International Association of Drilling Contractors



IADC Advanced Rig Technology (ART) Committee 09.30-11.30 Tuesday, 31 January 2023 Hybrid meeting IADC HQ, 3657 Briarpark Dr Ste 200 Houston, TX 77042

Minutes

Outgoing IADC Advanced Rig Technology Committee Chair Assaad Mohanna, ERM, introduced new ART Co-Chairs Blaine Dow, SLB, and Sarah Kern, H&P. They opened the meeting and welcomed the attendees and presented Mr Mohanna with a Chairman's Plaque recognizing his service to the ART Committee. IADC's Linda Hsieh gave an overview of the <u>IADC antitrust policy</u>.

- ART Committee updates:
 - Dull Bit Grading Project, Robert van Kuilenburg and Paul Pastusek, ExxonMobil: Draft document has been sent to IADC team for formatting while workgroup addresses a few remaining code revisions for the bits section; document also drafted for BHAs section but still need to do testing. Also need to think about how to address training requirements as new codes are rolled out; some training will be needed to get consistent grading.
 - Energy Efficiency Subcommittee, Konstantin Puskarskij, Noble, and Mike Party, Hess: Draft document of Emissions Reduction RP for Drilling Operations is ready to share within ART Committee for feedback; Emissions Forecasting and Reporting workgroup a bit behind, but remains focused on looking at emissions at a granular level of detail that will enable fuel efficiency in drilling; more volunteers would be welcome – please contact IADC (linda.hsieh@iadc.org)
 - Data, Controls and Sensors Subcommittee, Nathan Moralez, BP, and Andy Westlake, Seadrill: DCS Subcommittee seeks to work with SPE DSATS Human Factors group to look at human factors engineering, humans in the loop and automation complacency. Project proposal being drafted by a DSATS consultant. More volunteers also needed to finish Guidelines for Minimum Safety Features for Drilling Control Systems and Assets.
- Guest speakers:
 - Katherine Warren, ERM: Emissions Reduction and Sustainability (slides not available). Ms Warren provided an overview of the 3 greenhouse gas scopes, drilling industry GHG emissions sources and reporting examples, and presented a case study on climate and carbon risk with the NextDecade LNG project.

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 Mia Emborg, Technical University of Denmark: Bottom-up Scope 3 Assessment of Drilling Operations – How to Attack Indirect Emissions Strategically and Setting Industry Benchmarks (see attached slides)

The meeting was adjourned at 11:30am.

Attendance: Alan R Alex Ngan, Weatherford Andrew Calderwood, Stena Drilling Andy Westlake, Seadrill Assaad Mohanna, ERM Ben Cole, Seadrill Blaine Dow, SLB Blake Burns, Diamond Offshore Calvin Carter, MI Swaco Carter Miller, HDI Instruments Cody MacDonald Craig Colby, Diamond Offshore Dan Gudall, MHWIRTH Dustin Lyles, Taurex Drill Bits Erwin van den Berg, GustoMSC Graeme Craigon, NOV Greg Myers, HMH Jacob Wheeler, Chevron John Dady, Seadrill John de Wardt, DE WARDT & COMPANY John Sutler, BP Kalyan Singamshetty, ConocoPhillips Katherine Warren, ERM Konstantin Puskarskij, Noble Lee Womble, SLB

Martin Kershman, Tegnisolutions Mathias Taksdal, Esgian Melissa Eudy, Mi4 Mia Emborg, Maersk Oil & Gas Michael Edwards, Edwards Energy Innovation Mike Party, Hess Nathan Moralez, BP Paul Pastusek, ExxonMobil Pedro Costa, Petrobras Pedro Viveiros, Petrobras Pradeep Anaiyappa, Nabors Robert van Kuilenburg, Noble Robert Silva, Amerimex Motor & Controls Robert Wylie, xnDrilling Roger David Marin Martinez, Halliburton Sarah Kern, H&P Scott Rypstra, Beyond Energy Sean Emery, Trax Electronics Sean Roach, SLB **Taylor Berry** Tony Eschete, Caterpillar Trevor Braswell, Pason Systems

