

	<p style="text-align: center;">IADC UBO & MPD Committee Meeting MoM</p>	<p style="text-align: center;">4th Quarter Meeting Dec 4-6, 2018 Nabors Drilling, Houston</p>
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Day 1 – Tuesday December 4

08:30 Welcome, Announcements and Safety Moment

Andre Alonso Fernandes welcomed the UBO & MPD Committee and thanked Nabors Drilling for sponsoring the meeting. Safety briefing about the facilities.

Introduction of Committee Members and Guests. The group was asked to introduce itself. Each attendee gave an introduction including company name and work location. See Appendix 1 for the detailed list of the attendees.

Oscar Gabaldon volunteered to be a minute taker.

Safety moment – Hari Hariharan (Shell). Traffic accident due to careless driving and rush. Take your time, be careful

Leesa Teel (IADC) spoke about anti -Trust policy.

08:45 Brief recap of Q3 / 2018 Meeting

- Nothing new to add/change on the minutes, minutes approved.

Discussed Meeting schedule

2019 Committee Meeting Schedule.

Q1 2019: April 11-12 Amsterdam Sponsor: Shell

Q2 2019: June 4-6 Houston Sponsor: AFGlobal

Q3 2019: September 17-19 Houston IADC to host

Q4 2019: Houston, Proposed sponsor is Chevron (Andre proposed to change Chevron to Q4, will need to confirm with Chevron) – Email sent awaiting reply.

2020 Committee Meeting Schedule.

Q2 2020: June, dates TBD. Voted to select Rio de Janeiro. Petrobras will provide venue, a sponsor for lunches and coffee breaks is still pending.

Updates from Subcommittees and Workgroups

92U. CJ Bernard: Dennis reviewing and adding comments, along with Roland's comments. Currently updating the structure in accordance to 92M and 92S.

Influx Management Annex. Martyn: Work continued in Aberdeen. Section 6. Andre sent the progress on the document back in November.

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Gas in the Riser. Paul S: Mostly waiting on academic work progress and reports from Texas A&M and LSU, expecting to validate the work. Oscar submitted a first draft to work on RGH guidelines

DGD. Sara: Updating formatting of the document to reflect other API 92 series documents (M & S).

HSE & Training. Andre: Sent draft curriculum to IADC. No feedback received so far from IADC. After the meeting Jacob Petz talked with Mark Denkowski from IADC, he listed the summary from the dialogue, but Mark asked time to edit the document.

API 92 P. Document has been balloted, commented and reviewed by the committee. The document passed through its last revision and is awaiting a spot for edition by API. The expectation is to have the document published late Q1 2019.

API 16 RCD. Received from API color-coded review of the Second Edition, which will be the basis for the work during the Q4/2018 meeting.

Regulatory Liaison. Konstantin Puskariskij: Agreed to meet PSA Q1 2019 to discuss Committee issues.

BSEE NTL. Sara: BSEE wants more details than what was provided in the draft. Group agreed to leave it as in the draft submitted originally to BSEE.

Regulatory. Harish Patel: Installations should ensure that there are ways to handle accidental gas in the riser.

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11:00 2019 Positions Elections

IADC UBO & MPD Committee: Roger Van Noort (Shell) nominated for Committee Vice-Chair 2019. No other nominations. Committee voted to elect Roger.

MPD SC Vice: Sagar Nauduri. (Pruitt)

DGD SC Vice: Dave Smith (ED)

HSE & Training SC: Guilherme Vanni. Jon Thain later confirmed that he will be SC chairman.

UBO SC Vice: CJ Bernard (Halliburton)

GIR SC Chairman: Otto Santos (LSU)

GIR SC Vice: Hari Hariharan (Shell)

API 16RCD Chairman: Micah Spahn (Pruitt)

API 16RCD Vice: Joe Karigan (Halliburton)

Liaison groups

Regulatory: Konstantin Puskarskij (Chair)

Well Control: Paul Sonnemann (SafeKick)

Certifying: Harish Patel (ABS)

10:30 New Business

Konstantin Puskarskij.: Requests received from operators regarding MPD on hyper-deepwater, ultra-high pressure/High Temperature operations.

