APPENDIX 4

Water Use Standards Comparison

Purpose

This document reviews the Company's compliance against adopted international standards and guidelines.

The Table below:

- summarises key requirements of adopted international and EC standards,
- compares these with the current requirements applied to the Project,
- provides an overview of monitoring programmes, considering the adopted international and EC Standards, TEO-C and EMP, and
- provides a Comment stating the extent of compliance with the adopted international and EC Standards.

Who is this for?

This document supports the Asset/Activity HSE Managers and Environmental Specialists to determine compliance, maintain internal standards and specifications, and advise Asset/Activity Managers on relevant requirements.

<table>
<tr><th>Ref</th><th>Issue/Item</th><th>International Standards</th><th>EC standards</th><th>Current requirements applied to Project</th><th>Monitoring overview</th><th>Comment</th></tr>
<tr>
<td>1.</td>
<td>Discharge of treated effluent water (including treated sewage effluent, storm water) from the LNG / OET treatment facilities.</td>
<td>(<u>General Environmental, Health and Safety Guidelines (2007) IFC</u>
The quality of treated process wastewater, wastewater from utility operations or storm water discharged on land, including wetlands, should be established based on local regulatory requirements.
<u>Environmental, Health, and Safety Guidelines for Liquefied Natural Gas (LNG) Facilities (IFC, April 30,2007)</u>
Gray and black water from showers, toilets and kitchen facilities should be treated in accordance <u>with the following (General Environmental, Health and Safety Guidelines (2007) IFC, table 1.3.1 Indicative Values for Treated Sanitary Sewage Discharge):</u>
<u>Units in mg/l except pH</u>
pH 6-9
BOD 30
COD 125
Oil and grease 10
TSS 50
Total Nitrogen 10
Total Phosphorus 2.0
Coliform bacteria < 400 MPN/100 ml

