Appendix D Environmental Monitoring Plan

Table D1: WREP-SR Environmental Monitoring Requirements

Topic / Identifier	Responsible Party	Activity / Issue	Location	Frequency	Parameters / Units	Monitoring Methodology	Comments
Water							
1	CONTRACTOR	Discharge of effluent from oily water separators	After final treatment, prior to any mixing or co-mingling with other effluent streams	Weekly	pH BOD (5) (mg/l) COD (mg/l) Total Hydrocarbon Content (mg/l) Phenols (mg/l) TSS (mg/l) Sulphides (mg/l) Chlorides (mg/l) Temperature Heavy metals (total) (mg/l) (includes Ag, As, Cd, Cr, Cu, Pb, Hg, Ni, V, Zn)	Recognised methodologies available in COMPANY-approved laboratories in Georgia	To meet IFC guidelines and discharge of 10mg/l oil and grease Commitment 10-10
2	CONTRACTOR	Ambient water quality – surface waters subject to controlled wastewater discharges (from stormwater drainage systems) and hydrotest water	100m upstream and 100m downstream of discharge locations	Monthly for continuous discharges; at least once prior to any discharge; and for non-continuous discharges at least once during the discharge and no less than one sample per month Prior to, at least once during de-oiling and on cessation of de-oiling at river crossings; continuous visual monitoring during de-oiling	pH BOD (5) (mg/l) Total hydrocarbon content (mg/l) Phenols (mg/l) TSS (mg/l) Nitrites (mg/l NO_2) Dissolved Cu (mg/l) Zn (mg/l) Dissolved Oxygen (mg/lO_2) Non -ionised ammonia (mg/l NH_3) Total ammonium (mg/l NH_4) Total residual chlorine (mg/l)	Recognised methodologies available in COMPANY-approved laboratories in Georgia	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

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3	CONTRACTOR	Hydrostatic test water	At end of pipe/treatment (specific details of locations to be proposed by contractor with each hydrotest pack) Discharge subject to the review and approval by COMPANY	Prior to and during discharge – specific details of frequency, location to be proposed by contractor with each hydrotest pack Discharge subject to the review and approval by COMPANY	pH BOD (5) (mg/l) COD (mg/l) Total hydrocarbon content (mg/l) Phenols (mg/l) TSS (mg/l) Sulphides (mg/l) Chlorides (mg/l) Temperature Fe (mg/l) Heavy metals (total) (mg/l) (includes Ag, As, Cd, Cr, Cu, Pb, Hg, Ni, V, Zn)	Recognised methodologies available in COMPANY-approved laboratories in Georgia	Field analysis shall also include: temperature, pH, DO, TSS/turbidity (for indication), oil and grease, Fe, colour, odour, visible oil and grease and conductivity Commitment 10-10
4	CONTRACTOR	Abstraction wells	The abstraction borehole, when completed, will be test pumped and environmental parameters will be monitored	Test pump before abstraction occurs Contamination – monitoring prior to abstraction and every six months during operation of well	Test pump to determine recharge rate and sustainable abstraction volumes Contamination: pH, conductivity, DO, turbidity, TSS, total coliform and E-Coli, BOD5, COD, TPH (speciated); PAHs, heavy metals, VOCs		Commitment 15-04
5	CONTRACTOR	Discharges with excess of sediments (trenchwater, hydrotest water)	At discharge point	During discharge	Sediment content – turbidity	Visual and field testing	Commitment 10-10

