APPENDIX 4

Wetlands

Purpose

To mitigate impact and undertake restoration of wetlands, taking into account natural processes, operational requirements and technical feasibility, to deliver post-construction land conditions as similar as possible to those prior to construction or as agreed with the relevant authorities and/or landowner. This shall include appropriate techniques to minimise disturbance to wetland hydrology.

Who is this for

- *Onshore Asset Managers*[1]*;*
- *Corporate Environmental Manager;*
- *Project Managers, Contract Holders* and *Contractors* with work *s*cope in wetland areas.

To be clear, Requirements 1 and 2 list operations phase requirements. Requirements 3 to 15 are primarily applicable for the construction phase of pipeline projects and project expansions in wetland areas, however are also applicable to maintenance activities in operations phase (i.e. where wetlands restoration works require completion, and where maintenance activities may impact Wetlands).

Requirements – operations phase

1. **Inspect and maintain Wetland areas as follows:**
   a. **Do not use fertilizer, lime, or mulch** unless required in writing by the appropriate land management or relevant agency. Mitigation shall be detailed within specific method statements, where appropriate.
   b. Do not conduct vegetation maintenance over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a **corridor centered on the pipeline and up to 3 metres wide may be maintained** in herbaceous state. In addition, trees within 5 metres of the pipeline which are greater than 5m in height may be selectively cut and removed from the permanent right-of-way.
   c. **Do not use herbicides or pesticides in or within 30 metres of a wetland**, except as allowed by the appropriate land management agency or state agency.
   d. Develop and implement **mitigation measures** in case of any Project's impact at the operations phase and/or deviations from a natural successional pathway.
   e. Refer also Onshore Pipelines Right of Way specification.
   [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VID, VIC6.]
2. **Wetland revegetation shall be considered successful** if the cover of herbaceous and woody species after restoration is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction.

Requirements – Wetland Crossing construction and restoration

3. Route the pipeline to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. Where looping an existing pipeline, overlap the existing pipeline right-of-way with the new construction right-of-way. In addition, locate the loop line no more than 25 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIA2.]
4. Wetland delineation using the current RF requirements ("swamp inventory") shall be conducted. This report shall identify: by milepost all wetlands that would be affected, the crossing length of each wetland

[1] Italicized terms in this document are included in the Sakhalin Energy HSE Glossary.

in metres; and the area of permanent and temporary disturbance that would occur in each wetland to RF classification standards. The requirements outlined in this commitment do not apply to wetlands in actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIA1.]

5. Wetland boundaries and buffers must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIA4.]

6. Oil and gas pipelines are buried as deeply as is practicable in low weight bearing surface peat areas (Types I, II or III). Where practicable, the pipeline shall be buried in the mineral soil underlying peat deposits. [EIAA – Pipeline construction in wetlands. Section 3.7.1]

7. Remove all roads constructed during undertaking wetland crossings prior to the thaw if possible. However, consideration may be given to the longer term use of some sections of wetland roads during operation and maintenance, subject to agreement with RF authorities and commitments with respect to managing access to previously undisturbed or ecologically important areas. [EIAA – Pipeline construction in wetlands. Section 3.6]

8. Do not incur significant change to the hydraulic functioning of the wetland. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIB2.]

a. Ensure that measures are undertaken during the excavation works to maintain the hydrological integrity of wetland habitats. [EIAA Chapter 3 Pipeline construction through wetlands]

9. Do not locate aboveground facilities in any wetland. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIA6.]

10. General requirements.

a. Ensure that measures are undertaken during the excavation works to maintain the long-term hydrological integrity of wetland habitats. The construction methodology for pipeline installation (e.g. burial in mineral soil underlying peat where feasible) and the design of the route itself were developed specifically to reduce the potential effects on hydraulic functioning. [EIAA – Pipeline construction in wetlands. Section 4.7.4]

b. Affected surface vegetation (e.g. Sphagnum communities) shall be removed, stored separately from peat and mineral soil and then reinstated as close to their original position as possible, to reduce the possibility of longer-term change to wetland vegetation along the ROW, once the pipeline has been installed. When construction in wetland areas takes place during the winter months, replacement of surface vegetation may be assisted by the fact that the surface layer should be frozen, thus maintaining vegetation and underlying soil layer as an integral block for replacement. [EIAA – Pipeline construction in wetlands. Section 3.7.2]

c. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet (15 metres) away from wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.

d. Limit clearing of vegetation between extra work areas and the edge of the wetland to the certificated construction right-of-way.

e. The construction right-of-way may be used for access when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been appropriately stabilized to avoid rutting (e.g. with timber riprap, prefabricated equipment mats, or terra mats).

f. In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way. Alternatively, consider temporary cessation of construction activities. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIB1.]