<u>Standard applicable at time of Design:</u>
<u>World Bank PPAH Onshore Oil and Gas Guidelines (1998) General environmental guidelines, Table 4.</u>
Ammonia 10
<u>Environmental, Health, and Safety Guidelines for Ports, Harbors, and Terminals (IFC, April 30, 2007)</u>
Avoiding installation of storm drainage catch basins that discharge directly into surface waters, using containment basins in areas with a high risk of accidental releases of oil or hazardous materials (e.g. fueling or fuel transfer locations), and oil / grit or oil / water separators in all runoff collection areas. Oil / water separators and trapping catch basins should be maintained regularly to keep them operational. Installing</td>
<td>EC Directive concerning urban waste water treatment (91/271/EEC):
Requirements for discharges from urban waste water treatment plants subject to Articles 4 and 5 of the Directive:
• BOD_5 at 20°C: 25 mg/l O_2
• COD: 125 mg/l O_2
• TSS: 60 mg/l
Requirements for discharges from urban waste water treatment plants to sensitive areas that are subject to eutrophication. Either of these parameters may apply depending on the local situation:
• Total phosphorus: 2 mg/l P (10 000 - 100 000 pop. est.);
• Total nitrogen: 15 mg/l N (10 000 - 100 000 pop. est.).</td>
<td>General requirements relating to installed facilities are described in Water Use Standard, Appendix 7.
LNG/OET plant has four discharges (three to sea and one on land). Every discharge to sea has individually calculated allowable discharge norm (ADN) which ensure compliance with maximum permissible concentration in the receiving environment.
Drainage systems collect all oil contaminated water for further on-site treatment. Separators and storm containment basins are provided and maintained. No storm drainage catch basins discharge directly into surface waters.
LNG plant applies air cooling for main process (not cooling water).
<u>All units in mg/l</u>
For all discharges
pH 6.5-8.5
Discharge limits from temporary Effluent Treatment Facility (ETF)
BODfull 9.164
Oil and grease 0.08
TSS 21.17
Ammonia nitrogen 14.36*
Total phosphorus 1.206
Coliform bacteria < 100 MPN/100 ml
Discharge limits from permanent Sewage Treatment Plant (STP)
BODfull 5.32
Oil and grease 3.18
TSS 13.18
Ammonia nitrogen 1.685
Total phosphorus 0.835
Coliform bacteria < 100 MPN/100 ml
Discharge limits from fire pond
BODfull 15.69</td>
<td>
<table>
<tr><th>Parameter</th><th>Location</th><th>Frequency</th></tr>
<tr><td colspan="3">For discharge from temporary Effluent Treatment Facility (ETF) (Outlet 4)</td></tr>
<tr><td>BODfull
Oil and grease
TSS
Ammonia nitrogen
Total phosphorus</td><td>1) before/after ETF
2) mix in the seapipe before discharge
3) three points in the sea in control line (250 m from discharge)</td><td>1) quarterly
2) monthly,
3) monthly in the ice free period</td></tr>
<tr><td>Coliform bacteria</td><td>1) mix in the sea pipe before discharge,
2) point of discharge from sea pipe</td><td>1) monthly
2) monthly in the ice free period</td></tr>
<tr><td>pH</td><td>before/after ETF</td><td>quarterly</td></tr>
<tr><td colspan="3">For discharge from permanent Sewage Treatment Plant (STP) (Outlet 2)</td></tr>
<tr><td>BODfull,
Oil and grease
TSS
Ammonia nitrogen
Total phosphorus</td><td>1) before/after STP
2) mix in the sea pipe before discharge
3) three points in the sea in control line (250 m from discharge)</td><td>1) quarterly
2) monthly,
3) monthly in the ice free period</td></tr>
<tr><td>Coliform bacteria
Infectious agents</td><td>before discharge</td><td>monthly</td></tr>
<tr><td>Sulfolane
Synthetic surfactants
Organoleptic properties</td><td>three points in the sea in control line (250 m from discharge)</td><td>monthly in the ice free period</td></tr>
<tr><td>pH</td><td>before/after STP</td><td>quarterly</td></tr>
<tr><td>Nitrite</td><td>after STP</td><td>quarterly</td></tr>
<tr><td colspan="3">For discharge from fire pond (Outlet 1)</td></tr>
<tr><td>BODfull
Oil and grease
TSS</td><td>1) before discharge
2) three points in the sea in control line (250 m from discharge)</td><td>1) monthly
2) quarterly in the ice free period</td></tr>
<tr><td>Infectious agents
Total count of coliform
Thermo tolerant coli</td><td>before discharge</td><td>monthly</td></tr>
<tr><td>pH
Organoleptic properties
Temperature</td><td>three points in the sea in control line (250 m from discharge)</td><td>quarterly in the ice free period</td></tr>
</table>
</td>
<td>ETF nitrogen limit relates to "Ammonia Nitrogen" only, which is consistent with the parameter applicable in the WB PPAH (1998) at time of Project design. The Project limit specified is 14.36 mg/L, which exceeds the 1998 WB PPAH limit of 10 mg/L which was applicable at time of Project design; however the actual concentrations discharged are below the WB PPAH value. Hence, in practice the Project ETF nitrogen complies with the adopted standards applicable at the time of design.
Comply with limits, with the exception of the above item.
Although the approved limit (marked *) for Fire Pond TSS is higher than the IFC indicative value, the actual concentrations discharged are below the IFC indicative value.