Is there impact on API RP 92S? Do we need a group exploring this issue? Do we need an appendix to 92S to cover the potential issues?

Proposed to have a breakout group to investigate the issues during breakout sessions. Volunteers (4-5) will be meeting. Goal is to have something to present on Q1 meeting and discuss then the need to progress work or not.

Martyn Parker: Need to address pressure relieving on RCDs used on land, potentially even on non-MPD operations. Responsibility of RCD providers to educate their clients of the proper installation and use of RCDs, especially for non-MPD operations.

G. Vanni: Negative pressure across BOPs. API 16A has a negative pressure workgroup (Harish Patel). Negative pressure differential not exclusive to FMCD operations, but others: Interventions or emergency disconnect with a low-pressure reservoir may result in negative pressure differential on the BOP stack. Pending to discuss with representative from API 16A. Meeting on API 16

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tomorrow, Wed Dec 5. Harish P. will raise the issue and communicate that this committee will contact them to discuss negative differential pressure across BOP stack.

Borre initiative: Issues while drilling top holes and riserless. To be revisited later. API 65 has been balloted already this year.

Riser issues with MPD: API 16 Committee needs input from this group to expand on MPD impacts on their documents. Next meeting Harish should have material from volunteers to approach them.

12:00 Lunch - Sponsored by Nabors

13:00 Breakout sessions

- UBO
- Gas in the Riser
- API 16 RCD
- MPD / Influx Management Annex
- DGD and HSE & Training: No breakout session required

15:45 Committee reconvened. Brief recap from breakout sessions, thanked Nabors Drilling for hosting and sponsoring the meeting, and adjourned for the day.

- UBO: Discussion within the group, which continued briefly with the main committee group, on whether two-phase MPD (e.g., injecting Nitrogen to lighten the hydrostatic column, without intent of inviting influx), or Air Drilling should be discussed in the new version of API 92U. No final agreement, decided to keep it in the scope of the discussions of the SC until further discussion on where these techniques reside.
- Gas in the Riser: Discussed the framework and point in time ready to start working on riser gas handling guidelines, along with the ongoing work from academia on modeling and experiments.
- API 16 RCD: made it through all of the red commentary up to section 7, the group will continue from there tomorrow. Following that, the group will continue with the less critical yellow and blue items; ideally a lot of those are corrected as we fix the red items.

Short list of critical updates are as follows:

- All references to 16A were updated to reflect the 3rd edition based on David Postel finding the API rule requiring it
 - API 6A was decided by the group to maintain the latest revision rather than a past dated version due to its interconnectivity requirement for other oilfield equipment
 - All “Verification testing” text was revised to “Validation” to maintain compliance with other API documents
 - All “Must” statements were revised to say “Shall”
- MPD / Influx Management Annex: Continued working on the document, progress made on section 6.

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16:00 Andre thanked Nabors Drilling for hosting and sponsoring the meeting and adjourned for the day.

Day 2 – Wednesday December 5

08:30 Andre welcomed back the UBO & MPD Committee, thanked Nabors for hosting and sponsoring meeting.

MPD Categorization Matrix presented by Andre. (See Appendix 3). Continues discussion with comments from the floor.

Captures from discussions:

- Name: MPD Preparedness Matrix
- Simplified matrix, just Y/N
- Change name of DSIT, as it's a trademark from AFG. Decided to use Annular Isolation Device AID
- Discussion about equipment readily available for the rig versus equipment available but shared amongst more than one rig. When a company fills the matrix it must inform if the equipment is available for the rig or not.
- Agreed on using MPD Operational Framework, including: a) Rig specific policies; b) Rig specific procedures; and c) Rig specific training. One answer Y/N for all.
- Included "Flow Hoses" in MPD Riser Equipment.
- Included "MPD Pipework" and "Interfaces" in MPD Topside equipment.
- Ragnar Fredriksen volunteered to write wording explaining the context and definitions for the matrix.

10:45 Presentation from Leslie Cook (WoodMackenzie)

63 rigs 6th and 7th gen rigs with MPD (Rigs which are operating or have operated with MPD, Level 4 as defined in the first iteration of the categorization matrix proposed by Calvin Holt in 2017 – (check Appendix 4).

