

# **ARCTIC LNG 2 PROJECT**

# ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT

## PART 1

Prepared by: Ramboll CIS

Date: December 2020





Agreement: Assignment: 228 -ALNG2-2020 of 31.03.2020

Preparation of documentation package for the assessment and management of environmental and so Environmental, socioeconomic and human health impact assessment (ESHIA) for the Arctic LNG2 Project

Version:

Authors:

Ivan Senchenya, Sergey Chernyansky, Alexander Ignatyev, Olga Tertitskaya, Nikolay Nazarevsky, Elena Zaika, Ilya Gulakov, Maria Petrasova

Drug

Ivan Senchenya

4

#### Project Manager/Director:

Date:

30.12.2020

This Report is prepared by Ramboll CIS in accordance with the professional standards and quality requirements of the assignment, taking into account scope of the services and the terms agreed with the Client. This Report can be used solely by the Client or his advisers, thus the company does not assume any liability to third parties who may rely on the Report or any part thereof, except upon prior agreement with Ramboll CIS. Any use of the Report materials by such third party shall be at its own risk.

*Ramboll CIS does not assume any liability to the Client or other parties in relation to any matters beyond the scope of its services.* 

Version control record				
Issue	Description of the status	Date	Reviewer initials	Author(s) initials
A	Draft for internal review	21.04.2020	IS	IS, SCh, AI, EZ, OT, NN, SD, MP
1	First draft issued to the Client	22.04.2020	IS	SCh, AI, SD, MP
2	Revision with Client's comments incorporated	01.05.2020	IT, EK, IS	SD, AI, IG, SCh, NN, OT, MP, EZ
3	Revision with comments of the Client and NOVATEK incorporated	09.05.2020	IS	SD, AI, IG, SCh, NN, OT, MP, EZ
4	Revision with addressed comments of IESC and lenders	30.12.2020	IS	SD, AI, IG, SCh, NN, OT, MP, EZ





## **REPORT STRUCTURE**

### PART 1

- 1 Introduction
- **2 Legal Framework for Project Implementation**
- **3 ESHIA Process**
- 4 Stakeholder Engagement
- **5** Characteristics of the Planned Activity
- **6 Project Alternatives**

### PART 2

- 7 Environmental Baseline
- 8 Socio-Economic Baseline

### PART 3

- 9 Environmental Impact Assessment
- **10** Social and Health Impact Assessment

### PART 4

- **11** Decommissioning
- **12 Transboundary Impacts**
- **13 Cumulative Impacts**
- **14 Environmental and Social Management**
- **15** Conclusion

### **APPENDICES**

Appendix 1: Project environmental and social standards document

Appendix 2: ALNG2 Policy on Health, Safety, Environment and Social Responsibility

**Appendix 3:** List of identified sacred sites of the ISNP of the north in and around the Salmanovskiy (Utrenniy) license area

**Appendix 4:** List of waste management service providers that can be involved as subcontractors at the Arctic LNG 2 Project construction and operation stages

Appendix 5: Cumulative assessment scoping Phase I and Phase II

Appendix 6: Reference List

**Appendix 7:** Climate conditions at the Project site according to observation data at meteorological stations Tadebya-Yakhha, Seyakha, Tambey

**Appendix 8:** Assessment of possible geodynamic consequences of the development of the Salmanovskoye (Utrenneye) OGCF

**Appendix 9:** Proposals of consultant on prevention of exogenous geological processes and remediation of disturbed soil and vegetation cover for Arctic LNG 2 Project

**Appendix 10:** Disturbed land reclamation activities included in the design documentation for the field, plant and port facilities (Arctic LNG 2 project) and the Utrenniy airport

**Appendix 11:** Land plots in the Tazovskiy municipal district of YNAO occupied by the Salmanovskoye (Utrenneye) OGCF facilities setup (Arctic LNG 2 Project)

**Appendix 12:** Land plots in the Tazovskiy municipal district of YNAO and water areas within the Ob estuary occupied by the plant and port facilities (Arctic LNG 2 Project)





Appendix 13: Fuel consumption of the Project facilities

**Appendix 14:** List of hydraulic-jetting and dry-excavation quarries planned, being developed or existing within the Salmanovskiy (Utrenniy) LA

Appendix 15: Phasing of early development facilities of the Salmanovskoye (Utrenneye) OGCF facilities setup

Appendix 16: Constituent elements of the Salmanovskoye (Utrenneye) OGCF facilities setup logistics system

Appendix 17: Process overview of the GBS LNG & SGC plant

Appendix 18: Vascular plants flora of the Salmanovsky (Utrenny) license area

Appendix 19: Comparison of technological options for natural gas liquefaction for Arctic LNG 2 Project

**Appendix 20:** Summary table of damage to water bodies and recommended offset activities for Arctic LNG 2 project





# **TABLE OF CONTENTS**

ACRONY	MS AND ABBREVIATIONS	I
BASIC TE	RMS AND DEFINITIONS	VII
1.	INTRODUCTION	1-1
1.1	Overview of the Project and its area of implementation	1-1
1.2	Project Phases, Parties and Time Frames	1-5
1.2.1	Project background	1-5
1.2.2	Project Operator and other companies involved in the Project	1-5
1.2.3	Project Phases and Time Frames	1-7
1.2.4	LNG and SGC marketing plans	1-11
1.3	Ramboll – Project's Environmental and Social Consultant	1-11
1.4	Purpose and Objectives of ESHIA	1-12
1.5	Referenced sources	1-14
1.6	Structure of ESHIA materials	1-14
2.	LEGAL FRAMEWORK FOR PROJECT IMPLEMENTATION	2-1
2.1	Introduction	2-1
2.2	National legislation	2-1
2.2.1	Federal legislation	2-1
2.2.2	Yamalo-Nenets Autonomous Okrug Legislation	2-20
2.2.3	Tazovsky District Legislation	2-23
2.3	International treaties and conventions	2-23
2.4	International Financial Institutions Policies and Standards	2-26
2.4.1	Equator Principles	2-27
2.4.2	IFC Performance Standards (2012)	2-29
2.4.3	Applicable IFC EHS Guidelines	2-34
2.4.4	The Organization for Economic Cooperation and Development (OECD) Common (2016)	Approaches 2-34
2.4.5	World Bank Environmental and Social Framework (2018)	2-35
2.4.6	Japan Bank for International Cooperation (JBIC) Guidelines for Confirmation of En and Social Considerations (2015)	vironmental 2-35
2.4.7	NEXI Guidelines on Environmental and Social Considerations in Trade Insurance	2-38
2.5	European Union Environmental and Social Standards	2-39
2.6	Corporate Policies and Standards	2-40
3.	ESHIA PROCESS	3-1
3.1	ESHIA Approach	3-1
3.2	ESHIA Scoping	3-3
3.3	Baseline Studies	3-3
3.4	Impact Identification and Evaluation of Significance	3-4



3.4.1	Identification of Impacts	3-4
3.4.2	Project Implementation Phases	3-4
3.4.3	General Approach to Impact Assessment	3-4
3.4.4	Prediction	3-5
3.4.5	Impact Types	3-5
3.4.6	Evaluation of Significance: Planned Events	3-6
3.4.7	Risks and Unplanned Events	3-9
3.5	Impact Mitigation	3-10
3.6	Cumulative Impacts	3-10
3.6.1	Definition and Applicable Guidelines	3-10
3.6.2	CIA Objective	3-11
3.6.3	CIA Methodology	3-11
3.7	Presentation of ESIA Results	3-13
4.	STAKEHOLDER ENGAGEMENT	4-1
4.1	General	4-1
4.2	Identification of key stakeholders	4-1
4.2.1	Affected parties	4-1
4.2.2	Interested organizations and individuals	4-2
4.2.3	Vulnerable groups	4-3
4.3	Stakeholder engagement activities conducted by present	4-3
4.3.1	Statutory consultations (2013-2019)	4-4
4.3.2	Ethnographic survey (2015)	4-7
4.3.3	Consultations as part of the international ESHIA (2018)	4-7
4.3.4	Consultations in the framework of the international ESHIA for the Arctic LNG 2 Project	(2020) 4-17
4.4	Future stakeholder engagement activities	4-17
4.5	Gender Aspect of Consultations	4-17
4.6	Free Prior Informed Consent	4-18
5.	CHARACTERISTICS OF THE PLANNED ACTIVITY	5-1
5.1	Project background. Exploration and planning for the Salmanovskoye (Utrenneye) Facilities Setup	OGCF 5-3
5.2	Construction and operation of the berth structures	5-6
5.3	Maintenance dredging in the water area of Salmanovskoye (Utrenneye) OGCF	5-9
5.4	Salmanovskoye (Utrenneye) OGCF Facilities Setup	5-9
5.4.1	Early development facilities	5-9
5.4.2	Gas supply for the power supply facilities to support construction, hydraulic filling and operations	drilling 5-10
5.4.3	Main FIELD facilities	5-18
5.4.4	Well pads and single well sites Management of drilling wastes	5-31
5.4.5	Production of soil-based construction materials	5-32
5.5	Utrenniy Terminal	5-33

RAMBOLL



5.6	GBS LNG & SGC Plant	5-34
5.7	Associated Facilities and Activities	5-38
5.8	Project Shipping Activities	5-42
5.9	Utrenniy Airport	5-45
6.	PROJECT ALTERNATIVES	6-1
6.1	Benefits of LNG Technology	6-1
6.2	Benefits of GBS Technology	6-2
6.3	Geographic Alternatives	6-3
6.3.1	Preliminary identification and selection of options	6-4
6.3.2	Comparison of solutions for hydrocarbons transportation from the Salmanovskoye ( OGCF	Utrenneye) 6-4
6.3.3	Comparison of the Plant implementation options	6-8
6.4	Detailed Assessment of the Plant Location Options	6-10
6.4.1	Overview of Potential Plant Location Sites in the Coastal Area	6-10
6.4.2	Approach and Criteria	6-10
6.4.3	Specific positioning of the Plant process trains in the port area	6-12
6.5	Selection of Preferred Design Solutions	6-13
6.5.1	Dredged soil dumping options	6-14
6.5.2	Water intake alternatives	6-18
6.5.3	Wastewater disposal alternatives	6-18
6.5.4	Solid waste management options	6-19
6.5.5	Options for managing wastes from drilling producing wells	6-19
6.6	Zero Alternative	6-21
6.7	Summary	6-21