Monitoring programmes comply, with the exception of COD which is excluded as RF regulations do not stipulate COD for sanitary wastewater discharges to Fishery Waters. This is acceptable in accordance with IFC requirements which accept compliance with national standards.</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>filter mechanisms (e.g. draining swabs, filter berms, drainage inlet protection, sediment traps and sediment basins) to prevent sediment and particulates from reaching the surface water.
<u>Environmental, Health, and Safety Guidelines for Crude Oil and Petroleum Product Terminals (IFC, April 30, 2007)</u>
As the major wastewater sources are tank bottom water and storm water runoff, wastewater flows in this sector typically occur in batches, not lending themselves to on-site biological treatment. These types of effluents may need to be pre-treated via oil / water separators, with further on-site or off-site biological and chemical treatment and activated carbon systems, depending on the volume of contaminants present, and whether the facility is discharging the wastewater into a municipal system or directly to surface waters.</td>
<td></td>
<td>Oil and grease 0.04
TSS 61.83*
Discharge limits to land from quality control pond
BODfull 5
Oil and grease 0.1
TSS 25</td>
<td>
<table>
<tr><td>Dissolved Oxygen</td><td></td><td></td></tr>
<tr><td colspan="3">For discharge from quality control pond (Outlet 3)</td></tr>
<tr><td>BODfull
Oil and grease
TSS
pH</td><td>point of discharge, point of crossed by imaginary line from point of discharge with Goluboi brook, 100m upstream/170 m downstream</td><td>monthly (apr-nov) in the period of discharge</td></tr>
<tr><td colspan="3">LNG Jetty, Materials Offloading Facility (MOF), Tanker Loading Unit (TLU)</td></tr>
<tr><td>Wind speed, direction
Visual inspection (turbidity, foam, oil sheen, litter, floating material)</td><td>TLU: stations at 500m in each direction (north, south, west and east) from the TLU, plus one reference station at 2000m E of the TLU (5 stations in total)</td><td>Daily</td></tr>
<tr><td>Organoleptic properties
Colour
Temperature
Turbidity
Visual (oil sheen)
TSS
Hydrocarbons</td><td>TLU stations (above)
LNG Jetty
MOF</td><td>Quarterly (ice free season)</td></tr>
<tr><td>Depth
Direction/velocity current
Dissolved oxygen
ammonia
nitrite
nitrate
phosphate
Ba, Cd, Cr, Cu, Fe, Al, Hg, Pb, Zn
phenols
synthetic surfactants
Visual inspections</td><td>LNG Jetty
MOF</td><td>Quarterly (ice free season)</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Ship wastewater in the Port Prigorodnoye</td>
<td><u>Environmental, Health, and Safety Guidelines for Ports, Harbors, and Terminals (IFC, April 30,2007)</u>
Port operators should provide collection, storage, and transfer and / or treatment services, and facilities of sufficient capacity and type for all wastewater generated by vessels at the port in accordance with MARPOL and national regulations:
Oily waste and wastewater should be collected in barges, vehicles, or central collection systems and storage tanks. The capacity of oily waste collection should be established based on applicable MARPOL provisions. Sewage from ships should be collected and treated onsite or off-site according to the recommendations provided in the General EHS Guidelines (see above).</td>
<td>N/A</td>
<td>The LNG terminal or TLU has no facilities for receiving any oily residues. No discharges are accepted.
As required in the TEOC, all overboard discharge valves are isolated closed and sealed, and all deck scuppers plugged, while the export tanker is moored to the LNG terminal or TLU.</td>
<td>N/A</td>
<td>Sakhalin Energy does not permit any discharges from ships moored at the LNG or TLU. Protection of the environment and human health is therefore achieved without the need for the collection or treatment facilities stated in IFC guidelines.</td>
</tr>
<tr>
<td>3.</td>
<td>Treated wastewater discharge from the OPF site for produced water and mixed treated water (sewage, storm water)</td>
<td><u>Environmental, Health, and Safety Guidelines for Onshore Oil and Gas Development (IFC, April 30,2007)</u>
Produced water disposal may be injected into reservoir to enhance oil recovery or injected into a dedicated disposal well, drilled to a suitable receiving subsurface geological formation. Produced water discharges to surface waters or to land should be the last option considered and only if there is no other option available.
Storm water runoff should be treated through an oil/water separation system able to achieve an oil and grease concentration of 10 mg/l.</td>
<td>N/A</td>
<td>Produced/process waters are discharged to dedicated injection wells. Zero discharge of produced waters to surface waters. Zero discharge of cooling waters.
All sewage effluent and storm water after treatment is discharged to land and requirements were specified in permits including the following parameter relating to storm water.
Discharge limits for storm water runoff
Oil products 0.12 mg/l</td>
<td>
<table>
<tr><th>Location</th><th>Parameter</th><th>Frequency</th></tr>
<tr><td>• Permanent STP outlet
• Temporary residential and administrative buildings STP (TSK) outlet</td><td>Suspended solids
hydrocarbons
BOD_5
ammonium nitrogen
nitrite, nitrate
phosphates
synthetic surfactants
phenols</td><td>monthly</td></tr>
<tr><td>• SW02 (Balancing storm water tank)</td><td>Suspended solids
Hydrocarbons
MEG</td><td>Before discharge</td></tr>
</table>
</td>
<td>Comply</td>
</tr>
</table>