11. Construction in wetlands [EIAA – Pipeline construction in wetlands. Section 3.5-3.6]

a. Permit terms and conditions to conform with RF requirements.

b. Underlying peat material shall be excavated and stored in a separate linear pile within the boundary of the ROW.
c. Mineral soil (if encountered) shall be excavated and stored in a separate linear pile within the boundary of the ROW.
d. Water entering the pipeline trench shall be retained in the trench in order to avoid trench collapse.
e. Dewater the trench (either on or off the construction right of way) in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any wetland.
f. Dewatering pumps would be used to evacuate any accumulated water in the trench prior to the pipe being laid in the trench. The amount of time between excavation of the trench and back-filling operations would be minimized as far as practically possible.
g. Drains and flume pipes shall remain in place until construction work has ceased and natural drainage has been reinstated. Regular inspections shall be made to ensure that drains and flume pipes remain in good condition throughout the construction period.
h. Remove the dewatering structures as soon as possible after the completion of dewatering activities. [EIAA – Pipeline construction in wetlands. Section 3.4.1]
i. Assemble the pipeline in a non-wetland area unless the wetland is dry enough to adequately support skids and pipe.
j. Use "push-pull" or "float" techniques to place the pipe in the trench where water and other site conditions allow.
k. Minimise the length of time that the trench is open.
l. Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of- way.
m. Cut vegetation just aboveground level, leaving existing root systems in place, and remove it from the wetland for disposal.
n. Limit pulling of tree stumps and grading activities to directly over the trench line. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the environmental monitor in consultation with the construction manager determine that safety related construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.
o. Segregate the top one foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated or frozen. Immediately after backfilling is complete, restore the segregated topsoil to its original location.
p. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction right-of-way unless fully segregated from the wetland by geotextile. Any imported soil, rock or other debris used for road construction and separating geotextile will be removed following construction to the extent possible, unless the road is designated for permanent use.
q. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.
r. Do not cut trees outside of the approved construction work area to obtain timber for riprap or equipment mats.
s. Attempt to use no more than two layers of timber riprap to support equipment on the construction right-of-way.
t. Remove all roads constructed during undertaking wetland crossings. However, consideration will be being given to the longer term use of some sections of wetland roads during operation and maintenance, subject to agreement with RF authorities.

12. Winter Construction wetlands [EIAA – Pipeline construction in wetlands. Section 3.5]

a. To support winter wetland construction activity, ice roads will be constructed. Before commencing any activity testing will be conducted to ensure that equipment can be safely transported across the

wetland. Road signs indicating maximum load bearing capacity, speed of traffic and spacing between vehicles shall be put in place.

b. No more trench than can be closed in one day shall be opened.

c. Progress across peat bogs shall be no more than 450m/day.

d. Where the pipeline is located within mineral soil, the mineral soil shall be replaced around the pipe, where practicable, and finally shall lift ice/sphagnum moss block (if present) back into trench in original position/orientation.

13. Non-winter Construction wetlands [EIAA – Pipeline construction in wetlands. Section 3.6]

a. For construction activities carried out over peatland/wetland areas outside of the winter period a timber riprap or a plank road will be constructed to ensure that equipment can be transported and travel across the wetland for the duration of construction activity. When a plank access road cannot be constructed, alternative methods, such as push-pull installation, to minimise compaction may be utilised. Definitions for when non-winter crossings are permitted are given in the EIAA on Wetlands.

b. Temporary drainage may be required to support pipeline construction in wetland areas. This may take the form of open 'V' ditches cut on both sides of the working width to divert water away from the construction area. Cross ditches, or flume pipes, may also need to be installed to control water levels.

14. Temporary sediment control – Wetland crossings. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIB3 & 4.]

a. Install sediment barriers immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas are complete.

b. Install sediment barriers across the entire construction right-of-way at all wetland crossings where necessary to prevent sediment flow into the wetland. In the travel lane, these may consist of removable sediment barriers or drivable berms. Removable sediment barriers can be removed during the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent.

c. Where wetlands are adjacent to the construction right-of-way and the right-of-way slopes toward the wetland, install sediment barriers along the edge of the construction right-of-way as necessary to prevent sediment flow into the wetland.

d. Install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way through wetlands. Remove these sediment barriers during right-of-way cleanup.

e. Where the pipeline trench may drain a wetland, construct trench breakers and/or seal the trench bottom to maintain the original wetland hydrology.

f. For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction right-of-way at the base of the slopes greater than 5% where the base of the slope is less than 50 feet from the wetland, or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as required. In some areas, with the approval of the environmental monitor and construction manager, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.

15. Reinstatement of water logged areas and wetlands to their original condition is mandatory. Draining of wetlands is not allowed.

a. In circumstances where reseeding is advocated (i.e. there is significant potential for soil erosion to occur without stabilisation of the exposed soil surface), it cannot be undertaken wherever backfill activities have occurred during winter. The contractor shall therefore be required to come back to that section as soon as prevailing climatic conditions allow reseeding to take place. [EIAA – Pipeline construction in wetlands. Section 3.7.5]

b. If required for initial reinstatement, rewetting the peat surface (e.g. through the temporary blocking of drainage canals and the creation of bunds) will be considered. [EIAA – Pipeline construction in wetlands. Section 3.7.5]

c. If natural revegetation is determined to be unsuccessful, then the import of diaspore material from other areas of wetland vegetation should be considered. [EIAA – Pipeline construction in wetlands. Section 4.7.4]
d. Following excavation of the pipeline trench ensure that the surface vegetation and underlying peat is replaced in stratified sequence. [EIAA – Pipeline construction in wetlands. Section 3.7.5]
e. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are judged to be successful. [FERC comparison – Wetland and Waterbody Construction and Mitigation Procedures VIC7.]
f. Mitigation shall be detailed within specific method statements, where appropriate.