# LIST OF FIGURES

Figure 1.1: Arctic LNG 2 Project structure1-2
Figure 1.2: Salmanovskiy (Utrenniy) license area in the map of the Russian Federation, Yamal-Nenets
Autonomous Okrug, and MO Tazovskiy District1-3
Figure 1.3: Arctic LNG 2 Project in the map of MO Tazovskiy District1-4
Figure 1.4: Participants of LLC "Arctic LNG 2"1-6
Figure 1.5: General view of the main Project facilities:1-9
Figure 1.6: Arctic LNG 2 Project implementation time frames
Figure 1.7: General scheme of the cargo transport routes by sea for the Arctic LNG 2 Project 1-12
Figure 3.1: ESHIA Process
Figure 3.2: Impact Evaluation Process
Figure 3.3: Mitigation Hierarchy 3-10
Figure 4.1: Consultations with representatives of indigenous communities migrating within the area of the
Salmanovskoye (Utrenneye) field (2018) 4-8
Figure 5.1: Salmanovskoye (Utrenneye) oil, gas, and condensate field
Figure 5.2: Salmanovskoye (Utrenneye) OGCF Facilities Setup Programme
Figure 5.3: Berth structures
Figure 5.4: Water area used in the Ob Estuary and Utrenniy Terminal facilities
Figure 5.5: Contour lines of land use, designed artificial land plots (ALP), hydraulic structures, and dredging
in the Ob Estuary for the Plant and Port 5-10
Figure 5.6a: Location of the Salmanovskoye OGCF Facilities Setup: general layout
Figure 5.7: Preparation of drilling sites for producing wells in the Salmanovskiy (Utrenniy) LA. Well pad
GWP No.2 (left) and site of single well No.297 (right) 5-18
Figure 5.8: Drilling rig "Uralmash 6000/400 EK-BMCh (left) and ERIELL ZJ-70 DBS "Avrora" 5-19
Figure 5.9: HFU-5 unit for disposal of treated wastewater
Figure 5.10: Well pad development scheme (example of GWP No.9) including storage area (red contour
line) for construction material produced from drilling wastes
Figure 5.11: UPNSh unit (left) and Fortan unit for treatment of drilling wastes containing hydrocarbons
Figure 5.12: Block diagram of designed CGTP within the Salmanovskoye (Utrenneye) OGCF Facilities Setup
Figure 5.13: General layout of CGTP1 at the Salmanovskoye (Utrenneye) OGCF 5-24
Figure 5.14: Location scheme of accommodation facilities for rotation shift personnel involved in
construction of the LNG Plant in the territory of the Salmanovskiy (Utrenniy) LA 5-29
Figure 5.15: Arrangement scheme of crossing points at the intersections of herds migration routes with
roads
Figure 5.16: Hydraulic sand production in lakes 5-32
Figure 5.17: Model of the turn-key factory-fabricated technical equipment 'Plant Process Train' 5-35
Figure 5.18: Plant Plot Plan 5-36
Figure 5.19: Location of the nearest fiver ports
Figure 6.1: Project alternatives (the preferred option is shown with red arrows)
Figure 6.2: Schematic map of the port facilities (seasonal port) location options
Figure 6.3: Basic layout of the Plant process trains
Figure 6.4: Preferred layout of the Plant process trains, Option 2
Figure 6.5: Schematic map of location of dredged soil fill sites

# LIST OF TABLES

Table 2.1: Comparison of international and national requirements for EIA/ESHIA	
Table 2.2: BAT Technological indicators applicable to gas condensate stabilization	
Table 2.3: IFC project categories:	2-30
Table 3.1: Classification of Project Impacts	
Table 3.2: Description of impact criteria	
Table 3.3: Impact Magnitude	
Table 3.4: Impact Significance Matrix	
Table 3.5: Project impacts ranking by significance	
Table 3.6: Risk occurrence criteria	3-9





Table 3.7: General risk / event occurrence risk criteria
Table 3.8: Evaluation of impact significance: a form of a summary table         3-14
Table 4.1: Statutory consultations    4-4
Table 4.2: Stakeholder engagement activities at Stage 1 consultations under the international ESHIA
process (2018)
Table 4.3: Stakeholder engagement activities at Stage 2 consultations under the international ESHIA
process (2018) 4-15
Table 5.1: Arctic LNG 2 Project phases and implementation time frames
Table 5.2: Characteristics of the Salmanovskoye (Utrenneye) OGCF, breakdown by producing zones 5-4
Table 5.3: Cluster drilling rig    5-19
Table 5.4: Technical parameters of designed roads within the field territory       5-30
Table 5.5: Information on hazardous substances circulating in the Plant process trains
Table 5.6: Associated activities    5-40
Table 5.7: Turnover of general cargoes delivered to the Utrenniy Terminal         5-44
Table 6.1: Natural gas transportation options       6-5
Table 6.2: Plant location options    6-8
Table 6.3: Scored assessment of port facilities location options (Morstroitekhnologiya, 2014) 6-11
Table 6.4: Comparison of environmental impact charges and remediation costs associated with various
dredged soil disposal options, million rubles
Table 6.5: Comparison of solid waste disposal options       6-19
Table 6.6: Comparison of options for managing wastes from drilling the prospecting and producing wells





## **ACRONYMS AND ABBREVIATIONS**

AANII	Arctic and Antarctic Research Institute
AEPS	Arctic Environmental Protection Strategy
AEWA	African-Eurasian Migratory Waterbirds
AGRU	Acid Gas Removal Unit
AIDS	Acquired Immune Deficiency Syndrome
AIIB	Asian Infrastructure Investment Bank
AIS	Automatic Identification System
ALP	Artificial Land Plot
AMAP	Arctic Monitoring and Assessment Programme
AoI	Area of Influence
AP	Action Plan
AS	Anionic Surfactants
AWOU	Automated Wireless Observer Unit
AZRF	Arctic Zone of Russian Federation
BAP	Benz[a]pyrene, Biodiversity Action Plan
BAT	Best Available Technologies
BCC	Biodiversity Conservation Centre
BIMS	Brash Ice Management System
BOD	Biochemical Oxygen Demand
CAFF	Conservation of Arctic Flora and Fauna
CDP	Carbon Disclosure Project
CGTP	Complex Gas Treatment Plant
CIA	Cumulative Impact Assessment
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CL	Combustible Liquids
СМР	Construction Management Plan
CNODC	China National Oil and Gas Exploration and Development Company
CNOOC	China National Offshore Oil Corporation
CNPC	China National Petroleum Corporation
COD	Chemical Oxygen Demand
CPS	Compressor Pumping Station
CRA	Cryogenic Risk Assessment
CRZ	Conservation Reserve Zone
CS	Compressor Station
DCA	Detrended Correspondence Analysis
DCM	Dispersion Calculation Methods
DEGP&HP	Dangerous Exogenous Geological Processes and Hydrological Phenomena





DPP	Diesel Power Plant
DPRR YNAO	Representatives of YNAO Government
DWW	Drilling Wastewater
E&RA	Evacuation and Rescue Analysis
EBRD	European Bank for Reconstruction and Development
EBSA	Ecologically and Biologically Significant Areas
ECA	Export Credit Agency
EDPS	Emergency Diesel Power Station
EEZ	Exclusive Economic Zone
EGP	Exogenous Geological Process
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EP	Equator Principles
EPDR	Emergency Prevention, Preparedness and Response
EPF	Early Phase Facilities
EPFI	Equator Principles Financial Institutions
ERA	Explosion Risk Analysis
ERC	Emergency Response Centre
ERIS	Effluents Re-Injection Site
ESHIA	Environmental, Social and Health Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
ESS	Environmental and Social Standards
ESSA	Emergency Systems Survivability Analysis
EU	European Union
EWE	Extreme Weather Events
FAF	Federal Agency for Fishery
FC	Field Camp
FEED	Front-end Engineering Design
FPIC	Free, Prior, and Informed Consent
FRA	Fire Risk Analysis
FSBSI	Federal State Funded Research Institution
FWCC	Federal Waste Classification Catalogue
GBIF	Global Biodiversity Information Facility
GBS	Gravity-Based Structures
GFN	Good Faith Negotiation
GGN	Gas-Gathering Network





GHG	Greenhouse Gases
GIIP	Good International Industry Practice
GIS	Geographical Information System
GN	Hygiene Standards
GOST	State Specific Standard
GPH	Good Practice Handbook
GRP	Gross Regional Product
GT	Gas Turbine
GTCPP	Gas Turbine Compressor Power Plant
GTG	Gas Turbine Generator
GTPP	Gas Turbine Power Plant
GWP	Gas Well Pad
HADCRUT4	Hadley Centre and University of East Anglia
HAZOP	HAZard and Operability
HC	Hydrocarbons
HFL	Highly Flammable Liquid
HIF	Hazardous Industrial Facilities
HIV	Human Immunodeficiency Virus
HNS	Hazardous and Noxious Substances
НОВ	Hydrocarbon-Oxidizing Bacteria
HRA	Health Risk Assessment
HSE	Health, Safety & Environmental
HSES	Health, Safety, Environmental and Social Protection
HVAC	Heating, Ventilation and Air Conditioning
ICAO	International Civil Aviation Organisation
ICAO	International Civil Aviation Organisation
ICES	International Council for the Exploration of the Seas
ICP	Informed Consultation and Participation
IEM	Industrial Environmental Monitoring
IEMC	Integrated Emergency Management Course, Industrial Environmental Monitoring and Control
IEP	Integrated Environmental Permit
IFC	International Financial Corporation
IFI	International Financial Institutions
ILO	International Labour Organisation
IMO	International Maritime Organization
IMS	Integrated Management System, Ice Management System
IPCC	Intergovernmental Panel on Climate Change
IPDP	Indigenous People Development Plan
ISPN	Indigenous Small-Numbered Peoples of the North





ITS	Information and Technical Reference Documents
ITSO TB	Transport Safety System Facilities
IUCN	International Union for Conservation of Nature
JBIC	Japan Bank for International Cooperation
JOGMEC	Japan Oil, Gas and Metals National Corporation
КВА	Key Biodiversity Areas
КОТ	Key Ornithological Territories
LA	License Area
LDAR	Leak Detection and Repair
LEM	Local Environmental Monitoring
LEPM	List of Environmental Protection Measures
LFG	Liquefied Flammable Gases
LLC	Limited Liability Company
LNG	Liquefied Natural Gas
LOC	Loss of Containment
LTS	Low-Temperature Sepatration
MAC	Maximum Allowable Concentrations
MAE	Maximum Allowable Emission
MAL	Maximum Allowable Levels
MARPOL	International Convention for the Prevention of Pollution from Ships
MDEA	Methyldiethanolamine
MIA	Ministry of Internal Affairs
ММС	Marine Mammal Council
MPC	Maximum Permissible Concentrations
MTPA	Million Tonnes Per Annum
NLR	Northern Latitudinal Railway
NSR	Northern Sea Route
NSR	Northern Sea Route
NTS	Non-technical Summary
OBM	Oil-Based Clay Drilling Mud
OCC	Operations control Complex
OCS	Operations Control System
OEC	Operational Environmental Control/Monitoring
OECD	Organization for Economic Cooperation and Development
OGCF	Oil-Gas Condensate Field
OHS	Occupational Health and Safety
OSCY	Offshore Superfacility Construction Centre
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OSPRP	Oil Spill Prevention and Response Plan