		(General Environmental, Health and Safety Guidelines (2007) IFC The quality of treated process wastewater, wastewater from utility operations or storm water discharged on land, including wetlands, should be established based on local regulatory requirements. Where land is used as part of the treatment system, treatment to meet applicable national or local standards for sanitary wastewater discharges is required.			• , SW03, SW04, SW05. / Suspended solids Hydrocarbons / Monthly (May-Oct)	
4.	Produced water (relevant to platforms only)	**Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development (IFC, April 30,2007)** Produced water should be evaluated and integrated into production design. These alternatives may include injection along with seawater for reservoir pressure maintenance, injection into a suitable offshore disposal well, or export to shore with produced hydrocarbons for treatment and disposal. If none of these alternatives are technically or financially feasible, produced water should be treated for lowering to; • Oil Products daily average: 42 mg/l • Oil Products monthly average: 29 mg/l	N/A	All produced water is re-injected into the production reservoirs.	N/A	Comply
5.	Drilling Fluids (relevant to platforms only)	**Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development (IFC, April 30,2007)** Use of systems with diesel-based drilling fluids is not considered currently as a good practice for offshore drilling and should be avoided.	N/A	All oily water / wastewater from the platforms is re-injected. The platform drainage system is designed to collect all oily effluents and to re-inject these into special wells. There is no discharge of oily water from the platforms into the sea.	N/A	Comply
6.	Produced sand (relevant to platforms only)	**Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development (IFC, April 30,2007)** Discharge to the sea is not considered to be a current good practice, recommended to re-inject or take ashore. Discharge into the sea is possible only on condition that oil concentration is lower than 1% o of dry sand weight.	N/A	Produced sand is collected and transported onshore for disposal.	N/A	Comply
7.	Cooling water (Platforms only)	**Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development (IFC, April 30,2007)** The effluent should result in a temperature increase of no more than 3° C at the edge of the zone where initial mixing and dilution take place. Where the zone is not defined, use 100 meters from the point of discharge. MARPOL 73/78 doesn't set limits for containments in cooling water. The Resolution MEPC.159 (55) adopted on 13 October 2006 - Revised Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants apply to sewage treatment plants installed on board on or after 1 January 2010 includes a requirement that best technical practice is used to keep the chlorine residual to below 0.5mg/l. Note: Although this is not applicable for cooling water discharge, it provides an indicative figure for comparison.	N/A	The zone is defined at 250m and at this perimeter edge the temperature increase falls within these guidelines. Lun-A and PA-B platforms use sodium hypochlorite for preventing biofouling of sea water cooling systems. Permitted maximum discharge concentrations for sodium hypochlorite are 0.2 mg/l for Lun-A and 0.31 mg/l for PA-B.	Refer below	Comply
8.	Treated Waste Water Discharge from the Lun-A, PA-A and PA-B platforms. Exclude produced water (see I section #4) and cooling	**Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development (IFC, April 30,2007)** Deck drainage water should be routed to separate drainage system on offshore facilities. All process areas should be bunded to ensure drainage water flows into the closed drainage system. Bilge waters from machinery spaces should be routed to the facility closed drainage system.	N/A	The platform operations are designed for zero discharge of hydrocarbons into the sea. All platforms are situated in nearshore waters, these are fixed offshore platforms. All wastewater containing oily products will be re-injected. The platform's open drains system is designed to collect all spilled oily and chemical products and to re-inject these effluents. There is no discharge of oily water including produced	Location: • PA-A northern sluice • PA-A eastern sluice (conditionally clean water from desalination plants, power gen cooling systems) / Parameter: Sodium Hypochlorite Temperature / Frequency: Monthly (Internal monitoring of temperature performed on Platform)	Comply