11:00 Discussion on Regulatory (Konstantin Puskariski)

The SC created a draft to identify different bureaus and agencies around the world that might be unaware of the MPD technology and the work under development committee.

It is still pending the definition of the best strategy to approach different bureaus in different

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countries, as there are different levels of knowledge and use of the technology.

11:30 Resume working sessions

Influx Management Annex, Gas in the Riser and API 16 RCD.

Day 3 – Thursday December 6

08:30 Andre welcomed back the UBO & MPD Committee, thanked Nabors Drilling for hosting and sponsoring meeting.

Brief discussion regarding whether multiphase MPD operations should be included in 92U or not. Decision was not made, but the subcommittee will continue work on the technique, and discuss internally and later discuss about a document where the technique resides. Alternatives mentioned included a Two-phase MPD annex to 92M. Similar discussion regarding air drilling, which the SC considers is not covered in enough depth. Decision was to keep what is in the document and review later on.

09:00 Resume working sessions

Influx Management Annex, Gas in the Riser, API 92U and API 16 RCD.

12:00 Reconvene committee and updates from breakout sessions

API 16 RCD: Please see Appendix 2 for full workgroup minutes, provided by Micah Spahn

Influx Management

- Item 3.4.6 Text Ragnar to reword send to Sagar

IME document Volunteer Work 2019:

- Item 3.4.6 Text Ragnar to reword send to Sagar
- Section 3.4 Sagar is to review whole section with today's feeling of the intent that IME is used to develop Matrix
- Section 3.7 Procedures Ragnar and Roger to review / edit
- Section 5 Testing etc Martyn Parker to review
- Section 6 Execution Methods Harshard to issue work Bob Goodwin to review
- Section 7 Other types of influx need to be considered

Gas in riser

- Continued progress reviewing draft guidelines.
 - Oscar to clean out and circulate to SC for review and contributions.

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12:00 Andre Alonso Fernandes Thanked Nabors Drilling for hosting and sponsoring the meeting. Meeting adjourned

Lunch – Sponsored by Nabors Drilling



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Appendix 1. Attendance List:

First Name	Last Name	Company Name
Mahesh	Sonawane	2H OFFSHORE INC
Brian	Piccolo	AFGLOBAL CORPORATION
Harish N	Patel	AMERICAN BUREAU OF SHIPPING
Roland	Goodman	AMERICAN PETROLEUM INSTITUTE
Claire Bailey	Thompson	ANADARKO PETROLEUM CORPORATION
Greg	Myers	BAKER HUGHES, A GE COMPANY
Leiro David	Medina	BEYOND ENERGY SERVICES & TECHNOLOGY CORP
Oscar R	Gabaldon	BLADE ENERGY PARTNERS
Trang	Vu	BSEE
Stan	Christman	CHRISTMAN CONSULTING
Gerardo	Gonzales	CONTITECH OIL & MARINE CORP
Scott Timothy	Gooding	CORTEC FLUID CONTROL, LLC
Jeffrey	Graybeal	DIAMOND OFFSHORE
Ragnar Marcellus	Fredriksen	EQUINOR
Dale	Walden	EXXONMOBIL
Isabel	Poletzky	HALLIBURTON
Joseph M	Karigan	HALLIBURTON ENERGY SERVICES
CJ	Bernard	HALLIBURTON ENERGY SERVICES GROUP
Leesa	Teel	IADC
Otto Alcantara	Santos	LOUISIANA STATE UNIVERSITY
Konstantin	Puskarskij	MAERSK DRILLING
Adebowale	Solarin	MAERSK DRILLING A/S
John Edward	Conn	M-I SWACO DYNAMIC PRESSURE MANAGEMENT
Andre	Perales	NABORS CORPORATE SERVICES, INC.
Mark A.	Hartle	NABORS DRILLING SOLUTIONS
Andre Alonso	Fernandes	PETROBRAS
Guilherme S	Vanni	PETROBRAS



