

## Discharge Practices and Standards for Offshore Operations around the World

Country	Legal Basis	Licensing/ Monitoring Authorities	Water based Mud & Cuttings Discharge	Synthetic Based Cuttings (SBM)	Oily Cuttings Discharge	Discharge Limits for Produced Water	Comments
Albania	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	United Nations Environmental Program (UNEP): Convention on Protection of the Mediterranean Sea Against Pollution.
Algeria	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.
Angola		Ministry of Petroleum	Discharge allowed with a site specific review.	Discharge allowed on a Case by Case Basis. Synthetics on cuttings measured.	Cuttings discharge allowed, muds are reused. Oil on cuttings measured, no limit provided.	No Standard set	Environmental Legislation being drafted.
Argentina	Resolution No. 105/92	SRNAH	Discharge allowed: US testing results under review	Not determined	Unknown	Case-by-case	No regulations for offshore legislation; onshore regulations applied in principle.
Australia (Western)		Dept. of Minerals & Energy (DOME)	Discharge allowed. Toxicity testing of mud chemicals; 1% limit on oil; 17% limit on KCL; Toxicity tests are not required before drilling approval except in areas that are deemed to be sensitive Toxicity levels of >30,000 ppm (U.S. EPA Protocol) may be acceptable. Have list of approved products	Requires site specific ecological risk assessment. Cuttings discharge assessed on case-by-case basis. In Western Australia, technical justification, local environment, and environmental performance of fluid (in toxicity, biodegradation, and bioaccumulation) are considered. Fluid retention is limited to 10%. Operators have discharged esters and IO cuttings. Requirements for monitoring programs determined on case by case basis. Paraffin based fluid cuttings have been discharged in Western Australia.	1% oil limit on cuttings retention—effectively eliminates discharge. Restriction on fluids with aromatics >1%	30 mg/L 50 mg/L max	Operators must submit mud plan for review; testing and monitoring may vary; site specific. Only Olefins and Ester based SBM are allowed. Local species toxicity testing required for base oils and some additives. Assessed by DOME.

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Azerbaijan		State Committee of Ecology	Discharge allowed based on PSA and negotiations.	All discharges subject to meeting negotiated terms of specific Production Sharing Agreement. Discharge allowed for Olefin based Systems. Discharge may be allowed as long as fluids have acceptable toxicity and biodegradability; however no standards for these have been set.	Discharge prohibited other than cuttings generated from low toxicity and biodegradable muds.	48 mg/L	Environmental testing of products. Certificate awarded for approved products
Bahrain	KUWAIT Convention <sup>2</sup>		Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup> . May be discharged but can not "contain persistent systematic toxins".	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis. Use of diesel and mineral oil fluids requires express sanction of the competent State Authority. No whole diesel and mineral oil fluids can be discharged.  No diesel and mineral oil cuttings should be discharged except in exceptional circumstances  Express sanction is requested for discharge of mineral oil drill cuttings  No drill cuttings should be deposited on the sea bed in a sensitive area without the express sanction of the competent State Authority.	40 mg/L 100 mg/L max	Covers Red Sea and Persian Gulf Regions
Belgium	OSPAR Convention <sup>3</sup>		Discharge allowed under PARCOM <sup>3</sup>	10 mg/kg	10 mg/kg	40 mg/L PARCOM Decision 86/1	

