@radoil.com

REEL OPERATION

A. Ensure no personnel are in the spool or within the confines of the frame.
B. Ensure Reel is free to turn and remove locking pin.
C. Ensure operating speed of Reel during testing does not exceed 8 R.P.M.

LOCAL CONTROL

Disengage locking pin. Using the local controls, disengage brakes and rotate reel "IN". Ensure the reel turns in the appropriate direction. Center throttle control and the reel should come to a smooth stop in a short time. Rotate the reel "OUT". Ensure the reel turns in the appropriate direction. Engage brakes with throttle on and the reel is to stop.

Test Satisfactory: yes
Radoil Witness: Client Witness: NOV QC 47 Date: 1-15-10
26 Jan 2010

REMOTE CONTROL AND CONTROL LOGIC

C. BRAKE LOGIC TEST
Connect shop air and test provided RCP if applicable, or use shop test RCP. Follow the sequence grid using brake controls.

REMOTE CONTROL	LOCAL CONTROL	BRAKE POSITION	PASS Y/N
DISENGAGE	DISENGAGE	OPEN	yes
ENGAGE	DISENGAGE	CLOSED	yes
ENGAGE	ENGAGE	CLOSED	yes
DISENGAGE	ENGAGE	CLOSED	yes

Test Satisfactory
Radoil Witness: yes Client Witness: NOV QC 47 Date: 1-15-10
26 Jan 2010

D. MOTOR DRIVE LOGIC TEST
Set both the local and remote brake controls to the "DISENGAGED" position. Follow sequence grid

REMOTE CONTROL	LOCAL CONTROL	SPOOL ACTION	PASS Y/N
NEUTRAL	NEUTRAL	NOTHING	yes
IN	NEUTRAL	NOTHING	yes
IN	OUT	ROTATES OUT	yes
IN	NEUTRAL	STOP	yes
IN	IN	ROTATES IN	yes
NEUTRAL	IN	STOP	yes
OUT	IN	ROTATES OUT	yes
OUT	NEUTRAL	STOP	yes

Test Satisfactory: yes
Radoil Witness: Client Witness: NOV QC 47 Date: 1-15-10
26 Jan 2010