Appendix F Project Environmental Standards

TABLE OF CONTENTS

1 INTRODUCTION

The purpose of this document is to define the Western Route Export Pipeline (WREP) Sectional Replacement Project Quantitative Environmental Standards.

These standards shall apply for the duration of WREP-SR Project which covers construction and commissioning activities only. When the Project is complete the new sections will form part of the existing WREP system, including the existing WREP Environmental Management System and its environmental standards.

These standards have been derived based on the requirements of the WREP Pipeline Construction and Operation Agreement (PCOA) which require that the WREP-SR Project be carried out in accordance with:

1. Good international oil industry standards and practices
2. The environmental and technical standards detailed in the PCOA
3. Subject to the other provisions of the agreement and in accordance with Georgian law including all Regulatory Laws
4. As a reasonably prudent operator would conduct its own affairs.

1.2 References

Document Title
WHO Air Quality Guidelines, Global Update 2005
WHO Air Quality Guidelines for Europe, 2nd Edition, 2000
UK Air Quality Standards Regulations 2007
EU Ambient Air Quality Directive, 2008/50/EC
IFC General EHS Guidelines, 2008
WHO Guidelines for Community Noise (1999)
BS-5228-1; 2009: Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
BS-5228-1; 2009: Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration
EU Urban Wastewater Treatment Directive (91/271/EEC)
UK Urban Waste Water Treatment Regulations (1995)
IFC EHS Sector Guidelines: Onshore Oil and Gas Development, 2007
EU Freshwater Fish Directive (2006/44/EC)
Model Procedures for the Management of Contaminated Land (CR11) (DEFRA and the Environment Agency, 2004)
Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination (Environment Agency, 2006)

1.3 Abbreviations and Definitions

Abbreviation/ Acronym	Description
BOD	Biochemical Oxygen Demand
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
EU	European Union
Fe	Iron
IFC	International Finance Corporation
NO_2	Nitrogen Dioxide
PM	Particulate Matter
SO_2	Sulphur Dioxide
WHO	World Health Organisation
Zn	Zinc

2 PROJECT AMBIENT AIR QUALITY STANDARDS

Table 1: Project Ambient Air Quality Standards

Parameter	Project Standard	Ref
NO_2	40 μg/m³ annual average (human health) 30 μg/m³ annual average (ecosystems)* 200 μg/m³ hourly average	1;3;4 3 1;4
Benzene	5 μg/m³ annual average	3
CO	100,000 μg/m³ for 15 minutes 60,000 μg/m³ for 30 minutes 30,000 μg/m³ for 1 hour 10,000 μg/m³ maximum daily 8-hour average.	2 2 2 2;3
SO_2	266 μg/m³ 15 minute mean (not to be exceeded more than 35 times a calendar year) 350 μg/m³ hourly average (not to be exceeded more than 24 times a calendar year) 20 μg/m³ 24hr mean 20 μg/m³ daily average for the protection of ecosystems* 10 μg/m³ annual mean (for the protection of sensitive ecosystems)*	3 3 1;4 3 3
PM_{10}	20 μg/m³ annual average 50 μg/m³ 24hr average (not to be exceeded more than 3 days a year, 99th percentile)	1;4 1;4
$PM_{2.5}$	10 μg/m³ annual average 25 μg/m³ 24hr average	1;4 1;4
	Project emissions should not contribute more than 25% of the relevant ambient air quality standard	4
Note: **The air quality objectives for ecosystems should apply only in parts which are: ·more than 20km from an agglomeration (i.e. an area with a population of more than 250,000); ·more than 5km away from major industrial sources);·motorways; and ·built up areas of more than 5,000 people* Reference 1) WHO Air Quality Guidelines, Global Update 2005 2) WHO Air Quality Guidelines for Europe, 2nd Edition, 2000 3) UK Air Quality Standards Regulations 2010 (enacting EU Directive (2008/50/EC) 4) IFC General EHS Guidelines, 2008		
Note: Where existing ambient air quality levels are identified as exceeding the above standards prior to Project start-up (perhaps caused by non-project emissions sources) then the Project may not be able to meet these standards due to factors outside of the Project's control. In these circumstances the Project will consider the ambient air quality levels and, taking into account the non-project factors affecting air quality, will take reasonably practicable steps to reduce the Project's contribution to air emissions.		

Ambient air quality standards shall be achieved in the surrounding environment at points representative of population exposure. These include residential buildings, schools and hospitals.