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Brazil		Instituta Brazil Medio Ambiente (IBAMA)	Discharge allowed No specific regulatory language concerning WBF.	Discharge approved on a case by case basis by IBAMA.	Discharge prohibited.	20 mg/L max.	Looking at using four test species for testing of drilling fluids
Bulgaria	BLACK SEA Convention <sup>4</sup>		Discharge allowed based on UNEP: Protocol on protection against pollution from Land-Based sources <sup>4</sup>	Not determined	Case by Case Basis		UNEP: Convention on the Protection of the Black Sea Against Pollution.
Cameroon	WCARC <sup>5</sup>	Ministry of Industrial & Commercial Development	Discharge allowed based on UNEP: Protocol on Land-Based sources of pollution (Article 7) <sup>5</sup>	Not determined	Unknown		UNEP: West & Central African Region Convention (WCARC) on Protection of Marine and Coastal Environment
Canada	Act RSC 1987	Newfoundland offshore  Canada Offshore Petroleum Board	Discharge allowed. Microtox bacteria test EC20 :0-30 toxic; 30-50 slightly toxic; >50 no significant effect Trout ( <i>Salmo gairdneri</i> ) 96-hr LC50 — 0-50 toxic, 50-90 slightly toxic — >90 no effect  1996 draft guidelines allow discharge of water-based muds without restrictions but encourage operators to reduce the need for bulk disposal of drilling fluids. Cuttings may be discharged if reinjection is not economically or technically feasible.	Considering 1% SBM on cuttings Cuttings may be discharged if re-injection is not economically or technically feasible.  Canadian Nova Scotia Petroleum Board (CNSOPB) has adopted a 1% oil on cuttings limit for synthetics as of YE 1999, which is not operationally attainable with current technology  The agency that regulates the Industry in Newfoundland (CNOPB) still allows the discharge of cuttings.  1996 Offshore Waste Treatment Guidelines are under review with revision expected mid 2001.	1% OBM on cuttings (and review of disposal options)  1996 draft guidelines require specific approval to use diesel and mineral oil fluids. Use of WBF or synthetic oil preferred.  Aromatic content of fluid must be <5% and meet toxicity limit for water soluble fraction.  Cuttings may be discharged if re-injection not technically or economically feasible subject to 15% oil on cuttings limit.  Nova Scotia has adopted a 1% oil on cuttings limit as of YE 1999, which is not operationally attainable with current technology.	40 mg/L avg. 80 mg/L max	Encourage operators to reduce bulk disposal. Injection must be reviewed as option. End of well testing of drilling muds. EIA required prior to production drilling operations.

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Chile	SEPC <sup>6</sup>		Discharge allowed based on UNEP: Protocol on Protection against pollution from Land-Based Sources. <sup>6</sup>	Not determined	Case by Case Basis		Protocol for Protection of the South-East Pacific Against Pollution from Land-Based Sources.
China	GB 4914-85	National Offshore Oil Corp./EPB  State Oceanic Administration	Discharge allowed. Oil limit of 10% and recovery not possible Algae : <i>Chaetoceros muelle</i> — 48/96-hr EC50 — no limits provided Oyster: <i>Pinctada martens</i> — 48/96-hr EC50 — no limits provided Fish: <i>Ctenogobius gymnach</i> — 48/96-hr EC50 — no limits provided  Discharge of WBF mixed with oil <10% may be discharged, if difficult to recover, upon approval by the government and payment of a discharge fee.	Discharge allowed but oil content on cuttings lower than 15%  Government encouraging the use of low toxicity fluid. Minor volumes, when recovery is not possible, may be discharged subject to an appropriate discharge fee.	Discharge allowed but oil content on cuttings lower than 15%  Specific information on discharge, not available.	30-50 mg/L avg. 75 mg/L max.	Standard dependent on location of operation/ pollution fees. Regulations differ from each region with China. Samples collected and testing for toxicity under a Toxicity Assessment Report (TAR). State Oceanic Administration issues final approval certificates. Regulations under review and will become more restrictive in future. EIA required to support development plan.
Colombia	SEPC <sup>6</sup>		Discharge allowed based on UNEP: Protocol on Protection against pollution from Land-Based Sources. <sup>6</sup>	Not determined	Case by Case Basis	Removal of 80% of oil	Protocol for Protection of the South-East Pacific Against Pollution from Land-Based Sources.

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Congo	WCARC <sup>5</sup>	Department of Energy	Discharge allowed based on UNEP: Protocol on Land-Based sources of pollution (Article 7) <sup>5</sup>	No specific requirements	Use and discharge allowed, except for diesel based drilling fluids and associated cuttings  Authorities request that cuttings be subject to mechanical treatment in order to reduce amount of fluid discharged		UNEP: West & Central African Region Convention on Protection of Marine and Coastal Environment
Cote D'ivoire	WCARC <sup>5</sup>		Discharge allowed based on UNEP: Protocol on Land-Based sources of pollution (Article 7) <sup>5</sup>	Not determined	Unknown		UNEP: West & Central African Region Convention on Protection of Marine and Coastal Environment
Denmark (Baltic Sea)	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM (Helsinki Commission) Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea-Bed & its Subsoil.
Denmark (North Sea)	OSPAR Convention <sup>3</sup>		Discharge allowed under PARCOM <sup>3</sup>  Discharge allowed subject to pre-approval requirements for drilling fluid chemicals.	1 mg/kg	1 mg/kg  Discharged allowed with limit of 1% oil on cuttings – which is not operationally attainable with current technology	40 mg/L PARCOM Decision 86/1	Tests other than PARCOM used:  Algae — 72-hr EC50 — 1400 mg/L Gammaride — 10-day LC50 — 13 mg/L Shrimp — 96-hr EC50 — 18,000 mg/L Testing for both drilling fluids & produced water treating chemicals /worst case mud system & pre-approval of chemicals
Ecuador	SEPC <sup>6</sup>		Discharge allowed based on UNEP: Protocol on Protection against pollution from Land-Based Sources. <sup>6</sup>	Not determined	Case by Case		Protocol for Protection of the South-East Pacific Against Pollution from Land-Based Sources.

