

From: Fleming, Ray H
Sent: Thu May 13 19:09:35 2010
To: Dave; Guillot, Walter P; Judice, Ted P; MC252_Email_Retention; McNeillie, Graham A; Szafron, Kevin; Wetherbee, James D.; Wong, Norman (SUN); Worsley, Mark TC
Subject: FW: AMF test Procedure signed copy.
Importance: Normal
Attachments: image001.jpg; AMF Signed Test.pdf

Please find attached the AMF or Dead Man's sequence test that was performed on the yellow pod yesterday. The test was successful.

There is no indication of battery status and I cannot tell from the report if the test was performed with new solenoid batteries or the original batteries that were in the pod when it was retrieved.

I have requested this information from the BP support team on the Q4000.

Regards

Ray

From: Kelley, Merrick M
Sent: Thursday, May 13, 2010 10:28 AM
To: Fleming, Ray H
Cc: Worsley, Mark TC
Subject: FW: AMF test Procedure signed copy.

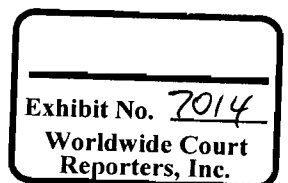
Ray
Attached is the completed and signed off deadman testing procedure that was completed yesterday onboard the Q-4000.
Merrick

From: Van Lue, Jason [mailto:Jason.VanLue@c-a-m.com]
Sent: Wednesday, May 12, 2010 5:04 PM
To: Stringfellow, William (Houston); rob.white@deepwater.com; Fry, Michael (Houston); Wright, Lawrence (Houston); BPTODDI, ERC; Park10 ERC (Houston); Redd, Eddy (Houston); Schultz, Serge; Hand, Steve (Houston); Kelley, Merrick M; Boughton, Geoff (Houston)
Cc: King, Don; McWhorter, David J.; Gaude, Edward C.; Coronado, Richard; Erwin, Carter; Whitby, Mel; Kennedy, Mac M; Cooper, Nathan; Todd, Ian; Vengalathur, Sriram T; Chiasson, Glenn
Subject: AMF test Procedure signed copy.

All,

Please see copy of signed off AMF/deadman test procedure. AMF tested correctly.

Thanks



CONFIDENTIAL


BP-HZN-BLY00090633

BPD003-004934

Jason Van Lue
Manager Field Service
Drilling Systems Division

CAM_200-K
Cameron
6650 Bingle Rd.
Houston, TX 77092
Cell 281.382.1548
Office 713.423.8904
jason.vanlue@c-a-m.com

~~~~~  
This email message is for the sole use of the intended recipient(s) and may contain confidential and privileged information of Cameron and its Operating Divisions. Any unauthorized use or disclosure is prohibited. If you are not the intended recipient, please contact the sender by reply email and delete and destroy all copies of the original message inclusive of any attachments.  
~~~~~

 PROPERTY OF CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 1 OF 11	

FACTORY ACCEPTANCE TEST PROCEDURE
FOR
SUBSEA ELECTRONIC MODULE
(Horizon AMF/Deadman In Current Situation - Test Procedure)

Checked by: Nathan Cooper

Date: May 11, 2010

Approved by: Richard Coronado

Date: May 11, 2010

CUSTOMER:

Transocean (Deepwater Horizon)

CUSTOMER ORDER NO.:

N/A

CAM PRODUCTION ORDER NO.:

N/A

CAM SALES ORDER NO.:

N/A

JHA 0012 Work Permit 30219



PROPERTY OF  CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 2 OF 11	

TABLE OF CONTENTS

1.0 AMF FUNCTION	3
1.1 INTRODUCTION AND DATA SHEET	3
2.0 AMF SEQUENCE TEST FOR SEM A	5
3.0 CORRECT SEQUENCE.....	9
4.0 TEST WITNESSED AND RESULTS ACCEPTED BY:	11

 PROPERTY OF CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 3 OF 11	

1.0 AMF Function

This test will prove the correct initiation and sequence of the built-in AMF function.

All these tests are necessary for every AMF hardware. I. e. for the different three multiplex pods blue, yellow and an optional spare pod and with two electronic modules in each pod you have to repeat six times. The naming convention for the different subsea electronic modules are defined for the pod (the first character) and the electronic module (second character), i.e Yb for the yellow b electronic.