OST	Industry Specific Standard
РАН	Polyaromatic Hydrocarbons
PAME	Protection of the Arctic Marine Environment
РСВ	Polychlorinated Biphenyls
PFHI	Publicly Funded Health Institution
PGTP	Primary Gas Treatment Plant
PHN	Content of Phenols
PJSC	Public Joint Stock Company
POL	Petroleum, Oil and Lubricants
PR	Permafrost Rocks
PS	Performance Standard, Project Standards
PSR	Project Specific Requirements
PSZ	Protective Sanitary Zones
PTS	Package Transformer Substation
QRA	Quantitative Risk Assessment
RC	Reinforced Concrete
RCIA	Rapid Cumulative Impact Assessment
RD	Reference Documents
RF	Russian Federation
SanPiN	Sanitary-Epidemiological Rules and Norms
SC	Startup Complex
SCWQI	Specific-Combinatorial Water Quality Index
SDM	Spent Oil-Based Clay Drilling Mud
SDWG	Sustainable Development Working Group
SEP	Stakeholder Engagement Plan
SGC	Stabilized Gas Condensate
SIL	Safety Integrity Level
SMCIW DS	Solid Municipal, Construction and Industrial Waste Disposal Site
SNiP	Civil Engineering Norms and Rules
SOLAS	International Convention for the Safety of Life at Sea
SP	Code of Rules
SPI	State Public Institution
SPNA	Specially Protected Natural Areas
SPZ	Sanitary Protection Zone
SR	Scoping Report
STD	Sexually Transmitted Diseases
STF	Sewage Treatment Facility
STGCF	South-Tambey Gas-Condensate Field
STL	Seasonally Thawed Layer





TAC	Temporary Accommodation Camp
TEA	Turbo-Expanding Assembly
TFCD	Task Force on Climate-Related Financial Disclosures
TLC	Takeoff-Landing Cycle
TPS	Territorial Planning Scheme
TRTF	Transmitting Radiotechnical Facilities
TS	Topside Structures
TSF	Temporary Site Facilities
TTS	Thermal Treatment System
UNCLOS	United Nations Convention on the Law of the Sea
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
URZ	Use-restricted Zone
USA	United States of America
USSR	Union of Soviet Socialist Republic
VEC	Valuable Environmental and Social Components
VOC	Volatile Organic Compounds
WBM	Water-Based Clay Drilling Mud
WITF	Water Intake and Treatment Facilities
WPZ	Water Protection Zone
WTF	Water Treatment Facilities
WWF	World Wildlife Fund
WWTP	Wastewater Treatment Plant
YNAO	Yamalo-Nenets Autonomous Okrug





## **BASIC TERMS AND DEFINITIONS**

Customer, Company	Arctic LNG 2, LLC								
Consultant	Ramboll CIS LLC, an independent environmental and social consultant								
Project Operator	The organization responsible for managing the project at the construction, commissioning, operation and decommissioning phases (Arctic LNG 2, LLC)								
Stakeholders	Persons or groups directly or indirectly affected by the Planned activity, as well as those who may be interested in its implementation and / or are able to influence it in a favorable or unfavorable way								
GBS LNG & SGC Plant (Complex)	The gravity-based structure Complex for production, storage and offloading of liquefied natural gas and stabilised gas condensate, which includes three process trains and onshore infrastructure								
Process Train	The gravity-based structure Complex will include three process trains for the production, storage and offloading of liquefied natural gas (LNG) and stabilised gas condensate (SGC) with a stated annual capacity of about 6.6 million tons of LNG each. The total peak capacity of SGC production can be as much as 1.6 million tons per year								
Associated facilities	Facilities that meet the following conditions: 1) they are not funded by the Project (by the planned activity); 2) they would not be built or expanded without the Project (the Planned activity fails to be implemented); 3) they ensure the viability of the Project (Planned activity)								
Arctic LNG 2 Project (Project)	The Project, including, along with the GBS LNG & SGC Plant construction of the Utrenniy Terminal (Port) and development of the Salmanovskoye (Utrenneye) oil and gas condensate field (OGCF) (Project Operator – 'Arctic LNG 2' LLC)								
Utrenniy Terminal (Port)	A section of the Sabetta seaport, the purpose of which is to provide offshore logistics for gas carriers and tankers for LNG and SGC offloading, reception and storage of processing and construction cargo								
Salmanovskiy (Utrenniy) license area	A subsoil plot of federal importance, including the Salmanovskoye (Utrenneye) oil and gas condensate field, within which Arctic LNG 2 LLC was licensed to use the subsoil resources – License No. CFL 15745 NE dated 06.20.2014 for the exploration and production of hydrocarbons								
Field	Facilities and activities involved in setting up the Salmanovskoye (Utrenneye) OGCF to ensure production and preparation of raw materials for production of LNG and SGC, and providing engineering resources to all the facilities of the Arctic LNG 2 Project								
Principles of the Equator	The internationally accepted environmental and social risk management system for financial organizations, including 10 key provisions (principles) <sup>1</sup>								
IFC Performance Standards	A set of environmental and social sustainability requirements of the International Finance Corporation which the organizations to be funded must follow throughout the lifecycle of an investment project. Available at: http://www.ifc.org/performancestandards								

<sup>&</sup>lt;sup>1</sup> The Equator Principles. A financial industry benchmark for determining, assessing and managing environmental and social risk in projects. The Equator Principles Association, 2019.





Environmental, social and health impact assessment (ESHIA)	In the IFC terminology, the process of identifying, predicting and assessing the significance of favorable (positive) and adverse (negative) environmental and social project impacts, including a description of the project implementation conditions, analysis of alternative options for the Planned activity, consideration of global, transboundary and cumulative impacts including their possible quantitative representation, an impact management programme. In the terminology of the International Association for Impact Assessment (IAIA <sup>2</sup> ) - the process of identifying, predicting, assessing and mitigating environmental and social impacts, as well as other adverse effects of the Planned activity, before making a decision on its implementation
Planned activity's (Project's) area of influence⁴	The land and water area, including: 1) land plots and water area sections, within which the Planned activities are directly implemented; 2) other land and water areas used or controlled by the Project's operator and its subcontractors (contractors); 3) land and water areas where the associated facilities are sited (see the corresponding definition); 4) land and water areas that may be subjected to cumulative impacts from the Planned activity; 5) land and water areas potentially affected by impacts from unplanned but predictable developments caused by project-related activities that may occur later or at a different location. The Project's area of influence does not include the area of dispersion of impacts which can be observed with a no-project version (abandonment of the Planned activity) or without the Project
The area of influence of air pollutant emission sources⁵	For a sole air pollutant emission source it is the circumference of the largest of the two radii, the first of which is equal to ten times the distance from the source to the point of the ground level concentration of the pollutant having the greatest prevalence (among the pollutants emitted by this source), and the second one is equal to the distance from the emission source to the most distant contour line of the ground level concentration of the pollutant, equal to 0.05 one time MPC. For the totality of air pollutant emission sources it is land or water areas that include all single source influence areas within this totality, as well as the 0.05 one time MPC contour for the estimated total concentration of each pollutant emitted by the totality of sources
Areas with controlled habitat quality indicators	Areas, where the existing hygienic air standards for chemical, biological and physical factors must be strictly followed. These include areas such as residential development, cottage development, sports and children's playgrounds, landscape and recreational areas, recreation areas, resorts, sanatoriums, rest homes; horticultural partnerships, collective or individual dachas and garden plots; sports facilities; educational and childcare facilities; general medical treatment and rehabilitation facilities
Social impact area	Areas and communities that may experience positive and negative impacts of the planned (project related) and associated activities

<sup>&</sup>lt;sup>5</sup> In the terminology of MRR-2017 (Dispersion Modeling of Harmful Air Pollutants. Approved by the Russian Ministry of Nature Order 273 dated June 006, 2017).



<sup>&</sup>lt;sup>2</sup> Global leader among best practice networks as regards impact assessment for informed decisions concerning policies, programs, plans, and projects (http://www.iaia.org/).

<sup>&</sup>lt;sup>4</sup> The definition is consistent with the IFC terminology (IFC Policy & Performance Standards and Guidance Notes. Glossary and Terms - http://www.ifc.org/). In this and all other <u>common</u> cases, the term "project" is a traditional synonym of the phrase "planned activity". As applicable to the ESHIA subject, the term <u>Project</u> (capitalized in the text) covers the activity under assessment designated as "Arctic LNG 2" to include Salmanovskoye (Utrenneye) OGCF **Facilities Setup**, construction and operation of the GBS LNG & SGC Plant (LNG **Complex**), and construction and operation of the **Port** (Utrenniy Terminal).

Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Os¢at Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

### **1. INTRODUCTION**

This document represents the Report on the assessment of environmental, social and human health impact (ESHIA) of the Arctic LNG 2 Project conducted in accordance with requirements of the International Financial Institutions under Contract No.228-ALNG2-2020 dated 31.03.2020 between LLC "Arctic LNG 2" (the Company) and LLC Ramboll CIS the Consultant).

The ESHIA Report is a part of the package of documents developed by the Consultant for the Arctic LNG 2 Project comprising:

- Scoping Report (SR) developed early in the ESHIA process, subject to discussion with stakeholders;
- **Stakeholder Engagement Plan (SEP)** developed early in the ESHIA process, subject to discussion with stakeholders;
- Non-technical Summary (NTS) developed upon finalisation of the main ESHIA Report as a generalised popular presentation of its conclusions; the document is subject to disclosure and discussion with stakeholders;
- Framework Project Environmental and Social Management Plan developed on the basis of the ESHIA results as a working document to be immediately adopted in the activities of the Project parties, including a list of sector-specific management plans for the Project construction and operation phases.

#### **1.1** Overview of the Project and its area of implementation

The Arctic LNG 2 is a project in the sphere of hydrocarbons extraction, production and offloading of liquefied natural gas and stabilized gas condensate.

The resource base for the Project is the Salmanovskoye (Utrenneye) oil, gas, and condensate field (OGCF) at the border of the Gydan and Yamal petroleum regions n West-Siberian oil-and-gas bearing province.

**Three main components** of the Arctic LNG 2 Project (Figure 1.1) are: the Salmanovskoye (Utrenneye) OGCF Facilities Setup (the FIELD); the GBS Plant for liquefaction of natural gas and stabilization of gas condensate (the GBS LNG & SGC Plant, the PLANT) and the Utrenniy LNG & SGC Terminal (the Utrenniy Terminal, the PORT) purposed to provide offshore logistics for gas carriers and tankers, offloading of LNG and SGC, reception and storage of cargoes for operations and construction.

Administratively, the field lies within the territory of Tazovskiy Municipal District of the Yamal-Nenets Autonomous Okrug; a part of the field area extends into the water area of the Ob Estuary of the Kara Sea which belongs to the internal marine waters of the Russian Federation (Figure 1.2).

Boundaries of the subsoil area needed for development of the field (mining allotment) have been identified considering the hydrocarbon deposits geometry and other factors that influence the geological and terrain conditions in relation to the process of geological exploration and use of the subsoil resources<sup>3</sup>. License CJIX 15745 H9 dated 20.06.2014<sup>4</sup> vests to LLC "Arctic LNG 2" exclusive right to use subsoil resources in the total area of about 3.5 thousand km<sup>2</sup> (45x50km) within the Salmanovskiy (Utrenniy) subsoil area of federal significance. The PLANT and PORT will be developed as an integrated system of onshore industrial facilities in the west of the license area.

<sup>&</sup>lt;sup>4</sup> Consolidated National Register of Subsoil Areas and Licenses. - Russian Federal Geological Fund of the Federal Agency for Mineral Resources. As amended by Addendum No.3 dated 29.03.2018.