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Egypt	Decree No. 338/95	EGPC/ EEAA	Discharge allowed using US EPA standards. Results from US testing labs OK for discharge approval.	Not determined	100 g/Kg Case -by -Case	15 mg/L max. 40 mg/L max. (Alternative)	Special dispensation may be awarded by EBPC. Also Egypt is a member of the Barcelona Convention. EIA at drilling stage.
Equatorial Guinea			Discharge allowed	Discharge allowed  Operators presently discharging EMBF (Certrex 67 special)	Mineral oil fluid cuttings discharge allowed		
Estonia	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea-Bed & its Subsoil.
Finland (North Sea)	OSPAR Convention <sup>3</sup>		Discharge allowed under PARCOM <sup>3</sup>	10 mg/kg	10 mg/kg	40 mg/L PARCOM Decision 86/1	
Finland (Baltic Sea)	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea-Bed & its Subsoil.
France (North Sea)	OSPAR Convention <sup>3</sup>	Agency for Environment & Energy Mgt.	Discharge allowed under PARCOM <sup>3</sup>	10 mg/kg PARCOM  Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings – which is not operationally attainable with current technology  It is expected that authorities will not grant any more discharge permits for the Northeast Atlantic or Mediterranean Sea	10 mg/kg Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings – which is not operationally attainable with current technology.  It is expected that authorities will not grant any more discharge permits for the Northeast Atlantic or Mediterranean Sea	40 mg/L PARCOM Decision 86/1	
France (Mediterranean Sea)	Barcelona Convention <sup>1</sup>	Agency for Environment & Energy Mgt.	Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.

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Gabon	WCARC <sup>5</sup>		Discharge allowed based on UNEP: Protocol on Land-Based sources of pollution (Article 7) <sup>5</sup> . No standards set: Case by Case.	Discharge allowed: no standards set: Case by Case	Discharge allowed: no standards set: Case by Case.  Use and discharge allowed, except for diesel based drilling fluids and associated cuttings  Authorities request that cuttings be subject to mechanical treatment in order to reduce amount of fluid discharged		UNEP: West & Central African Region Convention on Protection of Marine and Coastal Environment
Gambia	WCARC <sup>5</sup>		Discharge allowed based on UNEP: Protocol on Land-Based sources of pollution (Article 7) <sup>5</sup>	Not determined	Unknown		UNEP: West & Central African Region Convention on Protection of Marine and Coastal Environment
Georgia	BLACK SEA Convention <sup>4</sup>		Discharge allowed based on UNEP: Protocol on protection against pollution from Land-Based sources <sup>4</sup>	Not determined	Case by Case Basis		UNEP: Convention on the Protection of the Black Sea Against Pollution.
Germany (Baltic Sea)	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea-Bed & its Subsoil.
Germany (North Sea)	OSPAR Convention <sup>3</sup>		Discharge allowed under PARCOM <sup>3</sup>	10 mg/kg	10 mg/kg	40 mg/L PARCOM Decision 86/1	
Ghana	WCARC <sup>5</sup>	Ministry of Energy	Discharge allowed based on UNEP: Protocol on Land-Based sources of pollution (Article 7) <sup>5</sup>	Not determined	Unknown		UNEP: West & Central African Region Convention on Protection of Marine and Coastal Environment
Greece	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L avg. 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.

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Indonesia	MD KEP 3/91; 42/97	Ministry of Mining and Energy	Discharge allowed	Not determined	150 g/Kg	75 mg/L avg. 100 mg/L max.	More stringent standards applied on case-by-case basis. EIA for production operations.
Iran	KUWAIT Convention <sup>2</sup>	Ministry of Energy	Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup>  May be discharged but can not "contain persistent systematic toxins"	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis.  Use of diesel and mineral oil fluids requires express sanction of the competent State Authority  No whole diesel and mineral oil fluids can be discharged  No diesel and mineral oil cuttings should be discharged except in exceptional circumstances Express sanction is requested for discharge of mineral oil drill cuttings  No drill cuttings should be deposited on the sea bed in a sensitive area without the express sanction of the competent State Authority.		UNEP: Covers Red Sea and Persian Gulf Regions
Iraq	KUWAIT Convention <sup>2</sup>		Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup>	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis	40 mg/L avg. 100 mg/L max	UNEP: Covers Red Sea and Persian Gulf Regions
Ireland (North Sea)	Rules and Procedures for Offshore Petroleum Exploration Operations. OSPAR <sup>3</sup>	Department of the Marine and Natural Resources	Discharge allowed. Prior approval of chemicals based on HOCNF. Cuttings discharge allowed.	Prior approval required for use. Case by case decision. May require post-well surveys. May require cuttings to be shipped ashore.	Zero Discharge	40 mg/L avg.	Ireland is a member of OSPARCOM.  Regulator is pushing for zero discharge regime.