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Martyn	Parker	PRUITT
Micah Benjamin	Spahn	PRUITT
Sagar	Nauduri	PRUITT
David	Postel	REGIONAL MARINE & ENGINEERING SERVICES PTE LTD
Paul	Sonnemann	SAFEKICK
Sara	Shayegi	SHELL EXPLORATION & PRODUCTION
Hari R	Hariharan	SHELL INTERNATIONAL E&P
George	Medley	SIGNA ENGINEERING CORP
Nathan	Vargas	STASIS DRILLING SOLUTIONS
Gavin	Humphreys	STENA DRILLING LTD
Omer	Kaldirim	TEXAS A&M UNIVERSITY
Ryan	Klemetson	TOLOMATIC INC
Al	Alajbegovic	WEATHERFORD
Curtis	Palm	WEATHERFORD
James Wallace	Chambers	WEATHERFORD
Maurizio A	Arnone	WEATHERFORD
Sayamik	Ameen	WEATHERFORD
Bob	Goodwin	WEATHERFORD INTERNATIONAL
Brian	Grayson	WEATHERFORD UNITED STATES
Hunter	Craig	WEATHERFORD UNITED STATES
Peter Allen	Dugas	WEATHERFORD UNITED STATES
Harry A	Bolle	WELLIS MPCD
Tom	Askeland	WELLIS MPCD
Steve L	Richert	WILD WELL CONTROL INC.

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Appendix 2. Full API 16 RCD workgroup minutes:

(Submitted by Micah Spahn)

- API Color coded document revisions were completed as required by API
 - Do we need to send the document back for verification to Ed or Jacqueline (Jacqi) Roueché who was reported to be Ed's replacement for SC16 group, or is the color-coding simply an FYI process by API to our group?
- All references to 16A were updated to reflect the 3rd edition based on David Postel finding the API rule requiring it
- API 6A was decided by the group to maintain the latest revision rather than a past dated version due to its interconnectivity requirement for other oilfield equipment
 - This will also maintain compliance to any of the 20E & 20F bolting requirements via 6A reference
- All "Verification testing" text was revised to "Validation" to maintain compliance with other API documents
- All "Must" statements were revised to say "Shall"
- Elastomer list in Table 6 of 16RCD was updated per new 16A list
- Proposal to strike Annex B & C from the document was agreed upon by the group contingent on Guilherme's review of each to ensure all testing requirements are included in the body of the document
 - Each of these annexes create confusion for what testing is actually required by the OEM, minimum requirements for testing are in the body of the document and in some cases the informative Annex is more or less prescriptive and/or contradictory to the body
 - Rather than re-write the Informative Annexes, it is simpler to ensure the minimum test requirements are met in the document and strike the annexes
- Tables 2 & 3 were reversed based for better document flow
 - Edition 2 has Scaling of testing before the testing requirements, references to the tables were corrected in the remainder of the document
- Stripping Rating test was added to the Scaling Table (now Table 3) as it was missing in Ed. 2
 - Assumption by OEMs was that it was included but it is now articulated
- Temperature verification test was added to the Test requirements (now Table 2)
 - It previously had a procedure but not a requirement to perform that procedure
- Tables 2 & 3 were rearranged to match the order of testing in the document procedures section
 - Simply for ease of document flow
- Added "Wellbore fluid leakage shall not exceed 1 gpm while stripping to the Stripping Rating procedure
 - This was included in the Stripping life test previously but not in the rating
 - This was also in anticipation of the annex cleanup vs deletion
- Added a similar "documentation required" bullet list to the Stripping Pressure Rating test
 - Could be confusing for an OEM that did not perform the life test as a continuation of the rating test
- Materials section was clarified to state, "All Material requirement shall conform to API 16A, 3rd Edition"
- Welding section was clarified to state, "All Welding requirement shall conform to API 16A, 3rd Edition"
- Added "A data acquisition system shall be used on all hydrostatic tests and on hydraulic control system tests. The record shall identify the recording device and shall be dated and signed" to the MTE section
 - Was previously a statement in Annex B that was lacking in the body
 - Also a part of the annex cleanup
- Anywhere that stated, "Refer to the relevant section in API 16A" was removed
 - This is unnecessary to state unless it is to a specific section number
- Section 7.5.7.1 was deleted from the document due to having an FAT test matrix
- Note 3 was added to Table 4 to clarify only requiring a rotating torque test if the RCD has a bearing assembly
 - Also added an identical statement to the Rotating Torque Test section
- Deleted, "RCDs shall be tested with its sealing mechanism in the open position, if applicable" from the document
 - This is a follow up to the New Orleans meeting where CSO was removed from the document
- Removed "and/or body" from the marking section of the pressure rating