<sup>&</sup>lt;sup>3</sup> Since the subsoil use requirements within this area are regulated by the license, it is referred to in the ESHIA materials as "the license area" (LA)

Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Ostar Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No



#### Figure 1.1: Arctic LNG 2 Project structure

(the scheme is generated using the design documentation of LLC "Arctic LNG 2")

Yamal-Nenets Autonomous Okrug (YNAO) is an entity within the Arctic Zone of the Russian Federation, with a population of approximately 500 thousand. About a half of its total area (which is some 770 thousand km<sup>2</sup> in round numbers) lies north of the Arctic Circle, therefore the whole Okrug is referred to as a Far North region. The development of oil and gas extraction industry places YNAO in the list of regions with best socio-economic situation. Due to its geographic location, the Okrug serves as a base point for development of Russian sector of Arctic, and for transport communication with adjacent areas, both onshore and offshore. Demographically, the region is characterized by a relatively large and growing numbers of indigenous peoples who account for about 14% in the total number of Russian nationals designated as indigenous small-numbered peoples<sup>5</sup>.

The Project is being implemented in the territory listed as an area of customary residence and practices of indigenous small-numbered peoples of the North (ISPN)<sup>6</sup>. Tazovskiy Municipal District (Nenets name – *Tasu Yava*) was established as an administrative territory in 1930. It occupies an area of some 174 thousand km<sup>2</sup> in the north-east of YNAO which is washed by waters of three major river estuaries - Ob, Taz and Gydan estuaries of the Kara Sea. In April 2020 it acquired official status of Municipal Okrug<sup>7</sup> comprising administrative centre - Tazovskiy township, four settlements and four villages (Figure 1.3).

<sup>&</sup>lt;sup>7</sup> YNAO Law of 23.04.2020 No. 39-ZAO. The full name of the municipality is Municipal Okrug Tazovskiy District of Yamal-Nenets Autonomous Okrug, short name is Municipal Okrug (MO) Tazovskiy District.





<sup>&</sup>lt;sup>5</sup> V. I. Pavlenko et al. Indigenous small-numbered peoples of Russian Arctic (problems and development prospects) // Human Ecology. 2019. No. 1. pp. 26-33.

<sup>&</sup>lt;sup>6</sup> As defined by the RF Government Decree of 08.05.2009 N 631-r (rev. of 01.03.2017) "On approval of the List of Areas of Customary Residence and Practices of Small-numbered Indigenous Peoples of the Russian Federation, and the List of Customary Practices of Small-numbered Indigenous Peoples of the Russian Federation".

Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Ostaß Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No



Figure 1.2: Salmanovskiy (Utrenniy) license area in the map of the Russian Federation, Yamal-Nenets Autonomous Okrug, and MO Tazovskiy District





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Osta# Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No



About a half of the district residents are ethnic Nenets, many of which adhere to nomadic life style. The Salmanovskiy (Utrenniy) LA is situated on the migration routes of about 60 families of Nenets reindeer herders, however the area is not used for fixed camping grounds.

The Project sites are located far away from permanent residential units, the nearest of which are trading stations/villages of Tadebya-Yakha (appr. 70 km from the Plant and Port, 25 km from the LA boundary) and Yuribey (110 km and 60 km, respectively), Gyda (170 km and 110 km), and Antipayuta (240 km and 190 km) of Tazovskiy Municipal District of YNAO (Figure Tadebya-Yakha 1.3). and Yuribey<sup>8</sup> are associated with fishing activities and also operate as trading stations: the former one is situated in the abandoned geologists' settlement in the estuary of eponymous river, while the latter one is located on the bank of Yuribey River close by its debouchment to the Gydan Estuary (more details of the settlements are provided in Chapters 4 and 8 herein).

# Figure 1.3: Arctic LNG 2 Project in the map of MO Tazovskiy District

The distance from the Plant and Port to the city of Salekhard – the administrative center of YMAO – is 540 km (SSW), to Sabetta Sea Port near which another NOVATEK's project is being implemented – Yamal LNG – 72 km (NW).

The key element of the Project is the Plant comprising three process trains on gravity-based structures (GBS) for production, storage, and offloading of liquefied natural gas (LNG) and stabilised gas condensate (SGC),

<sup>&</sup>lt;sup>8</sup> Both settlements are recorded in the Charter of MO Tazovskiy District as villages and are included in the Trading Stations Register of Yamal-Nenets Autonomous Okrug. Sometimes the name of the former one is also spelled in joined-up version - Tadebyayakha.





with the declared annual capacity of 6.6 MTPA of LNG. The total SGC capacity of the Plant during the peak operations period can be as high as 1.6-1.8 MTPA<sup>9</sup>.

The Plant process trains are manufactured at the site of NOVATEK-Murmansk LLC in the Murmansk Region. The gravity-based structures for them will be manufactured in casting basin at the above site, whereas the topside modules will be manufactured at various sites located in Russia (including NOVATEK-Murmansk LLC) and other countries and transported to casting basins of NOVATEK-Murmansk LLC for integration into GBS and pre-commissioning of the equipment.

#### **1.2 Project Phases, Parties and Time Frames**

#### 1.2.1 Project background

The resource base for the Project - Salmanovskoye (Utrenneye) oil, gas, and condensate field, was discovered in 1979. The preliminary studies were conducted during 1980-1985, i.e. back in the Soviet era. Since 2011, licenses for the use of the field subsoil resources are held by subsidiaries or joint ventures with participation of NOVATEK. The field reserves and geological model were clarified by further exploration during 2012-2014 which confirmed the benefits of developing the discovered reservoirs of high-quality natural gas (16 reservoirs), gas condensate (15 reservoirs) and hydrocarbon mixture (2 reservoirs).

Starting from 2010<sup>10</sup>, Russian Government adopted an active approach to creating a supportive economic and legal environment for LNG projects in YNAO. Internal taxation and customs privileges are granted to companies involved in such projects. Public authorities in charge of regulation of subsoil use, navigation and other activities in the region are officially advised to cooperate for minimisation of time required for the statutory procedures - expert reviews, approvals, permits, etc.

At the same time, the infrastructure of the Northern Sea Route is being actively developed; comprehensive scientific research expeditions are conducted to investigate the natural and social environment for the projects; building of icebreaker fleet and other ships has been deployed. Utrenniy Terminal is included in the Integrated Action Plan for Modernization and Extension of Trunk Infrastructure Development 2024 (adopted by the RF Government Instruction No.2101-r of 30.09.2018), and its construction is financed by government under the Federal Project "Northern Sea Route", in accordance with the RF Government Instruction No. 965 of 27.07.2019 (as amended by Instruction No. 497 of 12.04.2020).

#### 1.2.2 Project Operator and other companies involved in the Project

Year 2014 when future operator of the Project - Limited Liability Company "Arctic LNG2" – was established can be considered as start year of the Project implementation. The Company was originally established as a subsidiary of NOVATEK, and was later on converted into a joint venture (Figure 1.4) of the parent company (60 %), China National Oil and Gas Exploration and Development Company (CNODC, 10 %), China National Offshore Oil Corporation (CNOOC, 10 %), French oil and gas company Total (Total E&P Salmanov, 10%), Consortium JAPAN Arctic LNG B.V. (10 %) of Japan Oil, Gas and Metals National Corporation (JOGMEC holding 7.5% share) and Japanese finance and industry group MITSUI & CO., LTD (2.5% share).

According to the official website of NOVATEK (http://www.novatek.ru/), equivalent investment need to achieve full capacity of the Project is assessed at 21.3 B USD.

LLC "Arctic LNG 2" is registered in Russia at 5 Yubilejnaya St., Novy Urengoy, YNAO. Brief overview of all participants of the Company is provided below.

**NOVATEK** is the Russia's largest independent producer of natural gas which occupies stable and enhancing positions in the domestic and international market of hydrocarbons. It has been engaged in natural gas and liquid hydrocarbons exploration, production, processing and sale in the of the Yamal-Nenets Autonomous Okrug since 1994. The priority development directions of NOVATEK include application of the best available technology, ensuring low failure rates at the operating and newly constructed facilities, efficient long-term engagement with indigenous peoples of the Russian Arctic sector and other

<sup>&</sup>lt;sup>10</sup>In particular, RF Government issued Instructions No.1713-r of 11.10.2010 and No.2101-r of 30.09.2018, and Decree No. 965 of 27.07.2019.





<sup>&</sup>lt;sup>9</sup> Maximum SGC capacity of the Plant mentioned in the Project Information Memorandum is 1.6 MTPA. According to the design documentation, the Plant will be capable to produce up to 98.6 tons of SGC per hour and offload up to 8000 m3 of SGC per hour. Maximum design SGC capacity of the Terminal to be achieved in 2026 is 1.8 MTPA.

Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Os&a& Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

stakeholders, enhancement of scientific research and environmental monitoring activities in the regions of operations.



#### Figure 1.4: Participants of LLC "Arctic LNG 2"

#### (Source: Project Information Memorandum. – ARCTIC LNG 2 LLC, February 2020)

The environmental activities of NOVATEK include implementation of the Biodiversity Program, actions to ensure artificial reproduction of aquatic biological resources in YNAO, regular thematic events involving broader community. In response to the global climate agenda, NOVATEK is persistently striving to reach a balance between the climate change risks and efficiency of the investment projects. Through participation in the Carbon Disclosure Project (CDP) and the Water Disclosure Project the relevant corporate reports are made available to all interested parties.

As part of the commitments under the Cooperation Agreement between NOVATEK and the RF MNR, the Russian Federal Service for Supervision of Natural Resource Usage (Rosprirodnadzor) and the Government of YNAO a greenhouse emission estimation module has been developed and Standard SK-ISU-0-012 "Greenhouse gas emission management system" has been approved. The adopted approach for emissions assessment features a combination of computations and direct measurement methods. The project "GHG Emission Management System" implemented by the company in 2017 was recognized as the winner of the competition for the National Environmental Prize named after V.I.Vernadsky in the nomination "Science for Ecology".

Following a re-certification audit by Bureau Veritas Certification Rus, the NOVATEK's Integrated Management System for Environmental Protection, Occupational Health and Safety was found to be in compliance with ISO 14001-2015 and OHSAS 18001-2007. The Environmental, Industrial Safety and Occupational Health Policy of NOVATEK being the core document of the system (approved by Order of NOVATEK No.046 of 25 April 2016) guarantees compliance with environmental safety norms and requirements when developing hydrocarbon fields in the Russian Federation Arctic area (p. 1.8), provides for environmental impact assessment to be conducted prior to any operations associated with potential environmental and social impact (p.2.1), establishes a mandatory requirement for environmental monitoring of operational and newly developed facilities to inform development of new target programs and environmental action plans.—

Along with this NOVATEK declares and is making sure that ESHIA results are made available to all stakeholders through mass media, official corporate channels, special events (hearings, discussions, meetings) in the region of operations. The Company was included in the FTSE4Good international rating index of compliance with the internationally recognized standards in the area of corporate social responsibility.

NOVATEK is initiator and key participant of the Arctic LNG 2 Project.

