BALLAST WATER SAMPLING SAUDI ARABIA

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SGS BALLAST WATER EXPERIENCE

BALLAST WATER SAMPLING: IMO

- All countries who signed the Ballast Water Management Convention have to implement it in their national legislation

- D-2 Ballast Water Performance Standard
  - Organisms ≥50µm: <10/m^3
  - Organisms ≥10 - <50 µm: <10/mL
  - Bacteria
    - *Escherichia coli*: <250 cfu/100 mL
    - Enterococci: <100 cfu/100 mL
    - *Vibrio cholerae*: <1 cfu/100 mL

BALLASTWASSER PROBENAHME: IMO

- Large volume samples (1-3 m^3)
- Special sampling equipment to concentrate these large volumes
- Elaborate sampling and analysis on board, inspectors need longer time on the ship (6-8 hours)

BALLAST WATER SAMPLING: VGP

- USA ballast water regulation: 2013 Vessel General Permit (VGP), new version at the end of this year
- Relatively small volume samples (1-5 Liter)
- Short holding time (<8 hours from sampling to start of analysis)
- Only specific analysis methods allowed

BALLAST WATER SAMPLING: VGP

- Testing frequency: 1-4 times per year
- Biological and chemical analysis as well as calibration of sensors
- Reports are sent to the Environmental Protection Agency (EPA) by the shipowner or captain

BALLAST WATER SAMPLING: SAUDI ARABIA

- Ballast water program started in August 2017
- Samples have to be taken every time ballast water is discharged in one of the three Saudi Aramco ports (Ras Tanura, Jeddah, Yanbu), regardless of if the ballast water was treated, exchanged or not managed at all
- Four inspection companies are recognized by the Saudi Aramco Environmental Protection Department
- Shipowners or captains can contact these inspection companies directly or go through port agents

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BALLAST WATER SAMPLING FORM	
Sampling date	
Ship Particulars	Ship name: IMO Number: Port of registry: Gross tonnage: Date of construction: Ship total ballast water capacity:
Sampling location (port/terminal)	
Identification of sampling tank/point	*(Minimum of 2 samples from different tanks/points)*
Sampling time and indicative sampling equipment used and details of inspector	(total time taken onboard to acquire sample and issue report, name of equipment and name of inspector)
Ballast water management undertaken	Exchange ( ) or Treatment ( )
IOPP renewal survey date	
Ballast water treatment system	Model name/type: Type Approved by: (Classification/Authority)

BALLAST WATER SAMPLING: SAUDI ARABIA

- Samples taken from at least two randomly selected ballast water tanks
- Sample volume: ~ 1 Liter per tank
- Analysis of the 10-50 µm fraction (D-2 Performance Standard)
- Indicative analysis methods: fast methods that estimate the organisms concentration, no direct counts

EXAMPLE OF INDICATIVE RESULTS

File date:	16/08/2017
File time:	13:23:28

SN:	16-0550-002	
455 nm:	280	mA
470 nm:	280	m
530 nm:	0	mA
624 nm:	0	mA

PMT calibration			LED calibration			
LED mA:	200			Min mA	Max mA	Bias
°C:	20		455 nm:	60	460	1
PMTX V:	560		470 nm:	60	460	0.9
PMT slope:	8.827		530 nm:	60	460	1
Signal slope:	24.65		624 nm:	60	460	0.1
Offset:	0.4268					
Volume:	0.55	ml				

	455 nm	470 nm	530 nm	624 nm
460 mA:	4.56	2.5834	4.4852	35.9395
300 mA:	3.2663	1.9015	3.6428	24.6125
140 mA:	2.0627	1.2492	2.6847	14.8197
80 mA:	1.1939	0.7598	1.8255	8.267
40 mA:	0.4948	0.3413	0.9472	3.3978
Bias:	1	0.9	0.1	0.4