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Israel	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L avg. 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.
Italy	Dm of 28.7 1994	Ministry of Environment	Discharge allowed following suitable regulatory authorization	Not considered under current regulations	Discharged allowed at less than 10% oil on cuttings  Discharge not permitted in Adriatic Sea	40 mg/L avg.	More stringent standards may be applied on Produced Water. EIA at drilling stage.
Kuwait	KUWAIT Convention <sup>2</sup>		Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup>  May be discharged but can not "contain persistent systematic toxins"	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis.  Use of diesel and mineral oil fluids requires express sanction of the competent State Authority  No whole diesel and mineral oil fluids can be discharged  No diesel and mineral oil cuttings should be discharged except in exceptional circumstances  Express sanction is requested for discharge of mineral oil drill cuttings  No drill cuttings should be deposited on the sea bed in a sensitive area without the express sanction of the competent State Authority.	40 mg/L avg. 100 mg/L max	UNEP: Covers Red Sea and Persian Gulf Regions
Lebanon	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.

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Libya	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.
Lithuania	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea- Bed & its Subsoil.
Malaysia		Dept. of Energy	Discharge allowed  Flow rate is estimated but not reported  Drilling mud makeup is monitored but not reported  No additional monitoring requirements	Discharge allowed  Operators are using synthetics and discharging cuttings. No regulatory action on synthetics currently on the horizon  No retention limit	Discharge allowed. No oil limit  Operators are using mineral oil fluids and discharging cuttings		Companies go through Patrons Environ. Dept. for approval. Toxicity test certificates are required
Mexico		Ministry of Energy (SEMARNAP)	Discharge allowed based on US EPA Standards with fluid products tested in generic fluid #7 at highest concentration Shrimp — <i>Mysidopsis bahia</i> — 96-hr LC50 — 30,000 mg/L	Zero Discharge	Zero Discharge	40 mg/L avg. 100 mg/L max.	Environmental testing required.
Monaco	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.
Morocco	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.

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Netherlands	Mining reg. 1996. Reg. 687/1224, 1987; OSPAR Convention <sup>3</sup>	Ministry of Economic Affairs/State Supervision of Mines	Discharge allowed under PARCOM <sup>3</sup> subject to pre-approval requirements for drilling fluid chemicals. Pre-approval requirements include toxicity testing according to OSPAR protocols.	Under OSPAR 2000/3, discharge subject to limit of 1% oil on cuttings – which is not operationally attainable with current technology  Extensive monitoring requirements effectively prohibit use.	Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings – which is not operationally attainable with current technology	40 mg/L avg. 100 mg/L max.	Gas platforms are exempt from 40 ppm limit where best available technology already installed. Testing for both drilling fluids & produced water treating chemicals pre-approval of chemicals. EIA required
New Zealand		Regional Council	Discharge allowed	Not determined	Used and discharged once		
Nigeria	Act No. 34/68: Regs 1992	Ministry of Petroleum Resources/EP A  Director of Petroleum Resources (DPR) with permit application.	Discharge allowed. Toxicity testing of drilling chemicals (US or NS). Hazard review of chemicals <i>Desmocaris trispinosa</i> — 96-hr EC50 — freshwater — no limits provided <i>Palaemonetes africanus</i> — 96-hr EC50 — brackish water — no limits provided.  DPR will examine WBF to determine how hazardous and toxic it is.	Considering limit of <5% SBM on cuttings; except for Esters (will be higher). Synthetic fluid must be recovered, reconditioned, and recycled.  Ester based cuttings limited to 10% drilling fluid or less for discharge  Discharge prohibited in swamp areas  DPR is considering special considerations for exploration drilling and drilling in deep water.	Oil on cuttings, limited to 1% with 0% goal.  To discharge, must submit proof to DPR with permit application that mineral oil fluid has low toxicity. Discharges will be treated to DPR's satisfaction.  On-site disposal if oil content does not cause sheen on the receiving water.  Inspection of operations shall be allowed at all reasonable times.	40 mg/L avg. 72 mg/L max.	Results compared to diesel oil toxicity  Test whole drilling fluid and base oil if synthetic oil base mud used  Monitoring of site required. EIA required.