**Total S.A.**, France, is one of the largest global producers of hydrocarbons (ranks the second in LNG sector) with operations across more than 130 countries. To diversify its business, Total is also developing activities in the sectors of power, petrochemical industry and marketing of petroleum products. It holds a share in





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Os¢a7 Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

NOVATEK and participates in another major project in the region - Yamal LNG. Total S.A. holds a share in LLC "Arctic LNG 2" via a dedicated subsidiary - Total E&P SALMANOV.

**China National Petroleum Corporation** (CNPC) is the largest in China oil-and-gas corporation. Established in 1988, it is nowadays a global player with operations across 30 countries including Russia (CNPC takes part in the Yamal LNG Project). CNPC holds a share in LLC "Arctic LNG 2" through its subsidiary – China National Oil and Gas Exploration and Development Company (CNODC).

**China National Offshore Oil Corporation** (CNOOC) was established in 1982 and is nowadays the third largest among the national petroleum companies of China after CNPC and Sinopec. It is engaged with offshore production of hydrocarbons in China, their processing and marketing. CNOOC is a national company which runs a part of its operations through Hong Kong subsidiary CNOOC Limited. It holds a share in the Arctic LNG Project via subsidiary - CEPR Limited.

**Mitsui Group** is a transnational corporation with diverse business areas. It was originally founded in Japan as a small family business and has grown to become one of the world's largest finance and industry groups. One division – Mitsui & Co., Ltd. – is active in hydrocarbons production and processing projects, e.g. it participates in Sakhalin-2 Project. It holds a share in the Arctic LNG 2 Project via subsidiary - Japan Arctic LNG B.V., a joint venture with **JOGMEC** – Japan Oil, Gas and Metals National Corporation.

#### 1.2.3 Project Phases and Time Frames

Since 2014, LLC "Arctic LNG 2" is the sole holder of subsoil license for the subsoil area of federal significance that includes the Salmanovskoye (Utrenneye) OGCF. The license which is valid till year 2120<sup>11</sup> permits exploration and production of hydrocarbons in the total area of 3409 km<sup>2</sup> within the territory of Tazovskiy Municipal District of YNAO and adjacent water area of the Ob Estuary of the Kara Sea (Figure 1.2), hereinafter - the Salmanovskiy (Utrenniy) license area. Property title to the land plots organised for the Project facilities within the subsoil license area belongs to LLC "Arctic LNG 2".

Summary of the Project development between year 2015 and present time is provided below.

**2015-2016** – *Preliminary front-end engineering design (pre-FEED)* for the LNG & SGC Plant with participation of KBR (US) and Kvaerner (Norway), which identified the mixed fluid cascade process by Linde (Germany) as preferred method of liquefaction of natural gas. At the same time, GBS (gravity-based structure) was first considered as an option for the Plant construction.

**2017** – A Russian-based limited liability company LNG Novaengineering LLC was established as a joint venture of the Company and its four partners – NIPIgaspererabotka, Linde AG, TechnipFMC and Saipem S.A. – with the main task of developing the FEED on the basis of data provided by the holders of technologies and engineering solutions. At the same time, Offshore Superfacility Construction center (OSCY, Kola Shipyard) was designed and established by subsidiary of NOVATEK - NOVATEK-Murmansk. Besides manufacturing gravity-based structures, this facility is also intended for building and maintenance of ships of various classes and functions.

**2018-2020** – Finalization of the design documentation and state expert review. Procurement of long lead items including gas turbine generators and compressors (Baker Hughes), heat exchangers (Linde), BOG compressors (Siemens), fuel gas booster compressors (Siemens). Final decision of participants of LLC "Arctic LNG 2" about the Project investments. Signing of the Engineering, Procurement and Construction Contract for the Project with TechnipFMC. Brief description of the Company's partners for the design and procurement of the main process elements is provided below.

**NIPIgaspererabotka JSC** is one of the oldest (established in 1972) and leading Russian centres for management of design development, procurement and construction in oil and gas sector. It joined SIBUR Holding since 1995 and actively participates in implementation of major projects in Russia, including Yamal LNG. The top priorities of the design institute include ensuring maximum energy efficiency and ecological safety of operations. NIPIgaspererabotka holds a certificate of compliance with the management system standard ISO 14001:2015 and requires that all engaged contractors adhere to the corporate standards in the sphere of environmental protection, occupational health and industrial safety.

<sup>&</sup>lt;sup>11</sup> Subsoil license C/IX 15745 H3 of 20.06.2014 for exploration and production of crude hydrocarbons in subsoil area of federal significance including Salmanovskoye (Utrenneye) oil, gas, and condensate field / Consolidated National Register of Subsoil Areas and Licenses. - Russian Federal Geological Fund of the Federal Agency for Mineral Resources. As amended by Addendum No.3 dated 29.03.2018.





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Os&a& Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

**Linde Group** registered in Germany as Linde AG counts its history since 1878 and is currently among the global leading manufacturers of gas for industrial and healthcare applications. The Group's process engineering division - Linde Engineering - is engaged in design development and construction of gas industry facilities throughout the globe. The Company holds patents for over 1000 unique technologies, and the list of its references includes over 4000 successful projects. Since 2012 the interests of Linde Engineering in Russia and CIS are represented by LLC Linde Engineering Rus which provides comprehensive engineering, construction and equipment supply solutions for petrochemical, metallurgy and pharmaceutical industry. NOVATEK and Linde AG have signed a license agreement for the natural gas liquefaction technology to be used for the Arctic LNG 2 Project.

**TechnipFMC Group** was established in France in 1958 and by present has become one of the global leaders in the sphere of development and application of construction technologies for offshore and onshore oil and gas facilities. The company is represented in 48 countries and employs 40 thousand of personnel. The interests of TechnipFMC in Russia are represented by JSC TECHNIP RUS which was established in 1989 and has gained a significant experience of design development for complex technical facilities in line with Russian and international standards.

**Saipem S.A.** was established in Italy in 1950 and became one of the pioneers in offshore drilling and pipeline transportation of hydrocarbons in Europe. The company provides services for process procurement, managing equipment supply, as well as project management and construction management services. It is active in three business areas - offshore and onshore production, and drilling, and has dozens of offices in different countries including Russia.

The berth structures (Figure 1.5, Picture 1) are among the first permanent facilities in the Salmanovskiy (Utrenniy) license area. As the Project evolves, they will be integrated into the combined system of process facilities of the Plant and Utrenniy Terminal (Figure 1.5, boxes 4 and 5).





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Osta® Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No



Figure 1.5: General view of the main Project facilities:

1 - berth (operational since 2016, will be integrated into the PORT structure); 2 - gas well site in the LA; 3 - temporary accommodation camp in the LA; 4 - GBS LNG & SGC Plant (model); 5 - one of the Plant process trains (model). Source of pictures and visualisation models - official website of NOVATEK

Further Project plans (Figure 1.6) provide for phased commissioning of the FIELD facilities, as soon as the PLANT process trains are available. It is planned that the Plant will become fully operational in 2026, with the three process trains running at full capacity.





												-		-	-																		
		20	19			2020			2021			2022			202	23			2024			2	025		Τ	2	2026		Τ	20			
	Q1	Q2	03 0	4	Q1 Q	2 Q3	Q4	01	Q2 Q3	Q4	01	Q2 0	Q3 Q4	L 01	0,2	Q3	Q4	01	Q2 (	Q3 Q4	0	L 02	03	Q4	Q	1 02	2 Q3	3 Q4	Q	1 02	Q3	Q4	01
Upstream Development				+																	+	_	-	-	+				+				
Drilling (213 wells)			· ·	+		· ·			· ·												$\top$				+				+				
Central Dome (89 wells)									·					1	• •						1			<u> </u>									
Southern Dome (92 wells)				$\neg$										-											+				+			- 1	
Northern Dome (32 wells)				+												P	lhace			Phare	,				Ľ.				+				
. , ,			<u> </u>			• •	·		•						compl			etion	· ·	comple	etion				Τ	•		Phase	-				
Gas condensate well nads																		+		- +							-	comp	letion	1			
Gas treatment plants	$\vdash$			+									Start-u	up of C	GTP 1						+				+		•		+			+	
CGTP 1												· · ·	+		· ·			$\vdash$	· ·		+				+				+			+	
CGTP 2	<del>                                      </del>			┓							-			-			1				+				+				+			-	
DOTE 3	<u> </u>			+			+			_	-			Stage	1 PGTP3		1	<u> </u>			+	-			+				Sta	age 2 PG	TP3	+	
Fair 5	+			+			+			-				-							+		•	•	+	•	•					+	
				+		· ·	+				$\vdash$	· · ·		+	· · ·			$\vdash$	· · ·	- ·	+				+				+			+	
GBS LNG Plant				_			_			_				+				$\vdash$			+				+				+			+	
FEED, Detailed Design				T			14	t modu	le is read	v for	-			+	Ready f	or feed	d gas	-in			+				+				+			$\rightarrow$	
		-					sai	ilaway	to NMP	,	low	ving start	date			_																	
Train 1		. –						Cón		e civil	1			1		ке	ady t	or sta	art-up		$\perp$				$\perp$				$\perp$			$\rightarrow$	
								wor	(		1	Mechar	nical ou	tfitting	9																		
												compre																					
Fabrication of GBS 1	<u> </u>			-					•		1		_	Cpmn	nissionn	ing .		<u> </u>			+-				+				+			$\rightarrow$	
Fabrication of Train 1 modules,																																	
Integration and Commissioning	<u> </u>			$\rightarrow$														<u> </u>			+				+				+				
Onshore facilities	<u> </u>			$\rightarrow$					10	fmod	ulo ic	ready fo		7						<u>-</u> -	-				+				_				
									sa	ilaway	to N	MP	י '	Towing	g start da	ate	R	eady	tor feed	gas-in													
Train 2											+			-		+		+	∍∔	Ready f	for st	tart-up											
				+							work	ipletion o k	of Civil	N	lechanic	al out	tfittin	9			$\top$				$\top$				$\top$				
														<sup>°</sup>	ompletio	n		Comm	nissionni	na													
Fabrication of GBS 2				+							-		•	Π.	<u> </u>	_			<u> </u>		+				+				+			-+	
Fabrication of Train 2 modules,																																	
Integration and Commissioning				+		· · ·	_		•								_				+				+				+			-+	
Onshore facilities	<u> </u>			+			- 1				-			-				<u> </u>		Tow	ina s	tart d	ate	F	Read	y for fe	eed g	as-in	+			$\rightarrow$	
LNG Train 3																				104	- e-P	A are a	+		+ -	•	Read	dy for s	start-	-up			
				+										+				Con	pietion o	of Civil		Mecha	nical	outfitti	ina				+				
																			<b>`</b>	-		compl	etion	C			_						
Fabrication of GBS 3				+			-+							-				-			-		_	Com	npis	sionnin	g		+			$\rightarrow$	
Fabrication of Train 3 modules,							ļ,														$\rightarrow$				Т								
Integration and Commissioning				+			-+														-				+				+			-+	
Onshore facilities				+			-+						•	-				-		•	+								+			-+	
				+			-+				<u> </u>			+				<u> </u>			-				+				+			-+	
Terminal	_							_			<u> </u>			_							+				+				+-			-+	
Quavside (Section 1 and Section 2 with																																	
shore protection, Section 2)																																	
Multi-functional guay				1				<u> </u>													$\top$				$\top$				$\top$			$\neg$	
BIMS, ice barriers				ţ				-	•		1	• •	•	$\Rightarrow$				1							$\top$							$\neg$	
Dredging							$\neg$							$\top$	· ·						$\top$				$\top$				$\top$			$\neg$	
			_																						_								

Figure 1.6: Arctic LNG 2 Project implementation time frames

(Source: Project Information Memorandum. - ARCTIC LNG 2 LLC, February 2020)







Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Ošcàť Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

#### 1.2.4 LNG and SGC marketing plans

LLC "Arctic LNG 2" holds hydrocarbons export license No. 262 Ru 142 000 000 03. About 80% of LNG output will be shipped by the eastern corridor of the Northern Sea Route via the marine transshipment complex (MTC) in Bechevinskaya Bay (Kamchatka Territory), and the rest 20% - to European region via MTC in Ura Bay (Murmansk Region, refer to Figure 1.7). It is planned that all LNG product will be supplied solely to European consumers. Both MTCs will be commissioned in 2022 and operated by subsidiaries of NOVATEK.