	water (see section #7).	Waters (gray and black water from showers, toilets and kitchen facilities, bilge water, deck drainage, storage displacement water) should be treated before discharge for compliance with MARPOL 73/78. In nearshore waters (e.g. less than 12 nautical miles from shore), carefully select discharge location based on environmental sensitivities and assimilative capacity of receiving waters: MARPOL 73/78 requirements apply for all fixed offshore platforms: • The effluent shall not produce visible floating solids in, nor cause discoloration of the surrounding water • Oil/grease is 15 mg/l (The 1992 amendments Adoption: 6 March 1992 Entry into force: 6 July 1993.) Treatment system should have International Sewage Pollution Prevention Certificate. The Resolution MEPC.159 (55) adopted on 13 October 2006 - Revised Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants apply to sewage treatment plants installed on board on or after 1 January 2010. Sewage treatment plant should satisfy by the following; • Thermotolerant coliforms should not exceed 100 coliforms/100 ml, • TSS no more than 35 mg/l plus x mg/l, where x is TSS for flushing water (if using), • BOD_5 – 25 mg/l, • COD – 125 mg/l, • pH – 6 – 8,5		water into the sea. In 2012 all platforms were registered as immovable property and therefore they exclude from Maritime Register of shipping. International Sewage Pollution Prevention Certificates is not issued for Sewage treatment systems of the objects not included in the Maritime Register of shipping. Nevertheless all Sewage treatment systems of the platforms have the Declaration of conformity with technical regulations of Russia. Existing treatment plants were installed before 1st January 2010. MARPOL 73/78 doesn't set the regulation for the level of contaminants in sewage water after treatment for STPs older than those installed after January 1, 2010, excluding oil products. Lun-A and PA-B platforms use ultraviolet as a sterilisation medium. Treated wastewater discharges must meet Water Use Decision conditions, allowable discharge norm (based on calculation of environmental sensitivities and assimilative capacity of receiving waters) and established wastewater standards. These are: Oil products daily average: 1.68 mg/l for LUN-A and PA-B Oil products daily average: 0.04 mg/l for PA-A	• PA-A western sluice (final treated effluent from grey water and sewage treatment plant)	TSS hydrocarbons BOD5 ammonia nitrogen nitrite, nitrate phosphates synthetic surfactants phenols Sodium Hypochlorite	Monthly
						Total coli form biogens , Termotolerant biogens fecal biogens,Coliphage	Quarterly
					• PA-B Outlet 1 • LUN-A Outlet 1 (conditionally clean water from cooling systems, desalination plant, washings of seawater filters)	Sodium Hypochlorite Temperature	Monthly (Internal monitoring of temperature performed on Platform
					Control Sections 250m PA-A northern and eastern sluices (three test points each of the sluices)	Sodium Hypochlorite Temperature Organoleptic parameters	Mothly (in ice free period)
					• Control Sections 250m from Outlet 1 PA-B, LUN-A (three test points and one control point)	Temperature Sodium Hypochlorite	Monthly (in ice free period and under favourable meteorological circumstances)
					• PA-B Outlet 2 • LUN-A Outlet 2 (final treated effluent from grey water and sewage treatment plant)	TSS Hydrocarbon BODtotal Phosphates Ammonia nitrogen Phenols Synthetic surfactants pH Temperature	Monthly
					• Control Sections 250m from Outlet 2 PA-B, LUN-A and from PA-A western sluice (three test points and one control point)	Suspended solids, hydrocarbons, BODFull, ammonia nitrogen, (nitrite, nitrate,sodium hypochlorite – only for PA-A), phosphates, synthetic surfactants, phenols, organoleptic properties, dissolved oxygen, pH, temperature, coli-index, Total coliform, fecal biogens,coliphage	Monthly (in ice free period and under favourable meteorological circumstances) PA-B, LUN-A, PA-A and Quarterly for microbiological indexes(in ice free period and under favourable meteorological circumstances)
					• Sea water intake quality is monitored under plan-shedule for operational control of natural, potable, and sewage water over compliance with sanitary rules at offshore platforms.		
9.	Quality of drinking water (at	WHO guidelines for drinking water quality.	N/A	The Project adopts the WHO guidelines for	Drinking water quality is monitored under the separate Sanitary Monitoring		Comply