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Norway	PARCOM 10/10/1 1988; OSPAR Convention <sup>3</sup>	Norwegian Pollution Control Authority (SFT)	<p>Discharge allowed under PARCOM<sup>3</sup></p> <p>Discharge allowed subject to pre-approval requirements for drilling fluid chemicals. Monitoring of discharge sites may be required. Pre-approval requirements include toxicity testing according to OSPAR protocols.</p>	<p>Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings</p> <p>OSPAR 2000/3 decision permits synthetic cuttings discharge only under exceptional circumstances (for Norway, likely to mean only at those sites where SBFs have been previously discharged).</p> <p>Synthetic discharge allowed only where technical/safety considerations preclude use of WBF .</p> <p>When allowed, synthetic content of cuttings limited to 8-18% depending on hole size.</p> <p>Chemical monitoring of cuttings required annually, biological monitoring required every 3 years</p> <p>Applications for approval require testing according to OSPAR format.</p>	Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings– which is not operationally attainable with current technology	40 mg/L avg. 100 mg/L max	<p>Monitoring of discharge may be required.</p> <p>Tests other than PARCOM used :</p> <p>Barnacle — <i>Balanus improvisus</i> — EC50 &lt; 1,000 m/kg high toxic</p> <p>Bivalve — <i>Mytilus edulis</i> — EC50 &gt;1 mg/kg — moderate toxicity</p> <p>Testing for both drilling fluids &amp; produced water treating chemicals, pre-approval of chemicals. EIA required prior to drilling and development.</p>

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Oman	Decree No. 10/82 KUWAIT Convention <sup>2</sup>	Ministry of Petroleum Resources/ Ministry of Environment	Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup>  May be discharged but can not "contain persistent systematic toxins"	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis  Use of diesel and mineral oil fluids requires express sanction of the competent State Authority  No whole diesel and mineral oil fluids can be discharged  No diesel or mineral oil cuttings should be discharged except in exceptional circumstances  Express sanction is requested for discharge of mineral oil fluid drill cuttings  No drill cuttings should be deposited on the sea bed in a sensitive area without the express sanction of the competent State Authority.	40 mg/L avg. 100 mg/L max.	UNEP: Covers Red Sea and Persian Gulf <a href="#">Qatar</a> If Regions. EIA required prior to drilling.
Panama	SEPC <sup>6</sup>		Discharge allowed based on UNEP: Protocol on Protection against pollution from Land-Based Sources. <sup>6</sup>	Not determined	Case by Case Basis		Protocol for Protection of the South-East Pacific Against Pollution from Land-Based Sources.
Peru	SEPC <sup>6</sup>		Discharge allowed based on UNEP: Protocol on Protection against pollution from Land-Based Sources. <sup>6</sup>	Not determined	Case by Case Basis		Protocol for Protection of the South-East Pacific Against Pollution from Land-Based Sources.
Poland	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea-Bed & its Subsoil.

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Portugal	OSPAR Convention <sup>3</sup>		Discharge allowed under PARCOM Decision 94/1 <sup>3</sup>	10 mg/kg	10 mg/kg	40 mg/L PARCOM Decision 86/1	
Qatar	KUWAIT Convention <sup>2</sup>		Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup>  May be discharged but can not "contain persistent systematic toxins	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis  Use of diesel and mineral oil fluids requires express sanction of the competent State Authority  No whole diesel and mineral oil fluids can be discharged  No diesel and mineral oil cuttings should be discharged except in exceptional circumstances  Express sanction is requested for discharge of mineral oil fluid drill cuttings  No drill cuttings should be deposited on the sea bed in a sensitive area without the express sanction of the competent State Authority.	40 mg/L avg. 100 mg/L max.	UNEP: Covers Red Sea and Persian Gulf Regions
Romania	BLACK SEA Convention <sup>4</sup>		Discharge allowed based on UNEP: Protocol on protection against pollution from Land-Based sources <sup>4</sup>	Not determined	Case by Case Basis		UNEP: Convention on the Protection of the Black Sea Against Pollution.
Russia	Water Code 1995/ GOST 1977	Committee of Ecology/ Fisheries	Discharge allowed	Not determined	Zero Discharge	0.05 mg/L MPC	MPC - Maximum Permissible Concentration. Limitations based on concentrations at the edge of a mixing zone