Leslie Dill, Precision Drilling Linda Hsieh, IADC Mark Anderson, Ensign Energy Services

Scope 3 in Drilling Operations

Introducing a bottom-up approach



New EU adapted standard for GHG reporting: Mandatory scope 3 disclosures for private companies from 2024



DTU





System boundaries suggested for the drilling industry



DTU Operational type (IADC codes) assessed according to each scope 3 category



Example of (sub) **activities** (categorized in inventory)



Included systems (SFIs) for drilling operations



Included systems (SFIs) and operation types for hotel operations



44: REPAIR, MAINTENANCE AND CLEANING EQUIPMENT, OUTFITTING (441:442:443:444:445:446:449)

454: MOBILE TRANSPORT AND HANDLING EQUIPMENT (454-G1 + G2)

489: CANTILEVER SKIDDING SYSTEMS (489 G1+G2+K1+Q1+Q2+W1+W2)

50: LIFESAVING, PROTECTION AND MEDICAL EQUIPMENT

55: GALLEY & PANTRY EQUIP., ARR. F/ROV., IRONING / DRYING EQUIP

57: VENTILATION, AIR-CONDITIONING AND HEATING SYSTEMS (571+572+573+574+575+576+577+578)

58. SANITARY SYSTEMS (581+582+583+584)

65: POWER GENERATION SYSTEM

Distribution of processes and activities (input flows) in relation to operations ty



Grouping of processes

- Systems = requipment and machinery on board rig
 SFI 300 to 600 included.
- Operation = operational processes e.g. Storage handling or waste handling on board rig.
- General = back-office support, onshore.
- Mobilisation = rig moves and planning.

Input flows = activities

- Sub-activities under each process
- 1 activity = 1 process input flow
- Input flow = quantitative e.g. Tonnes * km

Aggregation of input flows per scope 3 category = where to make a strategic / long-term impact



Results – Mobilisation (scenario 1 vs 2)

Contribu	tion from				
sub-processes					
ontribution	Process				

kisting platform

Jup p		Т	otal for pro	cess
Contributio		Process	Amount	Unit
100.00%		Mobilisation_Exisiting platform - NO	1,433,940	kg CO2-Eq
	52.91%	6.2. Towage	758,707	kg CO2-Eq
	9.56%	3.1. Equipment rig up / down (logistical arrangements)	137,145	kg CO2-Eq
	7.05%	7.3. Dis-connect tugs (Platform/Harbour)	101,112	kg CO2-Eq
	6.34%	7.4 Deploy mooring lines	90,957	kg CO2-Eq
	5.95%	3.3. Crew Mob / De-mob	85,320	kg CO2-Eq
	5.13%	2.4. Seabed / debris survey	73,537	kg CO2-Eq
	2.72%	3.1 Equipment rig up/ down (interface with platform)	39,044	kg CO2-Eq
	2.35%	7.5 Move to final location (Platform / Harbour)	33,704	kg CO2-Eq
	2.22%	3.1. Equipment rig up/ down (tank cleaning)	31,814	kg CO2-Eq
	1.79%	3.1. Equipment rig up / down (ROV / Subsea work)	25,636	kg CO2-Eq
	1.56%	2.3. Cone Penetration Testing (CPT) + Boreholes	22,338	kg CO2-Eq
	0.78%	7.2. Connect tugs	11,235	kg CO2-Eq
	0.49%	4.2. Mobilisation of tow tugs	7,022	kg CO2-Eq
	0.26%	4.1. Mobilisation of Tow Team	3,792	kg CO2-Eq
	0.20%	5.5. Departure	2,809	kg CO2-Eq
	0.20%	5.2 Connect tugs	2,809	kg CO2-Eq
	0.20%	5.4. Jacking Sub-process	ses 2,809	kg CO2-Eq
	0.13%	3.1. Equipment rig up / down (communication)	1,912	kg CO2-Eq
	0.13%	6.1. Demob-tow team	1,896	kg CO2-Eq
	0.02%	5.6. Disconnect Tugs	340	kg CO2-Eq
1.1	0.00%	2.9. Data Analysis (existing location)	2	kg CO2-Eq
	0.00%	1.4. Scope of Work (SOW)	1	kg CO2-Eq
	0.00%	1.1. Rig move request	0	kg CO2-Eq