3 PROJECT AMBIENT NOISE STANDARDS

During construction, noise emissions shall be assessed in accordance with BS5228-1 (2009), E3.3. Example Method 2: 5dB(A) change. As stated by this method, the following noise standards shall apply to construction activities:

- For activities with a duration of one month or longer, noise levels generated by construction shall not increase the pre-construction ambient noise by 5dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq, Period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively.

- For short duration noise activities at construction sites, less than one month duration, e.g. nitrogen venting, the above standards shall be met where practical. However, in the event that noise levels are predicted to exceed these levels a risk assessment shall be carried out to understand the predicted noise levels, the duration that the levels will be exceeded and potential mitigation measures which will help ensure the noise is as low as practicable.

4 PROJECT VIBRATION STANDARDS

Vibration has the potential to cause disturbance to humans and damage to buildings. The project shall adhere to the principles of British Standard 5228-2009 Part 2 for Vibration control and shall seek to control vibration to levels which remain tolerable to humans and are not likely to cause damage to buildings in line with the guideline values below:

Table 2: Project Vibration Standards

Standard	Receptor	Vibration limits mms-1 (ppv)
British Standard 5228, 2009 Code of practice for noise and vibration control on construction and open sites –Part 2: Vibration	Humans in buildings	1.0 mms^{-1} It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents. 10 mms^{-1} Vibration is likely to be intolerable for any more than a very brief exposure to this level.
British Standard 5228, 2009 Code of practice for noise and vibration control on construction and open sites –Part 2: Vibration	Unreinforced or light framed structures Residential or light commercial type buildings	Limits above which cosmetic damage to buildings could be caused: 15mms^{-1} at 4Hz increasing to 20mms^{-1} at 15Hz increasing to 50mms^{-1} at 40Hz and above
Refer to British Standards identified for further information		
Note: Where existing background vibration levels are identified as exceeding the above standards prior to Project start-up (perhaps caused by non-project sources) then the Project may not be able to meet these standards due to factors outside of the Project's control. In these circumstances the Project will consider the vibration levels and, taking into account the non-project factors affecting vibration, will take reasonably practicable steps to reduce the Project's contribution to vibration.		

5 WASTEWATER DISCHARGES

5.1 Project Standards for the Discharge of Sanitary Discharges

These standards apply at the point of discharge of treated sanitary discharges to a surface watercourse.

Table 3: Project Standards for Discharge of Sanitary Sewage

Parameter	Project Standard
pH	6-9
BOD (5) (mg/L)	25
COD (mg/L)	125
Total Nitrogen (mg/L)	15*
Total Phosphorous (mg/L)	2*
Oil and grease (mg/L)	10
Total Suspended Solids (TSS) (mg/L)	35
Coliform bacteria (Most probable number)/100 ml	400
Temperature	No increase greater than 3°C of ambient temperature at the edge of a scientifically established mixing zone
*Phosphorous and nitrogen standards to be applied based on the results of a risk assessment to identify if the receiving environment is vulnerable to eutrophication and critical levels could be exceeded	
Reference: IFC General EHS Guidelines, 2007: Environmental, Section 1.3; Reference: EU Urban Wastewater Treatment Directive (1991) and UK Urban Waste Water Treatment Regulations (1995)	

5.2 Project Standards for the Discharge of Industrial Wastewater

Industrial wastewater refers to all process, industrial (including vehicle and equipment washing and maintenance, waste transfer stations and other not-normally clean sources), hydrotest, trench water and stormwater. These standards apply at the point of discharge of industrial wastewater to surface water.

Table 4: Project Standards for Discharge of Industrial Wastewater

Parameter	Project Standard
pH	6-9
BOD (5) (mg/L)	25
COD (mg/L)	125
Total Hydrocarbon Content (mg/L)	10
Phenols (mg/L)	0.5
Total Suspended Solids (TSS) (mg/L)	35
Sulphides (mg/L)	1
Chlorides (mg/L)	600 mg/l (average), 1200 mg/L (maximum)
Temperature	Levels should be as low as practical and reflect the quality of the receiving waters Change the temperature of the receiving water by no more than 1°C at the edge of a scientifically established mixing zone, Upper temperature limit for a discharge is 40 C
Heavy metals (total) (mg/L) includes Arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, vanadium, and zinc	5
Reference: IFC EHS General Guidelines, Wastewater and Ambient Water Quality, 2007; IFC EHS Sector Guidelines: Onshore Oil and Gas Development, Wastewater and Ambient Water Quality, 2007	