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Russia (Baltic Sea)	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea- Bed & its Subsoil.
Russia (Black Sea)	BLACK SEA Convention <sup>4</sup>		Discharge allowed based on UNEP: Protocol on protection against pollution from Land-Based sources <sup>4</sup>	Not determined	Case by Case Basis		UNEP: Convention on the Protection of the Black Sea Against Pollution.
Russia— Sakhalin Island			Base case is zero discharge with discharges from exploratory drilling authorized on a case by case basis.	Not yet discussed with regulators.	Regulatory documents do not deal specifically with diesel or mineral oil fluids; regulations currently in draft form will prohibit cuttings discharge if diesel and mineral oil fluid are used.	0.05 mg/L MPC	MPC - Maximum Permissible Concentration. Limitations based on concentrations at the edge of a mixing zone
Saudi Arabia	KUWAIT Convention <sup>2</sup>		Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup> May be discharged but can not “contain persistent systematic toxins”	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis  Use of diesel and mineral oil fluids requires express sanction of the competent State Authority  No whole diesel and mineral oil fluids can be discharged  No diesel and mineral oil fluid cuttings should be discharged except in exceptional circumstances. Express sanction is requested for discharge of mineral oil drill cuttings  No drill cuttings should be deposited on the sea bed in a sensitive area without the express sanction of the competent State Authority.	40 mg/L 100 mg/L max	UNEP: Covers Red Sea and Persian Gulf Regions

Country	Legal Basis	Licensing/ Monitoring Authorities	Water based Mud & Cuttings Discharge	Synthetic Based Cuttings (SBM)	Oily Cuttings Discharge	Discharge Limits for Produced Water	Comments
Senegal	WCARC <sup>5</sup>		Discharge allowed based on UNEP: Protocol on Land-Based sources of pollution (Article 7) <sup>5</sup>	Not determined	Unknown		UNEP: West & Central African Region Convention on Protection of Marine and Coastal Environment
Spain (North Sea)	OSPAR Convention <sup>3</sup>		Discharge allowed under PARCOM <sup>3</sup>	Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings – which is not operationally attainable with current technology  It is expected that authorities will not grant any more discharge permits for the Northeast Atlantic or Mediterranean Sea	Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings – which is not operationally attainable with current technology.  It is expected that authorities will not grant any more discharge permits for the Northeast Atlantic or Mediterranean Sea	40 mg/L PARCOM Decision 86/1	
Spain (Mediterranean Sea)	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.
Sweden (Baltic Sea)	HELCOM Convention <sup>7</sup>		Discharge allowed based on HELCOM Recommendation No. 95/1	Not determined	HELCOM Recommendation No. 95/1	15 mg/L max. 40 mg/L (Alternative)	Helcom Recommendation 9/5: Concerning Exploration & Exploitation of the Sea-Bed & its Subsoil.
Sweden (North Sea)	OSPAR Convention <sup>3</sup>		Discharge allowed under PARCOM <sup>3</sup>	10 mg/kg	10 mg/kg	40 mg/L PARCOM Decision 86/1	
Syria	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.
Thailand	NEQA 1992: Gov. Reg. 20/90	Department of Mineral Resources	Discharge allowed on a case-by case basis	Discharge allowed on a case-by-case basis. No specific language concerning synthetic fluids	Discharge allowed on a case-by-case basis. Discharge allowed if <10% oil on cuttings. Regulators are reviewing existing practices.	40 mg/L avg. 100 mg/L max.	Discharge limit has no legislative basis and is defined on a case-by-case basis

Country	Legal Basis	Licensing/ Monitoring Authorities	Water based Mud & Cuttings Discharge	Synthetic Based Cuttings (SBM)	Oily Cuttings Discharge	Discharge Limits for Produced Water	Comments
Trinidad			No specific restrictions against offshore discharge and has historically been allowed. Use must be disclosed in EIA, which is approved by the Ministry of Energy. Impact of Water Pollution Rules currently being promulgated by EMA is uncertain at this time; will likely allow discharge.	No specific restrictions against offshore discharge and has historically been allowed. Impact of Water Pollution Rules currently being promulgated by EMA is uncertain at this time.	No specific restrictions against, but offshore discharge unlikely to be allowed by Ministry of Energy (MOE) during EIA approval process. No offshore wells have been drilled with OBM in several years, so MOE's stance has not been recently tested. Impact of Water Pollution Rules currently being promulgated by EMA is uncertain at this time; will likely not allow discharge.	40 mg/L max.	
Tunisia	Order of 1989	ANPE	Discharge allowed under Barcelona Protocols <sup>1</sup>	Not determined	Discharge allowed under Barcelona Protocols	10 mg/L max.	Zero discharge conditions have been applied in some cases. EIA required at each stage of development.
Turkey (Black Sea)	BLACK SEA Convention <sup>4</sup>		Discharge allowed based on UNEP: Protocol on protection against pollution from Land-Based sources <sup>4</sup>	Not determined	Case by Case Basis		UNEP: Convention on the Protection of the Black Sea Against Pollution.
Turkey (Mediterranean Convention)	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.
Ukraine	BLACK SEA Convention <sup>4</sup>		Discharge allowed based on UNEP: Protocol on protection against pollution from Land-Based sources <sup>4</sup>	Not determined	Case by Case Basis		UNEP: Convention on the Protection of the Black Sea Against Pollution.