	all project sites)			drinking water quality.	Program, as described in the HSE Monitoring Overview.	
10.	Storm water effluent (Onshore sites only)	**Environmental, Health, and Safety Guidelines for Onshore Oil and Gas Development (IFC, April 30,2007)** All process areas should be bunded to ensure drainage water flows into the closed drainage system and that uncontrolled contaminated surfaces run-off is avoided. Storm water flow channels and collection ponds should be fitted with oil/water separator. Separators may include baffle type or coalescing plate type and should be regulatory maintained. Storm water discharge should contain no more oil and grease concentration as of 10 mg/l.	N/A	General requirements relating to installed facilities are described in Water Use Standard, Appendix 7. Storm water accumulating in plant operating areas or tank farms is contained and discharged only after receiving appropriate treatment, or verification that it meets water quality requirements without treatment. Separators of baffle type are used in storm water drainage. Wastewater discharges must meet Water Use Decision conditions. Maximum permissible discharge was calculated in accordance with the allowable discharge norm approved by Russian environmental authorities. For discharge on land wastewater must meet maximum permissible discharge limits on the land approved by Russia environmental authorities. For discharges of storm water on land after Pipeline Maintenance Depots sewage treatment plants, the upper oil concentration is 0.11 mg/l	Monitoring programmes described in other rows (OPF, Onshore Pipelines, LNG, and Accommodation).	Comply
11.	Water after hydraulic testing of the pipeline systems	**OFFSHORE PIPELINES** **Environmental, Health and Safety Guidelines, OFFSHORE OIL AND GAS DEVELOPMENT, table 1** • Should be sent to shore for treatment and disposal, • Discharge offshore following environmental risk analysis, Careful selection of chemicals • Reduce use of chemicals • Hydrotest water disposal into shallow coastal waters should be avoided. **ONSHORE PIPELINES** **Environmental, Health and Safety Guidelines, ONSHORE OIL AND GAS DEVELOPMENT, table 1** For discharge to surface waters or to land: • Total hydrocarbon content: 10 mg/L • pH: 6 - 9 • BOD: 25 mg/L • COD: 125 mg/L • TSS: 35 mg/L • Phenols: 0.5 mg/L • Sulfides: 1 mg/L • Heavy metals (total): 5 mg/L • Chlorides: 600 mg/l (average), 1200 mg/L (maximum	N/A	General requirements relating to hydrotesting are described in Water Use Standard, Appendix 8.	The program of monitoring will be made for every hydrotesting individually in line with Water Use Standard, Appendix 8.	Comply
12.	Non-water based muds and cuttings	**Environmental, Health and Safety Guidelines, OFFSHORE OIL AND GAS DEVELOPMENT, table 1** No discharge to sea allowed for drill fluids Drilled cuttings – re-inject or ship-to-shore, no discharge to sea except: • Oil concentration lower than 1% by weight on dry cuttings • For stock barite use for cuttings see section #13 • Discharge via a caisson at least 15 m below sea surface.	N/A	No oil-based or synthetic-based cuttings are discharged into the marine environment (also, see commitment below).	N/A	Comply
13.	Water based muds and cuttings	**Environmental, Health and Safety Guidelines, OFFSHORE OIL AND GAS DEVELOPMENT, table 1** • No discharge allowed for fluids except in compliance with 96 hr. LC-50 of SPP-3% vol. toxicity test first for drilling fluids or	N/A	No cuttings or residual muds are disposed into the sea. Only in emergency cases can water based cuttings or mud be disposed of into the gravity based	N/A	Comply