1.1 Introduction and Data Sheet

The AMF system is designed to make shutdown-sequences possible in emergency situations.

This system is divide into AMF-controller and battery-packages. In every SEM card file (electronic A and B) is an AMF-controller inserted. The battery supply is arranged in the STM and has at one's disposal two voltages. The 9 Volt powerline supplies the two AMF-controller and the SEM-controller. The 27 Volt powerline supplies during shutdown sequence the conduit readback pressure transducer, the hydraulic head pressure transducer and the solenoids.

The very first initiation is to supply the AMF controller. This is done by a standard valve command. The switch state is saved via a bistable relais. The correct AMF initiation can be checked at an analog input channel.

The main job of the AMF-controller consist of checking several input informations and decide if an emergency situation has happened.

The conditions of an emergency situation are:


- The AMF-controller is connect to the 9V battery and powered.
- The pressure (combination of conduit readback and hydraulic head) fall short of a threshold.
- The pulse on one digital input line, which is serviced by the SEM-electronic A and B fails.
- The pulse on another digital input line (serviced by the the remote SEM-electronics) fails and
- the 27 V battery-supply is available.

In this case it is supposed the SEM is not powered and the AMF supplies itself the SEM electronic. The SEM controller immediately is booting, detects the shutdown order and initiate a sequence of solenod activation and deactivation.

The AMF shutdown order is realized with Interrupt generation. The AMF-controller pulses an interrupt line and the correspondig service routine is handled by the SEM controller.

The shutdown sequence is coded into a changeable ascii-file on the SEM controller cpu-board and has to be adapted to the custom design.

It is recommend to complete the shutdown sequence within 1 to 2 minutes to avoid unnecessary power consumption. The last sequence action should be a switch off the AMF-battery power supply.

PROPERTY OF  CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 4 OF 11	

Data Sheet:

Battery

- Capacity: 42 Ah


AMF-controller

- power consumption: < 1 W

Shutdown sequence

- current on 9 V side: 4 to 7 A (each SEM A & B, depends on SEM electronics)
- current on 27 V side: < 3 A
- time for shutdown sequence: < 1,5 minute

Note: ALL CONNECTORS DESIGNATIONS AND CHANNEL REFERENCES LEFT BLANK
SHOULD BE FILLED OUT BY REFERENCING THE SCHEMATICS

PROPERTY OF  CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 5 OF 11	

2.0 AMF sequence test for SEM A

This testing will confirm that the AMF will only be activated when all conditions are met. Each test will confirm a condition will stop the AMF from activating and also activate when it is removed.

Test 1 – Hydraulic pressure (TP9), when simulated value is above hydrostatic pressure AMF not active, when it is equal to or lower AMF is activated.

Test 2 – Electrical power and communications, when power is on the AMF will not activate, when power is turned off the AMF will activate.

NOTE: The AMF card in the PLC rack has a delay of 12-15 seconds once all conditions are met.

Section 1 – Test SEM A

10:55 start

Verify

Set up

Connect PETU to SEM A.

Select the SEM A modem with the PETU modem switch.

CE
CE

Connect 4 -20 mA simulator to side-connector that supplies the Conduit Supply analog channel (Usually TP9, pin 11). Use the pin from the same connector that connected to the 5th pin of the AMF card to provide +24 volts). Or use Enerpac to adjust pressure through the Transducer.

CZ

Connect 4 -20 mA simulator to side-connector that supplies the Hydrostatic Pressure analog channel (Usually TP10, pin 12). Use the pin from the same connector that connected to the 5th pin of the AMF card to provide +24 volts). Or use Enerpac to adjust pressure through the Transducer.

CE

Connect solenoids as per cutomer sequence (Page 9)

as is from absea

CE

Connect all AMF batteries

Connectors
Names?

CE/NA

Adjust hydrostatic head pressure TP10 simulator to 10.3 mA.

Or adjust to 2000 psig. using Enerpac.

CE

Check raw value with WinTsim

Analog
Channel?

26 2049

CE

Adjust Conduit Supply pressure TP9 simulator to 14.4 mA.