Country	Legal Basis	Licensing/ Monitoring Authorities	Water based Mud & Cuttings Discharge	Synthetic Based Cuttings (SBM)	Oily Cuttings Discharge	Discharge Limits for Produced Water	Comments
United Arab Emirates	KUWAIT Convention <sup>2</sup>		Discharge allowed based on UNEP: Kuwait Protocol on protection from Pollution <sup>2</sup> May be discharged but can not “contain persistent systematic toxins”	Not determined	Discharge allowed under Kuwait Protocol on a case by case basis Use of diesel and mineral oil fluids requires express sanction of the competent State Authority  No whole diesel and mineral oil fluids can be discharged  No diesel and mineral oil fluid drill cuttings should be discharged except in exceptional circumstances  Express sanction is requested for discharge of mineral oil fluid drill cuttings  No drill cuttings should be deposited on the sea bed in a sensitive area without the express sanction of the competent State Authority	40 mg/L avg. 100 mg/L max.	UNEP: Covers Red Sea and Persian Gulf Regions

Country	Legal Basis	Licensing/ Monitoring Authorities	Water based Mud & Cuttings Discharge	Synthetic Based Cuttings (SBM)	Oily Cuttings Discharge	Discharge Limits for Produced Water	Comments
United Kingdom	PARCOM 10/10/1988 OSPAR Convention <sup>3</sup>	Department of Trade & Industry/ Marine Pollution Control Unit	Discharge allowed under PARCOM <sup>3</sup> Discharge allowed subject to pre-approval requirements for drilling fluid chemicals. Pre-approval requirements include toxicity testing according to OSPAR protocols.	OSPARCOM protocols; Phase out SBM discharges except for Ester based by 2001 Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings which is not operationally attainable with current technology  Although OSPAR 2000/3 decision permits synthetic cuttings discharge only under exceptional circumstances, the UK government has made it clear that there will not be any exceptional circumstances arising that would lead to discharge of SBM cuttings.	<1.0% OBM on cuttings (to be reduced to 0.5% in 2000)  Under OSPAR 2000/3, discharge is subject to limit of 1% oil on cuttings which is not operationally attainable with current technology  Practice is to inject cuttings or return to shore and recover oil.	40 mg/L avg. 100 mg/L max.	Chemicals tested & placed in categories (0-5) with 0 being no notification required, 1 being all discharges to be notified, & 5 being excess of 1,000 tons per installation per year to be notified  Testing for both drilling fluids & produced water treating chemicals pre-approval of chemicals EIA required prior to production drilling.