<table>
<tr><td></td><td></td><td>alternatively testing based on standard toxicity assessment species (preferably site-specific species. Discharge via a caisson at least 15m below the surface.
• For stock barite use for cuttings see next section#13
• Maximum chloride concentration must be less than four times ambient concentration of fresh or brackish receiving water.</td><td></td><td>structure. This emergency measure does not apply to oil based or synthetic muds.
In the event of an emergency requiring overboard discharge of water based mud from PA-A, the point of discharge is only +/- 6 m below mean sea level.
Cuttings and residual muds are either reinjected or brought onshore for disposal.</td><td></td><td></td></tr>
<tr><td>14.</td><td>Additives and chemicals</td><td><u>Environmental, Health and Safety Guidelines, OFFSHORE OIL AND GAS DEVELOPMENT, table 1</u>
• No limitation except toxicity testing of chemicals for hazards.
• Barite used will meet: Hg<1 mg/kg and Cd <3 mg/kg dry weight (Total).
• Products known or suspected to cause taint, endocrine disruption or contain heavy metals will be avoided.</td><td>N/A</td><td>No cuttings or residual muds, nor related additives or chemicals, are disposed into the sea.</td><td>N/A</td><td>Comply</td></tr>
<tr><td>15.</td><td>Onshore Pipelines - Booster Station 2 (BS2), Pipeline Maintenance Depots (PMDs), Camps</td><td>(<u>General Environmental, Health and Safety Guidelines (2007) IFC</u>
The quality of treated process wastewater, wastewater from utility operations or storm water discharged on land, including wetlands, should be established based on local regulatory requirements.
Storm water runoff should be treated through an oil/water separation system able to achieve an oil and grease concentration of 10 mg/l.</td><td>N/A</td><td>These facilities do not discharge to water bodies.. Treated sewage and storm water from PMDs is discharged to land (treated sewage discharged through filtration fields).
Sewage from Gastello PMD is pumped to BS2 for treatment and sewage from OPF PMD to OPF for treatment.
BS-2: All sewage after treatment is discharged to land.
Discharges to land are controlled and reported in accordance with RF issued permits.
Storm water discharges do not exceed 10 mg/l oil and grease.
Camps: Onshore Pipeline Camps were closed and are not currently in use. Only exception is the Nogliki camp which has a Sewage Treatment Plant (STP) that discharges to the city of Nogliki STP for treatment.</td><td><table><tr><th>Location</th><th>Parameter</th><th>Frequency</th></tr><tr><td>Stormwater discharge from PMDs (OPF, Nogliki, Yasnoye, Gastello, Sovietskoye)</td><td>TSS
Hydrocarbons</td><td>Monthly (in warm period)</td></tr><tr><td>Treated sewage discharge (Nogliki, Yasnoye, Sovietskoye)</td><td>Suspended solids, hydrocarbons, BODFull, ammonium nitrogen, phosphates, chlorides, pH, coli-index</td><td>Quarterly</td></tr><tr><td>BS2
(1) Treated effluent from the wastewater quality control point (i.e. before discharge to Chernushka River)
(2) 100m upstream and 500m downstream of the point on the line from point of discharge on the land in the direction to the river</td><td>Suspended solids, dry residue, BODFull, ammonia nitrogen, nitrite nitrogen, nitrate nitrogen, iron, copper, zinc, hydrocarbons, synthetic surfactants, phenols, phosphates, free chlorine, pH, dissolved oxygen, organoleptic properties, temperature, coliphage count</td><td>(1) monthly
(2) twice in warm period</td></tr></table></td><td>Comply</td></tr>
<tr><td>16.</td><td>Infrastructure objects (LNG accommodation in Korsakov city, Zima accommodation in Yuzhno-Sakhalinsk city) with discharges to rivers</td><td><u>Environmental, Health, and Safety Guidelines for Onshore Oil and Gas Development (IFC, April 30,2007)</u>