Harbour entry

Contribution		Process	Amount	Unit
100.00%		Mobilisation_Harbour - NO	1,376,710	kg CO2-Eq
5	5.11%	6.2. Towage	758,707	kg CO2-Eq
	9.96%	3.1. Equipment rig up / down (logistical arrangements)	137,145	kg CO2-Eq
	7.34%	7.3. Dis-connect tugs (Platform/Harbour)	101,112	kg CO2-Eq
	6.20%	3.3. Crew Mob / De-mob	85,320	kg CO2-Eq
	5.34%	2.4. Seabed / debris survey	73,537	kg CO2-Eq
	4.90%	7.5 Move to final location (Platform / Harbour)	67,408	kg CO2-Eq
	2.84%	3.1 Equipment rig up/ down (interface with platform)	39,044	kg CO2-Eq
	2.31%	3.1. Equipment rig up/ down (tank cleaning)	31,814	kg CO2-Eq
	1.86%	3.1. Equipment rig up / down (ROV / Subsea work)	25,636	kg CO2-Eq
	1.62%	2.3. Cone Penetration Testing (CPT) + Boreholes	22,338	kg CO2-Eq
	0.82%	7.2. Connect tugs	11,235	kg CO2-Eq
	0.51%	4.2. Mobilisation of tow tugs	7,022	kg CO2-Eq
	0.28%	4.1. Mobilisation of Tow Team	3,792	kg CO2-Eq
	0.20%	5.5. Departure	2,809	kg CO2-Eq
	0.20%	5.4. Jacking	2,809	kg CO2-Eq
	0.20%	5.2 Connect tugs	2,809	kg CO2-Eq
	0.14%	3.1. Equipment rig up / down (communication)	1,912	kg CO2-Eq
	0.14%	6.1. Demob-tow team	1,896	kg CO2-Eq
	0.02%	5.6. Disconnect Tugs	340	kg CO2 Eq
	0.00%	2.13. Final Location Evaluation (harbour)	25	kg CO2-Eq
	0.00%	2.12. Data Analysis (harbour)	1	kg CO2-Eq
	0.00%	1.4. Scope of Work (SOW)	1	kg CO2-Eq
	0.00%	1.1. Rig move request	0	kg CO2-Eq

Total emissions = 1,433,940 kgCO2eq (47,798 kgCO2eq/day*)

Total emissions = 1,376,710 kgCO2eq (45,890 kgCO2eq/day*)

*Based on a 30 days campaign

Results – Mobilisation (scenario 3 vs 4)