Basic analysis	
Fo points:	60
Fm points:	240
Cell factor	1000

Distribution analysis	
Low cell:	3.25
Power A:	2
Slope A:	0.54
Bound A:	20
Power B:	1.67
Slope B:	1.375

[redacted]

BW Test Result

Pass EPD Fa

Level 1	
Numeric:	0

Super acquisition					
	Fv	Fo	Fm	Fv/Fm	RSigma
	0	0.0479	0.0486		0.0108

Acquisitions					
Acq	Fv	Fo	Fm	Fv/Fm	RSigma
1	0	0.048	0.0487		0.00839
2	0	0.0481	0.0486		0.0185
3	0	0.0477	0.0485		0.0259
4	0.000051	0.0478	0.0488	0.00105	0.0134
5	0.000176	0.0518	0.053	0.00332	0.0422
6	0.000048	0.0516	0.0526	0.000916	0.0104
7	0.000196	0.0491	0.0503	0.0039	0.0251
8	0	0.0486	0.0492		0.00377
9	0	0.0477	0.0486		0.0411

Fo analysis		
Slope	Offset	SE
0.000003	0.0997	0.000522
0.000006	0.0998	0.000429
0.000013	0.0995	0.000408
0.000008	0.0995	0.000423
0.00003	0.104	0.000408
0.000007	0.103	0.000416
0.000018	0.101	0.000358
0.000001	0.1	0.000468
0.000023	0.0996	0.000527

Fm analysis		
Slope	Offset	SE
0.000001	0.1	0.000517
0.000001	0.1	0.000477
0.000001	0.0999	0.000472
0.000002	0.1	0.00049
0.000002	0.104	0.000534
0.000002	0.104	0.000535
0	0.102	0.000531
0.000002	0.101	0.000535
0.000001	0.1	0.000454

ADC(%)	PMT (V)
32.5	671
32.5	671
32.4	671
32.6	671
33.9	671
33.8	671
33	671
32.7	671
32.4	671

EXAMPLE OF INDICATIVE RESULTS

Calculated Results

Good Control | Preventative Action | Immediate Action | No alarm configured

Ballast Water-cATP10-50

ALARM	VALUE (pg/mL)	SCHEDULE	COLLECTION	DATA COLLECTOR
	8.59		Mar 26, 2018 04:39 AM AST	[redacted]