Transportation of LNG and SGC to the transshipment complexes will be arranged using carriers of ice class Arc-7 fit for unassisted navigation in first-year Arctic ice with thickness up to 1.4 m during winter-spring navigation, and up to 1.7 m during summer-autumn navigation period, with occasional ramming of isthmuses. The same vessels can navigate in close first-year ice with thickness up to 2 m during winter-spring period, and up to 3.2 m in summer-autumn, in icebreaker track. Procurement or building of the above vessels are not parts of the Project. Cristophe de Margerie vessel - the lead ship of Yamalmax class (ice class Arc-7, draught up to 11.78 m) which is already used by the Yamal LNG Project is adopted as prototype for the design of Utrenniy Terminal and for the Project marine operations.

#### 1.3 Ramboll – Project's Environmental and Social Consultant

Ramboll, founded in 1945, is the largest Nordic holding in the field of engineering, design, construction and related consulting. In 2014 Ramboll Group A/S merged with a global leading environmental consultancy - ENVIRON Corp. Ramboll Environment and Health was established as a business line responsible inter alia for environmental consultancy services, including assessment of environmental and social impacts (ESIA) of proposed or existing operations.

One of the world's leading environmental and health consultancies for industry and construction sector, Ramboll is trusted by clients to manage their most challenging environmental, health and social issues. Ramboll has an impeccable reputation in its professional sphere, relies on the cutting edge research and development experience, devises innovative approaches to assessment of environmental and social impacts of construction projects and a wide range of producing and processing industries. The independent scienceoriented approach of Ramboll guarantees integrity and comprehensiveness of the prepared assessments and recommendations.

Ramboll's network of experts includes more than 17,000 experts across 300 offices in 35 countries around the world; over 3 thousand are engaged in environmental consulting. Russia is among the most important countries of Ramboll operations where the company is represented by Ramboll CIS LLC.

The 15 experts from the Russian office of Ramboll who are involved in the current ESHIA process are mostly the same who prepared the ESHIA materials in 2018 and took part in their discussion with the Company and stakeholders. Overall leadership of the works is held by Dr I.N. Senchenya - one of the Russia's leading experts in the sphere of environmental and social support for major petroleum and infrastructure projects, particularly in the Arctic Zone.

More details are available at the official website of Ramboll: http://www.ramboll.com.





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Oscbr Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No



Figure 1.7: General scheme of the cargo transport routes by sea for the Arctic LNG 2 Project

Information on the location of Kola Shipyard and marine transhipment complexes is sourced from the official website of NOVATEK and other open data sources, as well as legal acts of the Russian Federation

#### 1.4 Purpose and Objectives of ESHIA

In accordance with the Equator Principles, OECD Common Approaches, and the World Bank guiding principles, the environmental and social impact assessment shall be based on the Performance Standards (PSs) of the International Finance Corporation (IFC). The first Performance Standard (PS1) - Assessment and Management of Environmental and Social Risks and Impacts establishes the following objectives:

• To identify and evaluate environmental and social risks and impacts of the project;





- To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment;
- To promote improved environmental and social performance of clients through the effective use of management systems;
- To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately;
- To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.

The presented ESHIA materials have been prepared for the purpose of identification and assessment of all types of potential environmental and social impacts of the planned activity, development of measures to prevent the negative impacts or minimise them to the acceptable level in line with the Russian Law, international best practice, and the applicable requirements of the Equator Principles Financial Institutions (*EPFI*).

The following main processes are included in the ESHIA procedure:

- Characterization of the proposed operations as a source of environmental, social and health impacts;
- Characterization of the current environmental and social situation on the basis of the available information survey materials, studies, file materials, state statistics;
- Identification of environmental, social and health impacts of the proposed operations;
- Development of prevention, minimization and remediation measures to address the negative environmental, social and health impacts of the proposed operations;
- Development of efficient mechanisms to control the environmental and social aspects at all stages of the Plant Project implementation;
- Development of proposals for monitoring of environmental and social situation, and of efficiency of the adopted environmental and social measures at all stages of the Project implementation.

Originally (in 2018) the Consultant conducted the assessment for the GBS LNG & SGC Plant as one of the possible options for the development of the Salmanovskoye (Utrenneye) OGCF (as opposed to pipeline transportation of hydrocarbons to Sabetta, or transportation to the elements of the gas transmission system of GAZPROM). In this document, the focus of the impact assessment is the Arctic LNG 2 Project which, besides the Plan and the LNG & SGC Terminal, also includes the Salmanovskoye (Utrenneye) OGCF Facilities Setup. The spatial and temporal scope of ESHIA 2018 largely match the current configuration of the Project, as the Terminal and major part of the Field facilities were considered as associated facilities, and the social area of influence and stakeholder engagement process covered a larger territory in Tazovskiy Municipal District.

The current ESHIA will examine the following most significant changes in the Project that took place between June 2018 and May 2020:

- Completion of design development for the main facilities of the PLANT, PORT and FIELD, including clarification of important parameters of their impact on the environment (emissions to air; harmful physical impacts; use of land, water and energy resources; composition and quantity of wastes; wastewater management schemes, etc.);
- Changes in certain Project parameters of environmental significance (boundaries of the license area, location of specific facilities waste disposal site, hydraulic structures, temporary site facilities, etc.);
- Establishing of the sanitary protection zone;
- Clarification of status of heritage sites within the Project area of influence;
- Clarification of planned designated nature conservation areas and fishery protection zones in the territory of Tazovskiy Municipal District of YNAO and water area of the Ob Estuary, respectively;
- Further engineering surveys and operational environmental monitoring for in the territory of the Salmanovskiy (Utrenniy) LA and water areas within the Ob Estuary affected by the Project;
- Modelling of the most probable emergency situations related to location and operation of hazardous chemical facilities of the Plant and Terminal;





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Osca# Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

 Clarification of parameters of the resource base for the Arctic LNG 2 Project, in relation to its future enhancement prospects and implementation of other projects by subsidiaries and joint ventures of NOVATEK in the territory of YNAO.

Outputs of environmental and social review of construction and operation effects of the Plant and associated facilities (that the Consultant conducted in 2018) indicate that, after implementation of the declared obligations of the Company, as well as environmental and social measures recommended by the Consultant, the planned activities will not cause any significant irreversible impact on the environmental, social and health situation that would be felt beyond the boundaries of the territories and water areas immediately used by the Project, and associated restricted-use territories.

Considering all the above, the impact assessment that the Consultant prepared in 2018 can be considered as a preliminary ESHIA for the Project, and the respective stakeholder consultations – as a stage of disclosure and discussion of the Project impact assessment, to be continued during the current ESHIA 2020.

The first stage of this ESHIA is scoping and preliminary consultations with stakeholders which were held in May 2020. As a result of those activities, two documents have been prepared and approved by the Company and other stakeholders – the Scoping Report (SR) and the Stakeholder Engagement Plan (SEP) – which formed the basis for development of the impact assessment presented herein.

#### 1.5 Referenced sources

The following documents have been provided by the Company and reviewed during the impact assessment process (as by 20 May 2020):

- Declaration of Intent and Project Information Memorandum;
- Engineering survey materials, Russian EIA and design documentation for the permanent facilities of the Project, and for the Utrenniy Airport;
- Stakeholder engagement documentation of the Project;
- Land use and urban development documentation for the Project facilities;
- Documentation on the Project approvals in the sphere of nature use and resources provision;
- Results of Project operational environmental monitoring and control (reports from 2018 and 2019);
- Documentation of the companies involved in the Project: policies, strategies, corporate standards).

Along with the above materials, the review also covered publications on the Project and the area its implementation in mass media, scientific publications, official statistics, presentations and other open sources. Further social information was requested from the Municipal Administration as appropriate. Strategies and plans at the regional and national level have been reviewed, as well as those concerning the Arctic region in general.

#### **1.6 Structure of ESHIA materials**

In order to provide clear presentation of the baseline situation, methods and results of the assessment, including the forecasts and recommendations for selection of appropriate environmental and social mitigation measures, this Report is structured as follows:

#### Chapter 1 Introduction

- **Chapter 2** Legal Environment of the Project Implementation. This chapter provides an overview of the main regional, national and international policy and legal framework within which the Arctic LNG 2 Project is being developed. Legal framework in the Russian Federation and Yamal-Nenets Autonomous Okrug is considered, together with an overview of applicable EPFI requirements.
- **Chapter 3 ESHIA Materials Development: Key Methods and Procedures.** This chapter provides an overview of the overall process of environmental and social impact assessment. It further addresses: definitions of key terms; identification of potential environmental and social impacts (through consultation and scoping process); description of the criteria used to determine the significance of impacts for various environmental and social topics; and mitigation measures based on results of the assessed magnitude of each impact.





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Ošcā Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

- **Chapter 4 Stakeholder Engagement.** The chapter provides identification and categorization of stakeholders, as well as detailed description of the engagement activities with participation of the Company and Consultant.
- **Chapter 5 Characteristics of Planned Activity.** This chapter contains process description of various components of the Project, including the Field facilities, GBS LNG & SGC Plant, the Terminal (Port), technical parameters of their location, associated activities, and supply chain for the Project.
- **Chapter 6 Project Alternatives.** The chapter provides a comparative review of the implementation options which have been considered by the Company and can be adopted in the future, including the "zero alternative", i.e. situation "without the project", as well as substantiation of the preferred solutions.
- **Chapter 7 Environmental Baseline.** The chapter discusses historical studies of onshore and offshore areas in the designed area of the Project facilities, closely reviews current state of components of the environment air, surface water, vegetation, soil, fauna, and geological conditions.
- **Chapter 8 Social Baseline.** This chapter describes the key parameters of socio-economic environment of the Project implementation, including demography, land use and other activities of the permanent population and nomadic communities, situation in the labour market and employment, transport and utilities infrastructure, life quality of the local communities.
- **Chapter 9 Environmental Impact Assessment.** This chapter presents the assessment of potential environmental impacts (specifically for each of the main phases of the life cycle), including identification of comprehensive prevention, minimization and remediation measures, and proposals for the operational environmental monitoring activities.
- **Chapter 10 Social and Health Impact Assessment.** This chapter is structured to consistently describe the process of assessment of potential impact at various stages of the Project in relation to the following social aspects: community health and safety; economy and employment; labour relations; immigration; behaviour of security personnel; land use (including customary activities); heritage.
- **Chapter 11 Decommissioning Impacts**. The main requirements to decommissioning of the designed facilities and environmental remedy measures to be implemented after demolition of the Project buildings and structures are addressed in this chapter.
- **Chapter 12** Transboundary Impacts. Assessment of potential transboundary effects of the Project.
- **Chapter 13 Cumulative Impacts.** This chapter considers potential cumulative effects of the planned activity which are recognised by experts and stakeholders as being significant, in combination with other existing, planned and anticipated future impacts of third party activities.
- **Chapter 14 Environmental and Social Management.** This chapter describes the approaches to environmental and social management at all stages of the Project life cycle. The review covers the existing environmental, health and safety system, the Company's requirements to contractors, as well as audit and operational monitoring practices.