New entry

Contribution		Process	Amount	Unit
100.00%		Mobilisation_New Entry - NO	1,376,710	kg CO2-Eq
	55.11%	6.2. Towage	758,707	kg CO2-Eq
	9.96%	3.1. Equipment rig up / down (logistical arrangements)	137,145	kg CO2-Eq
	7.34%	7.3. Dis-connect tugs (Platform/Harbour)	101,112	kg CO2-Eq
	6.20%	3.3. Crew Mob / De-mob	85,320	kg CO2-Eq
	5.34%	2.4. Seabed / debris survey	73,537	kg CO2-Eq
	4.90%	7.5 Move to final location (Platform / Harbour)	67,408	kg CO2-Eq
	2.84%	3.1 Equipment rig up/ down (interface with platform)	39,044	kg CO2-Eq
	2.31%	3.1. Equipment rig up/ down (tank cleaning)	31,814	kg CO2-Eq
	1.86%	3.1. Equipment rig up / down (ROV / Subsea work)	25,636	kg CO2-Eq
	1.62%	2.3. Cone Penetration Testing (CPT) + Boreholes	22,338	kg CO2-Eq
	0.82%	7.2. Connect tugs	11,235	kg CO2-Eq
	0.51%	4.2. Mobilisation of tow tugs	7,022	kg CO2-Eq
	0.28%	4.1. Mobilisation of Tow Team	3,792	kg CO2-Eq
	0.20%	5.2 Connect tugs	2,809	kg CO2-Eq
	0.20%	5.5. Departure	2,809	kg CO2-Eq
	0.20%	5.4. Jacking	2,809	kg CO2-Eq
	0.14%	3.1. Equipment rig up / down (communication)	1,912	kg CO2-Eq
	0.14%	6.1. Demob-tow team	1,896	kg CO2-Eq
	0.02%	5.6. Disconnect Tugs	340	kg CO2-Eq
	0.00%	2.7.a Final Location Evaluation (new location)	25	kg CO2-Eq
	0.00%	2.6. Data Analysis (new location)	2	kg CO2-Eq
10	0.00%	1.4. Scope of Work (SOW)	1	kg CO2-Eq
	0.00%	1.1. Rig move request	0	kg CO2-Eq

Open location

Contribution	Process	Amount	Unit
100.00%	Mobilisation_Open location - NO	1,375,110	kg CO2-Eq
55.1	7% 6.2. Towage	758,707	kg CO2-Eq
9.9	7% 3.1. Equipment rig up / down (logistical arrangements)	137.145	kg CO2-Eq
7,3	5% 8.3 Deploy anchors @ stdb location (Open location)	101,112	kg CO2-Eq
6.2	0% 3.3. Crew Mob / De-mob	85,320	kg CO2-Eq
5.3	5% 2.4. Seabed / debris survey	73,537	kg CO2-Eq
2.8	4% 3.1 Equipment rig up/ down (interface with platform)	39,044	kg CO2-Eq
2.4	5% 8.5 Move to final location (Open Location)	33,704	kg CO2-Eq
2.3	1% 3.1. Equipment rig up/ down (tank cleaning)	31,814	kg CO2-Eq
2.3	0% 8.4 Deploy mooring lines (Open location)	31,673	kg CO2-Eq
1.8	6% 3.1. Equipment rig up / down (ROV / Subsea work)	25,636	kg CO2-Eq
1.6	2% 2.3. Cone Penetration Testing (CPT) + Boreholes	22,338	kg CO2-Eq
0.8	5% 8.2. Connect tugs (Open Location)	11,666	kg CO2-Eq
0.5	1% 4.2. Mobilisation of tow tugs	7,022	kg CO2-Eq
0.2	8% 4.1. Mobilisation of Tow Team	3,792	kg CO2-Eq
0.2	0% 5.5. Departure	2,809	kg CO2-Eq
0.2	0% 5.4. Jacking	2,809	kg CO2-Eq
0.2	0% 5.2 Connect tugs	2,809	kg CO2-Eq
0.1	4% 3.1. Equipment rig up / down (communication)	1,912	kg CO2-Eq
0.1	4% 6.1. Demob-tow team	1,896	kg CO2-Eq
0.0	2% 5.6. Disconnect Tugs	340	kg CO2-Eq
0.0	0% 2.7.a Final Location Evaluation (new location)	25	kg CO2-Eq
0.0	0% 2.6. Data Analysis (new location)	2	kg CO2-Eq
0.0	0% 1.4. Scope of Work (SOW)	1	kg CO2-Eq
0.0	0% 1.1. Rig move request	0	kg CO2-Eq

Total emissions = 1,376,710 kgCO2eq (45,890 kgCO2eq/day*)

Total emissions = 1,375,110 kgCO2eq (45,837 kgCO2eq/day*)

*Based on a 30 days campaign