Ballast Water-cATP50

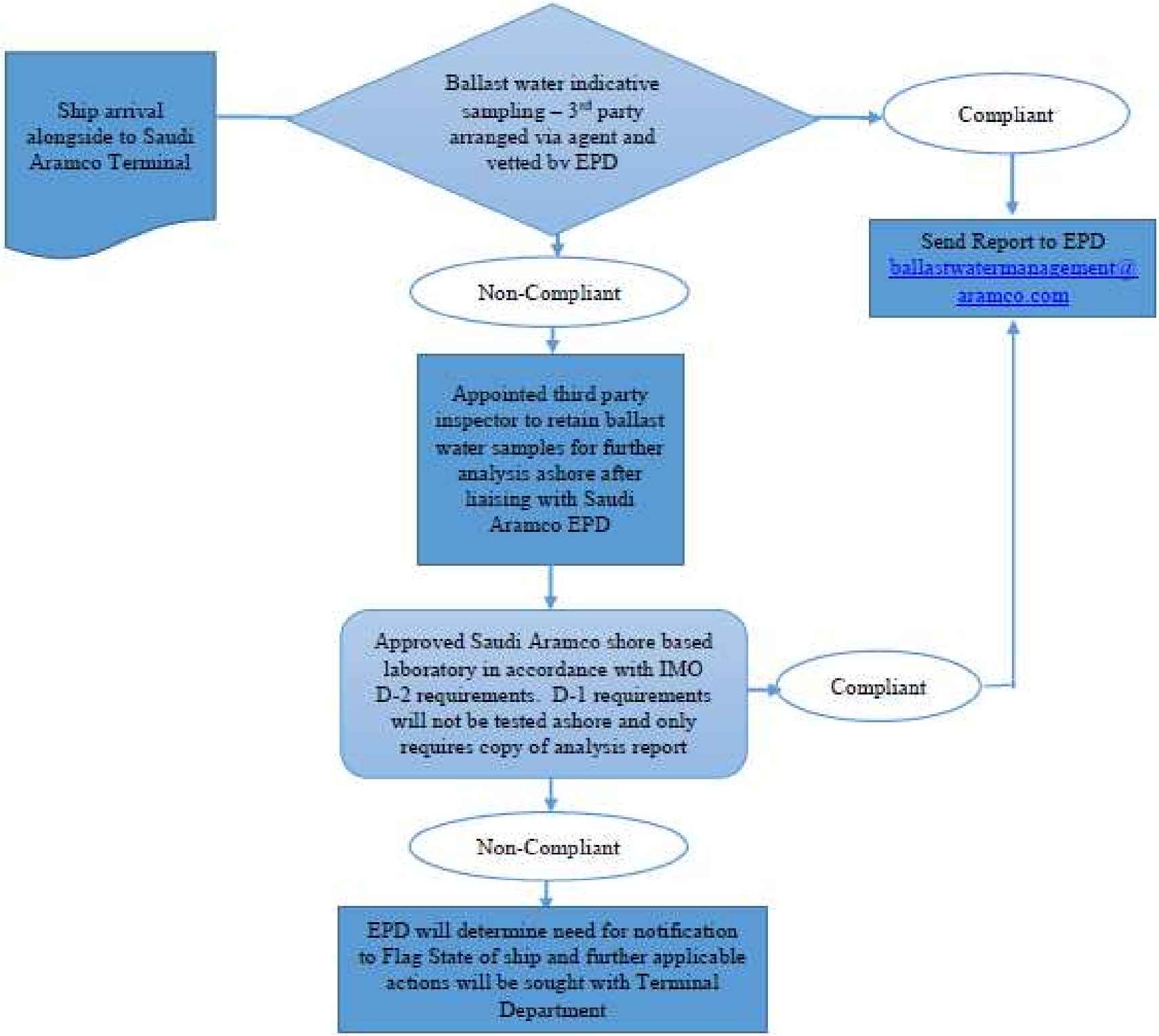
ALARM	VALUE (pg/m³)	SCHEDULE	COLLECTION	DATA COLLECTOR
	4979.69		Mar 26, 2018 04:39 AM AST	[redacted]

Ballast Water-cATPbact

ALARM	VALUE (pg/100mL)	SCHEDULE	COLLECTION	DATA COLLECTOR
	729.28		Mar 26, 2018 04:39 AM AST	[redacted]

BALLAST WATER SAMPLING: SAUDI ARABIA

- Reports are generated as pdf on board and sent directly to the Saudi Aramco Environmental Protection Department
- Currently no penalties or fines, the goal is to gather data for the IMO Experience Building Phase
- Information on non-compliant ships may be shared with next ports of call


Ship arrival alongside to Saudi Aramco Terminal
Ballast water indicative sampling – 3rd party arranged via agent and vetted by EPD
Compliant
Send Report to EPD ballastwatermanagement@aramco.com
Non-Compliant
Appointed third party inspector to retain ballast water samples for further analysis ashore after liaising with Saudi Aramco EPD
Approved Saudi Aramco shore based laboratory in accordance with IMO D-2 requirements. D-1 requirements will not be tested ashore and only requires copy of analysis report
Compliant
Non-Compliant
EPD will determine need for notification to Flag State of ship and further applicable actions will be sought with Terminal Department

SAUDI ARABIA: FUTURE DEVELOPMENTS

- Saudi Arabia Environmental Protection Department is planning to expand the project
  - to all ports in Saudi Arabia, not just the current three
  - to all D-2 Parameters, not just the 10-50 µm fraction
  - with detailed analysis methods, in addition to the current indicative analysis methods

Thank you for your attention

Questions?

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