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Air							
1	CONTRACTOR	Effectiveness of dust suppression	Work areas, access roads	Visually daily	Visual ID of dusty conditions	Visual	Commitments 23-05, 24-08
2	CONTRACTOR	Effectiveness of vehicle and equipment maintenance programme	Work areas, access roads	Visual	Visual ID of black emissions Valid Project-issued Technical certificate	Visual	Commitment 23-02
Noise							
1	CONTRACTOR	Pre-construction representative baseline noise survey	CONTRACTOR to determine to be representative of Project environment	One-off	dB(A); $L_{Amax, fast}$ (day and night time monitoring) to allow comparison against Project environmental standards	Actual noise measurements in accordance with BS7445-2; calibrated meters in accordance with BS EN 61672-1; BS EN 61260; BS60942	
2	CONTRACTOR	Construction / commission noise related to activities	Work areas; ROW; tunnelling activities	At least once during the activity if longer than one month; on receipt of complaints	dB(A); $L_{Amax, fast}$ (day and night time monitoring) to allow comparison against Project environmental standards	Actual noise measurements in accordance with BS7445-2:1991; Calibrated meters in accordance with BS EN 61672-1; BS EN 61260; BS60942	Commitment 25-05, 25-09
Vibration							
1	CONTRACTOR	Construction vibration	Representative locations	At least once during the activity at representative locations and sufficient to predict vibration levels based on different vehicle/activity types	mms^{-1} (ppv)	In accordance with guidance in BS5228-2 (2009)	Commitment 25-13

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2	CONTRACTOR	Tyre pressure	N/A	Weekly	bar/PSI	Tyre pressure gauge reading	Commitment 25-16
Erosion and Sedimentation Control							
1	CONTRACTOR	Erosion detection and treatment	Areas cleared and graded	Weekly, and before predictable major storms	Areas of possible erosion	To be proposed by Contractor, subject to review and approval by COMPANY	Commitment 3-08
2	CONTRACTOR	River sedimentation	All river crossings	Daily	Visual monitoring of suspended sedimentation	Visual evidence of plumes	Contractor shall ensure that sedimentation control works at river crossings are effective and that sediment is not visible in the river water Commitment 10-16
Soil							
1	CONTRACTOR	Oil / chemical spills	At oil spill locations	As required per incident	(1) Reported number/cases of spills/leakages (2) Number of times spill kits (oil absorbers, grab packs and granules) put to use (3) Analysis of soil for contaminants: Heavy metals, TPH, VOC, SVOC (other as relevant depending on type of spill)	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)	

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Pollution Prevention							
1	All Contractors	Integrity of fuel / chemical containment systems	Fuel and chemical storage areas Work areas	Monthly	Visual	Visual inspection for: (a) holes or overflow from primary containment (b) breaches in secondary containment c) no secondary containment	Commitments 6-21, 7-12
Reinstatement							
1	CONTRACTOR	Topsoil preservation	Topsoil storage areas	Monthly	Visual observation of : (1) Stockpile area segregated from site (2) Height of stockpile (2-3 m) (3) Slope of stockpile (<45 degrees slope) Aerobic conditions will be monitored if topsoil stored for more than six months. Manual aeration will be undertaken if anaerobic conditions develop	Visual To be proposed by Contractor and approved by Company	Commitment 4-04
2	CONTRACTOR	Subsoil reinstatement	ROW and temporary areas	Once during reinstatement activity; at least every 100m	Percentage compaction relative to undisturbed areas	Cone penetrometer	
3	COMPANY	Re-establishment of vegetation	ROW and temporary areas	Annually	Vegetation cover and species composition	Ecological survey	Commitment 17-10

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Waste							
1	CONTRACTOR	Waste storage; segregation; handling and transport	ROW; facility construction sites; temporary areas; waste disposal locations; waste processing centres	Weekly inspections; monthly waste audits	Segregation practices; waste documentation including tracking notes; round trip transport; WSA management; training; contractor performance	Visual	Commitment 7-04
Employment							
1	CONTRACTOR	Recruitment procedures; local content	N/A	Monthly	Local content figures; employment records; interviews with employees	N/A	
2	CONTRACTOR	Driving performance	N/A	Monthly	Accidents, incidents, near-misses; public complaints	To be proposed by Contractor and approved by Company	Commitment 19-07
3	CONTRACTOR	Performance of security providers	N/A	Monthly	N/A	To be proposed by Contractor and approved by Company	Commitment 30-12
Operations							
1	COMPANY	Ground subsidence	Pipeline sections removed from service	to be determined	Ground subsidence	Visual	Commitment OP01
2	COMPANY	Planting and re-planting trees	At re-planting locations	Annually	Tree growth	Tree survey	Commitment OP51