Ошибка! Используйте вкладку "Главная" для применения Heading 1;H1;~SectionHeading;Head 1wsa;Outline1;1 ghost;g;Ošcātī Faber 1;Heading 1 TXC;My Heading 1;CES Heading 1;Kopf Firma;Chapter Heading;L1;h1;(Alt+1);l1;Header1;level 1;Chapter;Chapter head;CH;. (1.0);Do No

**Chapter 15 Conclusions and Recommendations.** This chapter provides summary of the outputs of assessment and integrated comparative review of the inputs significance; general conclusion of the ESHIA process is drawn and approach to further use of the ESHIA materials is discussed in this chapter.





## 2. LEGAL FRAMEWORK FOR PROJECT IMPLEMENTATION

#### 2.1 Introduction

This chapter provides an overview of national and international environmental, social, health, and safety legislation, which requirements shall be taken into consideration in the process of development and implementation of the Arctic LNG 2 Project and implementation of the ESHIA procedure.

All specific requirements applicable to the implementation of the planned activities and defining the process of impact assessment are described in detail in the relevant Technical Chapters of this ESHIA report. More details on the applicable standards are provided in the specially prepared document on "the Project Environmental and Social Standards" (Project Standards), which is given in Annex 1 to the ESHIA report.

#### 2.2 National legislation

In the Russian Federation (RF), requirements for the use and protection of natural resources, natural and social environment, health and safety, working and leisure conditions are regulated in depth at federal and regional levels. The structure of the relevant legislation can be outlined as follows (from general to more specific requirements):

- The Constitution of the Russian Federation;
- International treaties, conventions, agreements, and other international legal documents ratified by the Russian Federation;
- Federal laws;
- Executive Orders and Decrees of the President of the Russian Federation, Russian Federation Government Resolutions;
- Orders of federal executive authorities (Ministries, Agencies, Services);
- Laws of the Subjects of the Russian Federation;
- Resolutions of the chief executives of the Subjects of the Russian Federation;
- Laws of the local authorities;
- System of technical specifications and national Sanitary epidemiological Norms and Regulations (SanPiN), Hygiene Standards (GN), State (GOST) and Industry-specific Standards (OST), Civil Engineering Norms and Regulations (SNiP), Code of Rules (SP), and Reference Documents (RD).
- Best Available Techniques (BAT) Reference Documents ("Information and Technical" reference documents ITS).

#### 2.2.1 Federal legislation

2.2.1.1 General requirements for environment and public health protection

The Key principles of the Russian environmental policy are set out in the Constitution of the Russian Federation (dated 12.12.1993), the "Principles of State policy in the area of environmental development in the Russian Federation for the period up to 2030" (approved by the President of the Russian Federation on April 30, 2012), the Federal Laws dated 10.01.2002 No. 7-FZ "On Environmental Protection", dated 30.03.1999 No. 52-FZ "On the Sanitary and Epidemiological Welfare of the Population", and dated 23.11.1995 No. 174-FZ "On Environmental Review".

The Constitution of the Russian Federation is the main law, that enshrines right to a favourable environment, reliable information on the state of the environment and compensation for damage caused to his/her health or property by violations of environmental laws" (Article 42). The Constitution also states that the natural resources shall be utilized and protected in the Russian Federation as the basis of life and activity of the peoples dwelling in the corresponding territories (Article 9) and obliges to preserve nature and environment (Article 58).

The strategic objective of the *State policy in the field of environmental development* is achievement of the socio-economic goals for environmentally oriented economic growth, preservation of the environment, biodiversity, and natural resources to meet the needs of present and future generations, the realization of the right of everyone to a favourable environment, strengthening of the rule of law in the area of environmental protection and environmental safety." (paragraph 7 of the Principles of State policy in the area of environmental development in the Russian Federation for the period up to 2030).





The Federal Law dated 10.01.2002 No. 7-FZ "On Environmental Protection" lays down a legal foundation for the state policy in the field of environmental protection, governs relations in the field of interaction of the society and the nature occurring in economic and other activities, and also establishes:

- the basic principles of environmental protection, including "the use of natural wealth for a pay and the reimbursement of a harm inflicted to the environment" (Article 3);
- the right of citizens, public and other non-commercial associations to put forward proposals for a
  public ecological expert examination and take part in the conduct thereof in the established
  manner; provide assistance to governmental bodies of the Russian Federation, governmental
  bodies of Russian regions, local government bodies in the resolution of environmental protection
  issues (Articles 11 and 12);
- the requirement to conduct environmental impact assessment in respect of a planned economic or another activity capable of exerting a direct or indirect effect on the environment (Article 32);
- general provisions governing environmental protection in case of determination of location, design, construction, and operation of facilities intended for economic activities (Article 34);
- requirements for facilities intended for processing, transportation, storage, and selling of oil, gas, and petroleum/gas products (Article 46);
- obligation of legal entities and natural persons, who have inflicted damage to the environment by
  polluting, depleting, damaging, destroying it, by irrational use of natural resources, degrading and
  destroying natural ecological systems, natural complexes, and natural landscapes, and another
  violation of the environmental protection legislation, to compensate it in full (Article 77).

Federal Law dated 30.03.1999 No. 52-FZ "On the sanitary and epidemiological welfare of the population" regulates relations in the field of public health protection. In particular, legal entities are obliged to ensure the safety of performed works and rendered services for human health, exercise production control over the observance of sanitary and counter-epidemic (preventive) measures during the performance of work and the rendering of services, inform the population, local self-government bodies, the bodies engaged in the state sanitary and epidemiological supervision in a timely manner about emergency conditions, production stoppages and breaches of technological processes endangering the sanitary and epidemiological welfare of the population (Article 11).

The Federal Law dated 23.11.1995 No. 174-FZ "On Environmental Review" regulates relations in the field of environmental expert review. The law is aimed at the realization of the constitutional right of citizens to a favorable environment through preventing the adverse environmental impacts associated with economic and other activities.

#### 2.2.1.2 Arctic Zone of the Russian Federation

According to the Executive Orders of the President of the Russian Federation dated 05.03.2020 No. 164 "On the Fundamental Principles of the Russian Federation's State Policy in the Arctic until the year 2035" and dated 02.05.2014 No. 296 "On the Land Territories of the Arctic Zone of the Russian Federation", the territory of the YNAO, its adjacent inland waters, territorial sea, exclusive economic zone, and the Arctic shelf of Russia are included in the Arctic Zone of the Russian Federation (AZRF).

Among the principal aims and main lines of the governmental policy in the AZRF, the emphasis is put on environmental protection and safety and protection of traditional habitats and lifestyles of the Low-Numbered Peoples. The core objectives in the field of environmental protection and safety are:

- to develop a scientifically sound network of specially protected natural areas and water protection zones in order to preserve ecosystems and ensure their adaptation to climate change;
- to ensure preservation of Arctic flora and fauna and protection of rare and endangered species of animals, plants, and other organisms;
- to continue the implementation of actions aimed at elimination of the accumulated environmental damage;
- to improve environmental monitoring systems;
- to implement the best available techniques and ensure minimization of air emissions and pollution discharges to water bodies and reduction of any other adverse environmental impacts from economic or other activities;
- to ensure sound and consistent use of natural resources, also in the areas of traditional residence and traditional economic activities of the low-numbered peoples;
- to develop integrated waste management system for wastes of all classes of hazard and construct modern environmentally sound waste treatment complexes;





• to implement a set of measures to prevent noxious substances, agents of infectious diseases, and radioactive substances from entering the AZRF.

The development strategy of the Arctic zone of the Russian Federation and national security for the period up to 2020 (approved by the President of the Russian Federation on February 20, 2013) sets out priorities for the sustainable development and key measures to ensure environmental safety within the AZRF. At the time of writing the report, the preparation of a draft development strategy of the Arctic zone for the period up to 2035 has been completed, but the draft document has not yet been made available for review. It is also planned, that the new Arctic strategy is to include the new Federal law on the special economic regime of the Arctic zone.

In accordance with the *Maritime Doctrine of the Russian Federation (approved by the President of the Russian Federation on July 26, 2015)* the protection and preservation of the maritime environment is achieved by:

- Monitoring of the state of the marine environment and implementation of the comprehensive measures to prevent and eliminate the consequences of its pollution;
- Implementation of measures to prevent oil spills during its exploration, production and transportation; construction and modernization of port receiving facilities to collect and process residues and wastes.

The Arctic region is a point of application of political and legal efforts of such organization as the Arctic Council<sup>12</sup>. In 2014, following the procedures of the Convention on Biological Diversity, ratified by the Russian Federation (for more details, see Section 2.3 and Appendix 1 "Project Standards Document") with the support of the Arctic Council Working Group on the Conservation of Arctic Flora and Fauna (CAFF), the Gulf of Ob and the Yenisei Gulf, among 11 Arctic ecosystems, have been included in the list of Ecologically or Biologically Significant Marine Areas (EBSAs), which require appropriate measures for their conservation and sustainable use to be taken in compliance with international law and national legislation.

The list of flora and fauna species serving as indicators of stability of marine ecosystems in the AZRF was approved by the *Resolution of the RF Ministry of Natural Resources dated 22.09.2015 No. 25-r* "On approval of the list of flora and fauna species serving as indicators of stability of marine ecosystems in the Arctic zone of the Russian Federation".

2.2.1.3 System of Environmental Permits and EIA requirements

In order to prepare project design documentation for construction or upgrade of capital facilities, there shall be engineering (including environmental engineering) surveys conducted in such a way as to ensure consideration of the entire area of possible influence of the planned activities (Article 47 of the Urban Planning Code).

Project design documentation for capital construction projects and the results of engineering survey conducted in the course of its preparation in accordance with *the Urban Planning Code of the Russian Federation dated 29.12.2004 No. 190-FZ* are subject to State expert review, which is to assess their compliance with the requirements of technical regulations, including sanitary, epidemiological, and environmental requirements, state requirements for protection of cultural heritage sites, requirements for fire and industrial safety, and other safety requirements. The State expert review is carried out by the Glavgosexpertiza of Russia.