Or adjust to 8000 psig. using Enerpac.

Check raw value with WinTsim

Analog Channel?

25 8100

CE
CE


AMF activate/deactivate – check analogue data

Function the AMF virtual solenoid to deactivate/unarm. Confirm that analog channel has a value of 900 +/- 60.

CE (914)

Function AMF virtual solenoid to activate/arm and confirm that corresponding analog channel has value of 0-30

CE (12)

 PROPERTY OF CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 6 OF 11	

Verify

Test 1

1. Turn off the power to the SEM A at the PETU main switch, confirm for 30 seconds AMF does not activate
2. Confirm that AMF battery supply is now pulsing the simulator for TP9 Conduit Supply, display should be flashing on and off
3. Lower (lower simulator to 10.3 ma) simulated pressure to TP9 (Conduit Supply) and confirm AMF sequence activates within 15 seconds
4. Confirm sequence as per function table and that the sequence is complete within 44 seconds after first initialising. Verify assigned solenoids have functioned by opening bleed ports on designated POD valves. (Refer to rig/SEM specific shutdown.asc file to determine correct time in seconds)
5. Once complete confirm no other solenoids function for one minute

CE

N/A

CE

CE

CE

11:45 complete

Reset system for next test

(Wait three minutes before powering SEM back up, to allow AMF circuitry to cool down)

Turn on PETU power to SEM A. Confirm that the AMF analog channel indicates the AMF is disarmed. Value should be 900 +/- 60.

CE

Function AMF solenoid to activate/arm and confirm that corresponding analog channel has value of 0-30

CE

11:55 start

TP10 2,344 → 2,000 CE
TP9 2,182 → 2,000

Test 2

1. Lower (lower simulator to 10.3 ma) simulated pressure to TP9 (Conduit Supply), confirm for 30 seconds AMF does not activate
2. Turn off the power to the SEM A at the PETU main switch and confirm AMF sequence activates within 15 seconds
3. Confirm sequence as per function table and that the sequence is complete within 35 seconds after first initialising. Verify assigned solenoids have functioned by opening bleed ports on designated POD valves. (Refer to rig/SEM specific shutdown.asc file to determine correct time in seconds)
4. Once complete confirm no other solenoids function for one minute

CE

CE

CE

CE

Section 2 - Test SEM B

(Wait three minutes before powering SEM back up, to allow AMF circuitry to cool down)

Remove PETU connection from SEM A and connect to SEM B.
Select the SEM B modem with the PETU modem switch.

CE


CE

Connect 4 -20 mA simulator to side-connector that supplies the Conduit Supply analog channel (Usually TP9, pin 11). Use the pin from the same connector that connected to the 5th pin of the AMF card to provide +24 volts). Or use Enerpac to adjust pressure through the Transducer.

CE

Connect 4 -20 mA simulator to side-connector that supplies the Hydrostatic Pressure analog channel (Usually TP10, pin 12). Use the pin from the same connector that connected to the 5th pin of the AMF card to provide +24 volts). Or use Enerpac to adjust pressure through the Transducer.

CE

 PROPERTY OF CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 7 OF 11	

Connect solenoids as per cutomer sequence (Page 9) *as is From subsec* Verify
CE

Connect all AMF batteries Connectors Names? CE/N/A

Adjust hydrostatic head pressure TP10 simulator to 10.3 mA.
 Or adjust to 2000 psig. using Enerpac.
 Check raw value with WinTsim Analog Channel? (24) 2122 psi CE

Adjust Conduit Supply pressure TP9 simulator to 14.4 mA.
 Or adjust to 8000 psig. using Enerpac.
 Check raw value with WinTsim Analog Channel? (25) 8030 CE

AMF activate/deactivate – check analogue data

Function the AMF virtual solenoid to deactivate/unarm. Confirm that analog channel has a value of 900 +/- 60. CE

Function AMF solenoid to activate/arm and confirm that corresponding analog channel has value of 0-30 CE