5.3 Discharge to Land

Soakaways shall only be used for treated sanitary, stormwater or potentially hydrotest water discharges. Potential impacts on soil, groundwater and surface water shall be evaluated in all situations where effluent is discharged to land. For soakaways, the standards in Table 3 and Table 4 shall apply where the effluent reaches the water. Ensuring the discharge has no more than a minor impact to water resources will require a two-phased investigation:

- In the first instance the capacity of the ground to physically accommodate the water flows will be investigated. Trial pits will be excavated and percolation tests will be undertaken of the surface strata at the site to establish their characteristics (porous versus fissured) in terms of capacity to accommodate the waste flows
- Secondly, a risk assessment will be undertaken to establish potential impacts to the nearest groundwater resource. The approach using analytical solutions similar to those recommended by UK Environment Agency (as in Section 6 Project Clean Up Criteria) shall be used.

5.4 Project Ambient Surface Water Quality Standards

Ambient water quality standards will be applied to surface waters which receive routine discharges i.e. treated sewage effluent, controlled wastewater discharges (from stormwater drainage systems) and hydrotest water (refer to Appendix D for the monitoring programme).

Table 5: Project Ambient Water Quality Standards

Parameter	Unit	EQS Salmonid Waters	EQS Cyprinid Waters
pH		6-9	6-9
BOD (5)	mg/l	≤ 3	≤ 6
Total Hydrocarbon Content		Petroleum products must not be present in water in such quantities that they: - form a visible film on the surface of the water or form coatings on the beds of water-courses and lakes, - impart a detectable "hydrocarbon" taste to fish, - produce harmful effects in fish	
Phenols		Not present in concentrations that adversely affect fish flavour	
Total Suspended Solids (TSS)*:	mg/l	≤ 25	≤ 25
Nitrites (mg/l NO_2)	mg/l	≤ 0,01	≤ 0,03
Dissolved Cu Assuming water hardness of 100 mg/l $CaCO_3$	mg/l	≤ 0,04	≤ 0,04
Zn mg/l (Assuming water hardness of 100 mg/l $CaCO_3$)	mg/l	≤ 0,3	≤ 1,0
Dissolved Oxygen (mg/lO_2)	mg/l	50 % of the time ≥ 9, 100 % of the time ≥ 7	50 % of the time ≥ 8, 100 % of the time ≥ 5
Non -ionised ammonia mg/l NH_3	mg/l	≤ 0,005	≤ 0,005
Total ammonium(mg/l NH_4)	mg/l	≤ 0.04	≤ 0.2
Total residual chlorine(mg/l HOCl)	mg/l	≤ 0,005	≤ 0,005
*Derogations from this standard are possible if e.g. exceptional weather or natural enrichment occurs. Reference: EU Freshwater Fish Directive (2006/44/EC) Salmonid Waters - waters which support or become capable of supporting fish belonging to species such as salmon, trout, grayling or whitefish. Cyprinid Waters- waters which support or become capable of supporting fish belonging to the cyprinids or other species such as pike, perch and eel. Standards will be applied as applicable (depending on the range of species supported by a surface water body).			
Note: Where existing water quality levels are identified as exceeding the above standards prior to Project start-up (perhaps caused by non-project emissions sources) then the Project may not be able to meet these standards due to factors outside of the Project's control. In these circumstances the Project will consider the water quality levels and, taking into account the non-project factors affecting water quality, will take reasonably practicable steps to reduce the Project's contribution to water emissions. The Project will however continue to comply with the above discharge standards in Table 1-4 and Table 1-5			

6 PROJECT CLEAN UP CRITERIA

The Project will apply a risk assessment approach to contaminated land management evaluate the potential impact of soil, surface water or groundwater contamination on local receptors. This will follow the methodology from the UK Environment Agency's approach as defined in:

- Model Procedures for the Management of Contaminated Land (CR11) (DEFRA and the Environment Agency, 2004)
- Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination (Environment Agency, 2006).

This is based on the source-pathway-receptor principle which seeks to establish the linkages between the pollutants and the receptor, and whether harm to health or the environment is likely to occur. This approach does not specify defined clean-up standards as these depend on the land/water use and the presence of pathways to potential receptors.

This method follows a tiered approach to risk assessment, where the need for a further, more detailed analysis is determined in the first tier. During subsequent risk assessment tiers the data requirements and the sophistication of the analysis increase, as does the confidence in the predicted impact.

If the risk assessment demonstrates that risk to health or the environment exists a remediation plan will be developed. This may include the development of remedial targets which can be based on information from a variety of sources which make include World Health Organisation guidelines, EU or UK standards and guidelines or other national standards and guidelines as appropriate.