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- This is in anticipation for the “operationally interchangeable major subcomponents” work that will be in Edition 3
- This is also seen as a safety concern for RCD users based on common industry practice of having different pressure ratings for the body, sealing assemblies, and packing elements
- Also removed section 8.2.1.4 which was also stating to have the body rating on the body
- Studs and Nuts were specified to be PSL 1 minimum to be in compliance with 6As new BSL & PSL ratings
- Temp Class of XX was revised from being an informative note to an (*) prescriptive statement in Table 7

Annex G work did not progress and remains as follows:

- Mud formulations need review from all members for ability to mix and/or obtain easily for testing
- Mud formulation for SAL-1 from Guilherme

Zanthan gun	2,0 a 2,5 ppb (pound per barrel)
NaHCO	3.2 ppb
MgO	1 ppb
AntiFoam	0,3
Barite	~118 ppb (until 12 ppg)

- Mud formulation for SAL-2 from Guilherme is already listed in Annex G

Outstanding items from API are as follows:

- API response to the Sealing Assembly separate monogram
- API response to our task group working toward Edition 3
 - Do we need to submit the SRRR (attached) to obtain permission from API to perform this work?
 - Has this document already been submitted to API?


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Appendix 3 MPD preparedness Matrix

Availability		Example		
		Rig 1	Rig 2	Rig 3
MPD Riser Equipment	<ul style="list-style-type: none"> • X-Over • Annular Isolation device (AID) • FS • Flow Hoses 	Y	Y	N
	<ul style="list-style-type: none"> • RCD and adaptor 	Y	N	N
MPD Topside Equipment	<ul style="list-style-type: none"> • MPD Pipework • Interfaces 	Y	Y	Y
	<ul style="list-style-type: none"> • MPD Manifold &Control 	Y	Y	N
MPD Operational Framework	<ul style="list-style-type: none"> • Rig specific policies & procedures. • Rig specific MPD training. 	Y	Y	N

Notes:

- The possible answers for the matrix are Yes or No.
- In order to be able to indicate an item of the Matrix as Yes, all sub items must be available to the rig.
- The information on the matrix is not time dependent; it must reflect the status of the rig at the time of the inquiry.
- Interfaces comprehend all possible interfaces between the MPD system and other existing system on the rig, such as mechanical connections, electrical supply, and communication, among others.

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Appendix 4 – Outdated MPD Matrix used by WoodMackenzie group

Level	SBP MPD Functionality	Comment	
1	MPD hard piping / flow return / Hydraulic / Control cables with penetrations and tie-ins installed.	Prepared to accept RGH or MPD. Either new build or left over from previous project. Recognizes fundamental MPD design (Friction Pressure) has been performed by Contractor.	MPD Prepared
2	Functioning RGH system (AID/DSIT + Flow Spool + Buffer/Interface Manifold + MGS)	Works in combination with Diverter. Has its own valve/choke/PRV configuration - This is owned by Contractor. MGS capacity : Liquid / Gas Flow Rate.	MPD Capable
3	Level 2 + Equipped with MPD Manifold thru Buffer/Interface Manifold	RGH system can direct flow to MPD Manifold via Buffer/Interface Manifold – Implies rig has MPD experience.	MPD Enabled
4	Level 3 + Equipped with RCD/ACD	MPD Operational or Ready	MPD Offshore Ready
A	Alternative MPD system – CML, CCS, DGD	Other MPD solutions are identified	

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Ryan	Klemetson	TOLOMATIC INC
Al	Alajbegovic	WEATHERFORD
Curtis	Palm	WEATHERFORD
James Wallace	Chambers	WEATHERFORD
Maurizio A	Arnone	WEATHERFORD
Sayamik	Ameen	WEATHERFORD
Bob	Goodwin	Weatherford International
Brian	Grayson	WEATHERFORD UNITED STATES
Hunter	Craig	WEATHERFORD UNITED STATES
Peter Allen	Dugas	WEATHERFORD UNITED STATES
Harry A	Bolle	WELLIS MPCD

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