Gray and black water from showers, toilets and kitchen facilities should be treated accordance
<u>General Environmental, Health and Safety Guidelines (2007) IFC, table 1.3.1 Indicative Values for Treated Sanitary Sewage Discharge</u>
<table><tr><td></td><td><u>Units in mg/l except pH</u></td></tr><tr><td>pH</td><td>6-9</td></tr><tr><td>BOD</td><td>30</td></tr><tr><td>COD</td><td>125</td></tr><tr><td>Oil and grease</td><td>10</td></tr><tr><td>TSS</td><td>50</td></tr><tr><td>Total nitrogen</td><td>10</td></tr><tr><td>Total phosphorus</td><td>2.0</td></tr><tr><td>Coliform bacteria</td><td>< 400 MPN/100 ml</td></tr></table><u>Standard applicable at time of Design:</u>
<u>World Bank PPAH Onshore Oil and Gas Guidelines (1998) General environmental guidelines, Table 4.</u>
Ammonia 10
(<u>General Environmental, Health and Safety Guidelines (2007) IFC</u></td><td>EC Directive concerning urban waste water treatment (91/271/EEC):
Requirements for discharges from urban waste water treatment plants subject to Articles 4 and 5 of the Directive:
• BOD_5 at 20°C: 25 mg/l O_2
• COD: 125 mg/l O_2
• TSS: 60 mg/l
Requirements for discharges from urban waste water treatment plants to sensitive areas that are subject to eutrophication. Either of these parameters may apply depending on the local situation:
• Total phosphorus: 2 mg/l P (10 000 - 100 000 pop. est.);
• Total nitrogen: 15 mg/l N (10 000 - 100 000 pop. est.).</td><td>Treated wastewater discharges must meet conditions of water use Decision, in accordance with the allowable discharge norm for fishery value river, as per tables below.
<u>Units in mg/l except pH</u>
For LNG accommodation – discharge in Korsakovka river
<table><tr><td>pH</td><td>6.5-8.5</td></tr><tr><td>BODfull</td><td>5.72</td></tr><tr><td>Oil</td><td>0.05</td></tr><tr><td>TSS</td><td>17.0</td></tr><tr><td>Ammonia nitrogen</td><td>0.4</td></tr><tr><td>Total phosphorus (non organic)</td><td>0.2</td></tr><tr><td>Coliform bacteria</td><td>< 100 MPN/100 ml</td></tr></table>For Zima accommodation - discharge in Zima river:
<table><tr><td>pH</td><td>6.5-8.5</td></tr><tr><td>BODfull</td><td>3.318</td></tr><tr><td>TSS</td><td>23.00</td></tr><tr><td>Ammonia nitrogen</td><td>0.634</td></tr></table></td><td><table><tr><th>Location</th><th>Parameter</th><th>Frequency</th></tr><tr><td>LNG accommodation – discharge in Korsakovka river
Before discharge, point of discharge, 100 m upstream from point of discharge in Korsakovka river</td><td>BODfull
Oil and grease
TSS
Ammonia nitrogen
Total phosphorus
Coliform bacteria
pH</td><td>monthly</td></tr><tr><td>Zima accommodation - discharge in Zima river
1) before discharge,
2) point of discharge, 100 m upstream of discharge in Zima river</td><td>BODfull
TSS
Ammonia nitrogen
Phosphor phosphates
Nitrates
Syntetic surfactants
Sulfates
Clorides
Organoleptic parameters
Total Coliform bacteria
Termotolerant coloiform bacteria
Coliphage</td><td>monthly</td></tr></table></td><td>Comply with limits (noting also the differences in nitrogen limits as per description in Row 1).

Monitoring programmes comply.</td></tr>
</table>

		Storm water runoff should be treated through an oil/water separation system able to an achieve oil and grease concentration of 10 mg/l.		Nitrates 11.81 Phosphorus phosphates 0.217 Coliform bacteria < 100 MPN/100 ml **For Zima accommodation - discharge in Pravy creek:** Petroleum hydrocarbons 0.087	<table><tr><td></td><td>Fecal bacterispH, COD</td><td></td></tr><tr><td>Zima accommodation – storm water discharge in Pravy creek, at point of discharge and 50 m before discharge point</td><td>Suspended Solids Hydrocarbons BOD full Organoleptic parameters Microbiological indexes</td><td>Monthly (in warm period) for natural water in Pravy creek, and monthly for storm water</td></tr></table>	