11:50 start **Test 1**

1. Turn off the power to the SEM B at the PETU main switch, confirm for 30 seconds AMF does not activate CE
2. Confirm that AMF battery supply is now pulsing the simulator for TP9 Conduit Supply, display should be flashing on and off N/A
3. Lower (lower simulator to 10.3 ma) simulated pressure to TP9 (Conduit Supply) and confirm AMF sequence activates within 15 seconds CE
4. Confirm sequence as per function table and that the sequence is complete within 45 seconds after first initialising. Verify assigned solenoids have functioned by opening bleed ports on designated POD valves. (Refer to rig/SEM specific shutdown.asc file to determine correct time in seconds) CE
5. Once complete confirm no other solenoids function for one minute CE

12:05

Reset system for next test

(Wait three minutes before powering SEM back up, to allow AMF circuitry to cool down)


Turn on PETU power to SEM B. Confirm that the AMF analog channel indicates the AMF is disarmed. Value should be 900 +/- 60. CE

Function AMF solenoid to activate/arm and confirm that corresponding analog channel has value of 0-30 CE

Test 2

*TP10 2435
TP9 8015 → 2,200*

1. Lower (lower simulator to 10.3 ma) simulated pressure to TP9 (Conduit Supply), confirm for 30 seconds AMF does not activate CE
2. Turn off the power to the SEM B at the PETU main switch and confirm AMF sequence CE

 PROPERTY OF CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 8 OF 11	

activates within 15 seconds

3. Confirm sequence as per function table and that the sequence is complete within 44 seconds after first initialising. Verify assigned solenoids have functioned by opening bleed ports on designated POD valves. (Refer to rig/SEM specific shutdown.asc file to determine correct time in seconds)
4. Once complete confirm no other solenoids function for one minute

Verify
CE

OK
CE

 PROPERTY OF CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 9 OF 11	

3.0 Correct Sequence

This section will prove that the AMF function will fire the correct solenoids in the correct sequence.

Attention:


1. the listed sequence in the table is only an example and has to be adapted to the customer project.
2. be aware that never more than six (6) solenoids are activated at the same time due to the limited power consumption of the 27 V battery.

Fill in the customer designed Sequence Table

Solenoid Test Set Up	Solenoid Output (Connector Number)		Function Name	Time (seconds) delay after initiation of AMF		Verify			
	(Dog)	(Function)		ON	OFF	SEM A		SEM B	
						Test 1	Test 2	Test 1	Test 2
6C	33	50	LMRP Stinger Extend	0		✓	✓	✓	✓
8A	43	107	Stack Stinger Extend	0		✓	✓	✓	✓
6E	35	52	Lmrp Stinger Seals Energize	10		✓	✓	✓	✓
8C	45	109	Stack Stinger Seals Energize	10		✓	✓	✓	✓
6C	33	50	De-activate LMRP Stinger Extend		14	✓	✓	✓	✓
8A	43	107	De-activate Stack Stinger Extend		14	✓	✓	✓	✓
8E	47	103	High Pressure Blind Shear Ram Close	14		✓	✓	✓	✓
8E	47	103	De-activate High Pressure Blind Shear Close		74	✓	✓	✓	✓

Due to the availability of test solenoids, repeat the following steps for all the outputs in the sequence table.

Verify A B N/A as we
are able to perform test
in one test. No additional
test setup required
Carter Eum May 12/2010

 PROPERTY OF CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 10 OF 11	

Last Step

Verify that the AMF-controller is **deactivated** when this FAT is finished

Switch Power ON at the PETU.

Send a valve command to deactivate the AMF.

Check the raw value.

If the AMF is inactive the analog value should be between 700 .. 1000.

Verify


CE

CE

CE

CE

End of Test

PROPERTY OF  CAMERON	DRAWN BY: J.Redding	REVISION 02	Document No. X-065449-05-03
	DATE: May 11, 2010	SHEET 11 OF 11	

4.0 TEST WITNESSED AND RESULTS ACCEPTED BY:

CAMERON INSPECTOR

Carter Erwin Carter Erwin 12/may/2010
 BLOCK LETTERS SIGNATURE DATE

THIRD PARTY INSPECTOR (IF APPLICABLE)

R. Skidmore R. Skidmore 12/may/2010
 BLOCK LETTERS SIGNATURE DATE

CUSTOMER (IF APPLICABLE)

Ray A. Lewis Ray A. Lewis 12/may/2010
 BLOCK LETTERS SIGNATURE DATE