Country	Legal Basis	Licensing/ Monitoring Authorities	Water based Mud & Cuttings Discharge	Synthetic Based Cuttings (SBM)	Oily Cuttings Discharge	Discharge Limits for Produced Water	Comments
United States	40 CFR 435	EPA/MMS	<p>Discharge allowed under NPDES Permit limits</p> <p>Mysid shrimp --- <i>Mysidopsis bahia</i> — 96-hr LC50 — &gt;30,000 ppm (using suspended particulate phase of fluid)</p> <p><i>Coastal Waters:</i> (e.g. inland canals and enclosed bays). Discharge prohibited except for Alaska. Alaskan coastal waters subject to same regulations as offshore waters.</p> <p><i>Offshore Waters:</i> Discharge allowed subject to:</p> <p>&gt;3 mi. from shore (except Alaska where &gt;3 mi restriction does not apply)</p> <p>Limit on toxicity (LC50 of suspended particulate phase &gt;30000 ppm)</p> <p>Limit on Hg/Cd in barite (1/3 mg/kg) No free oil (static sheen test) No diesel oil Discharge rate &lt; 1000 bbl/hr Further restrictions on rate in areas of special biological sensitivity</p>	<p>Under Review</p> <p><i>WESTERN GOM.</i> Discharge allowed subject to the following restrictions:</p> <p>Must be &gt;3 mi. from shore</p> <p>Maximum retention on cuttings (wet weight basis well average over intervals drilled with SBFs) varies with fluid</p> <p>+ 9.4% for ester or equivalent (based on toxicity and biodegradation standards)</p> <p>+ 6.9% for fluid with equivalent environmental performance to C16-C18 IOs.</p> <p>Limit on toxicity-Base fluid (LC50 of base fluid less than a C1618 internal olefin.</p> <p>Limit on toxicity discharge of field mud( LC50 of whole mud is not greater than standard mud)</p> <p>Limit on Biodegradation by closed bottle test of base fluid less than a C1618 internal olefin)</p> <p>Limit on Hg/Cd in barite (1/3 mg/kg)</p> <p>No free oil (Reverse phase extraction method)</p> <p>No diesel oil Further restrictions on rate in areas of special biological sensitivity</p>	Discharge prohibited.	29 mg/L 42 mg/L max	<p>No visual sheen; discharge prohibited in near-shore areas.</p> <p>Drilling fluids monthly and end of well testing.</p> <p>EIA required prior to production drilling operations.</p>

Country	Legal Basis	Licensing/ Monitoring Authorities	Water based Mud & Cuttings Discharge	Synthetic Based Cuttings (SBM)	Oily Cuttings Discharge	Discharge Limits for Produced Water	Comments
Venezuela	Decree No. 833/1995	MARNR	Discharge allowed; toxicity testing under review	Zero Discharge	Zero Discharge	20 mg/L	Special exemptions granted if environmental impact is not significant. EIA required at drilling stage.
Vietnam	Decision No. 333/QB 1990	Petrovietnam/ Ministry of Science, Technology & Environment (MOSTE)	Discharge allowed on a Case by Case Basis	Discharge allowed on a Case by Case Basis (max 10 g/Kg)	Discharge allowed on a Case by Case Basis (max 10 g/Kg)	40 mg/L	Toxicity testing of base fluid and additives by Petrovietnam Research & Development Center for Petroleum Safety and Environment (RDCPSE). EIA required prior to drilling.
Vietnam (EEPVL)			Discharge allowed.  No stipulations on KCI  Toxicity requirements not stipulated concretely.  In general oil content should be lower than 1%.  Any use of drilling fluids, toxic and/or hazardous chemicals must be approved by regulatory agency in advance.  Drilling mud makeup is monitored and reported as drilling mud components in EIA report.	No stipulations regarding synthetic cuttings. May have same restrictions as diesel and mineral oil fluid drill cuttings.	Discharge prohibited < 3 nautical miles. 1% oil limit (possibly extended for certain cases) for areas beyond 3 nautical miles.  Use of diesel-based drilling fluids is totally prohibited.		
Yugoslavia	Barcelona Convention <sup>1</sup>		Discharge allowed under Barcelona Protocol <sup>1</sup>	Not determined	100g/Kg	40 mg/L 100 mg/L max	UNEP: Convention on Protection of the Mediterranean Sea Against Pollution.

- 1)Barcelona Convention. 1976. Convention for the Protection of the Mediterranean Sea against Pollution. Protocol for the Protection of the Mediterranean Sea against Pollution resulting from Exploitation of the Continental Shelf and the Seabed and its Subsoil (14 October, 1994).
- 2)Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution (1 July, 1979). Kuwait Protocol (1989). Concerning Marine Pollution Resulting from Exploration and Exploitation of the Continental Shelf (29 March, 1989).
- 3)OSPAR Convention. 1992. Convention for the Protection of the Marine Environment in the North East Atlantic.
- 4)Black Sea Convention. 1992. Convention on the Protection of the Black Sea against Pollution (21 April, 1992). Protocol on Protection of the Black Sea Marine Environment against Pollution from Land Based Sources (21 April, 1992).
- 5)Convention for Cooperation in the Protection & Development of the Marine and Coastal Environment of the West & Central African Region (5 August, 1984).
- 6)Protocol for Protection of the South-East Pacific against Pollution from Land Based Sources (1983). Protocol associated with Agreement on Regional Cooperation in Combating Pollution of the South-East Pacific by Hydrocarbons or other Harmful Substances in Cases of Emergency (1981).
- 7)Helsinki Convention, 1974. Convention on the Protection of the Marine Environment of the Baltic Sea. Helcom Recommendations 9/5.