Article 47 of the Urban Planning Code specifies capital facilities, for which State expert review of the project design documentation and engineering survey results is mandatory. For the Project and its associated facilities/activities, these includes:

- facilities, construction / modernization of which is planned to be implemented in internal waters;
- capital air transportation infrastructure facilities;
- highly hazardous, technically sophisticated, and unique facilities (including class I and II hydraulic structures, port hydraulic structures related to seaport infrastructure, hazardous industrial facilities subject to registration in the state register);
- waste decontamination and disposal facilities.

<sup>&</sup>lt;sup>12</sup> In 1996, the Ottawa Declaration formally established the Arctic Council as a high-level intergovernmental forum to provide a means for promoting cooperation, coordination, and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues; in particular, issues of sustainable development and environmental protection in the Arctic. Its Founder States were: Canada, the Kingdom of Denmark, Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America.




*RF* Government Resolution dated 16.02.2008 No. 87 "On the structure of Project design documentation and requirements to its content" establishes requirements to include a special Section entitled "List of Environmental Protection Measures" containing the **results of Environmental Impact Assessment** (**EIA**) and proposed mitigation measures, as well as environmental monitoring and control program in the project design documentation. The required approvals and references from various environmental agencies and other executive authorities are attached as Supplementary Materials. The implementation of a project is possible only after the said documentation has been approved by the State Environmental Expert Review Board.

According to the classification established by the *RF Government Resolution dated 28.09.2015 No. 1029* "On approval of criteria for classification of facilities causing adverse environmental impacts as operations of category I, II, III, and IV", enterprises engaged in crude oil and natural gas production, including natural gas processing, are classified as category I facilities, which cause significant adverse environmental impact and relate to a field of application of BAT. Gas and gas products transportation via pipelines using main pipelines is classified as category II activity. The corresponding category is assigned to facility exerting adverse environmental impact, when it is entered into the State Register of facilities with adverse environmental impact (Article 4.2 of the Federal Law dated 10.01.2002 No. 7-FZ "On Environmental Protection").

Entities performing operations at facilities related to a field of application of BAT and not included into the list of category I facilities <sup>13</sup>having an adverse impact on the environment that contribute at least 60 percent to total emissions and discharges of pollutants in the Russian Federation (*approved by the Order of the RF Ministry of Natural Resources dated 18.04.2018 No. 154 "On approval of the list of category I facilities having an adverse impact on the environment that contribute at least 60 percent to total emissions and discharges of pollutants in the Russian Federation"*, shall obtain an Integrated Environmental Permit by January 1, 2025.

In accordance with paragraph 7 of Article 11 of the *Federal Law dated 23.11.1995 No. 174-FZ* "*On Environmental Review*", and the Federal Law No. 155-FZ of 31.07.1998 "On internal waters, territorial sea and contiguous zone of the Russian Federation", economic and other activities of all types can be implemented in internal waters and territorial sea only if there is a positive conclusion of the State Environmental Expert Review Board in place. In accordance with subparagraph 7.5 of Article 11 of 174-FZ, the project design documentation for capital facilities, which are classified as category I facilities that have a negative impact on the environment in compliance environmental legislation, is also subject to the State environmental expert review. In accordance with paragraph 7.7 of 174-FZ, introduced on 02.08.2019, the project design documentation for fueling stations, fuel and lubricants stores, in case they are planned to be constructed within the boundaries of water protection zones at port sites, inland waterways infrastructure are also subject to the State environmental expert review.

In compliance with Article 14 of the 174-FZ, the documentation subject to the State environmental expert review shall contain **materials of the Environmental Impact Assessment**. Legal requirements for EIA procedure in Russia are set forth in the *Regulation "On the Environmental Impact Assessment of planned economic and other activities in the Russian Federation" approved by the Order of the State Ecology Committee of the Russian Federation (Goskomekologia) dated 16.05.2000 No. 372 insofar as it does not conflict with the current legislation of the Russian Federation.* 

According to the Regulation, the Russian EIA process consists of three main stages:

- Stage 1: preliminary stage Notification, Declaration of intent, Terms of reference (TOR) for an EIA;
- Stage 2: conducting EIA investigations; preparing preliminary EIA materials, conducting public hearings to learn public opinion;
- Stage 3: Preparing final version of materials on Environmental Impact Assessment, taking into account the results of public consultations conducted.

The following components are to be included in Environmental Impact Assessment materials:

- General information;
- Explanatory note on supporting documentation;
- The aim and justification of the planned economic and other activities;

<sup>&</sup>lt;sup>13</sup> This list includes up to 300 facilities causing an adverse environmental impact that contribute at least 60 percent to total emissions and discharges of pollutants in the Russian Federation. Such facilities must address Rosprirodnadzor in order to apply for the Integrated Environmental Permit starting from January 1, 2019 and no later than December 31, 2022.





- Description of possible alternatives of the proposed economic and other activities, including alternative selected and "No-project alternative" ("Zero" alternative);
- Description of possible types of environmental impact of the proposed economic and other activities associated with every alternative (if being implemented);
- Description of environment that may be affected by the planned economic and other activities as a result of its implementation (for each alternative);
- Environmental Impact Assessment of the proposed economic and other activities associated with every alternative (if being implemented);
- Measures to prevent and / or mitigate possible adverse impact of the planned economic and other activities;
- Uncertainties in identification of environmental impact of economic and other activities found in the course of assessment;
- Summary of monitoring programmes and post-project analysis;
- Rationale for the selection of a proposed alternative for planned economic and other activities among all alternatives under consideration;
- Protocol of public hearings conducted during surveys and preparation of materials on assessment of environmental impact of the proposed economic and other activities;

The EIA process includes consultations with state authorities and public involvement. In general, the Russian EIA procedure is in large part similar to the procedures recommended by International Financial Institutions, including the World Bank Group. However, there are some differences in the scope of survey, methodology, and approaches between the two procedures (Table 2.1).

#### **International Requirements Russian Requirements** - assessment of all aspects of impacts taking into account - assessment of compliance of planned activities with sensitivity of the receptors; Russian requirements using national standards and methodologies, including a standardized procedure for - assessment of impacts for the whole project taking into calculating damages; consideration its associated facilities and activities; - impact assessment is required only for the main types - cumulative impact assessment; of impact; - transboundary impact assessment; - it is permissible to prepare separate EIA documents - climate impact assessment and assessment of impacts on for different facilities of one project. a project deriving from the effects of climate change; - detailed assessment of impacts on biodiversity; - advanced social survey and social impact assessment; - enhanced stakeholder engagement; "List of Environmental Protection The ESIA report is necessary to identify significant impacts The Section and develop respective impact mitigation measures and Measures", which includes the EIA results and impact required to obtain external financing (in case it is decided mitigation measures, is developed as part of the project to attract foreign investment) design documentation for its subsequent approval and obtaining license to operate.

#### Table 2.1: Comparison of international and national requirements for EIA/ESHIA

The text part of the Section on environmental protection measures for capital production facilities shall contain:

- results of the Environmental Impact Assessment of the capital facility;
- list of measures to prevent and (or) mitigate potential negative environmental impact of planned economic activities and on rational use of natural resources for the period of construction and operation of the capital facility, which includes:
  - results of calculations of ground level pollutant concentrations, analysis and proposals for maximum permissible and temporarily agreed emissions.
  - justification of solutions for wastewater treatment and disposal of neutralized substances, for prevention of emergency wastewater discharges;
  - $\circ$  ambient air protection measures;
  - o measures related to recirculation water supply for industrial facilities;





- measures aimed at protection and rational use of land resources and soil cover, including measures for reclamation of disturbed or contaminated land and soil cover;
- o measures for collection, use, treatment, transportation, and disposal of hazardous waste;
- measures aimed at protection of subsoil resources for production facilities;
- o measures aimed at protection of wildlife and habitats.
- measures to minimise the occurrence of potential emergencies at the capital facilities and mitigate their impact on the ecosystem of the region;
- measures, technical solutions and facilities ensuring the rational use and protection of water bodies, as well as the conservation of aquatic bioresources and their habitats, including conditions for their reproduction, feeding, migration routes;
- the program of operational environmental control (industrial environmental monitoring) over the nature of changes in all components of the ecosystem during the construction and operation of the facility, as well as in case of emergencies;
- the list and calculation of costs for implementation of environmental measures and compensation payments;

The State environmental expert review is conducted by the Federal Service for Supervision of Natural Resource Management (Rosprirodnadzor) and the documentation submitted for review shall contain, among other things, an approval issued by the Federal Agency for Fisheries (Rosrybolovstvo). Requirements for review of request and approval of project design documentation by the Federal Agency for Fisheries are set forth in: *the Federal Law dated 20.12.2004 No. 166-FZ "On Fishing and Preservation of Aquatic Biological Resources"* (Article 50) and *the RF Government Decree dated 30.04.2013 No. 384 "On the endorsement by the Federal Agency for Fisheries of construction and modernisation of capital construction facilities, introduction of new technological processes, and implementation other types of activities affecting aquatic biological resources and their habitats".* 

After the positive conclusions of the State Environmental Expert Review and State expert review of the project design documentation, the Company submits all the documents required for issuing a construction permit, which establishes the compliance of the project design documentation with the requirements of the relevant territorial planning system. The procedure for obtaining a construction permit is regulated by Article 51 of the RF Urban Planning Code.

### An Integrated Environmental Permit

A step-by-step transition of category I facilities to the Integrated Environmental Permit (IEP) system has started in the Russian Federation since 2019.

In compliance with Article 31.1 of the 7-FZ, for new category I facilities that have a negative impact on the environment, it is required to submit an application to the Federal Service for Supervision of Natural Resource Management (Rosprirodnadzor) to obtain an Integrated Environmental Permit no later than two months prior to the commissioning of the constructed facility. An IEP is issued for the seven-year period.

An Integrated Environmental Permit will contain:

- technological standards;
- limit values for emissions, discharges of highly noxious substances, carcinogenic or mutagenic substances (substances of hazard class I, II), in case such substances are present in emissions and discharges;
- standards for permissible physical impacts;
- standards for waste generation and limits for their disposal;
- requirements for production and consumption waste management;
- agreed program of Operational Environmental Control Program.
- validity period of an Integrated Environmental Permit.

#### 2.2.1.4 Application of the Best Available Techniques (BAT)

In accordance with legal requirements, an IEP can be obtained only if BAT are implemented at the facility.

Among the sector-specific BAT reference documents (ITS), the following documents may be considered as directly applicable to the Project:

- ITS 29-2017 Natural gas production;
- ITS 50-2017 Processing of natural and accompanying gas.





In line with ITS 29-2017, BAT for LNG production involve implementation of technological solutions ensuring reduction of air pollutant emissions, including:

- the use of isothermal tanks for initial storage of LNG providing for removal and use of boil-off gas as fuel;
- the use of flare units, that allow to exclude emissions of non-ignited hydrocarbon gas into the ambient air.

In accordance with ITS 50-2017, BAT involve gas condensate stabilization technology providing for the use of combined condensate stabilization units (separation and fractionation), multistage degassing and stabilization in fractionation columns.

Application of this technology allows to achieve the air pollutant emission indicators provided in Table 2.2 in the course of gas condensate stabilization process.

Polluting substance	Specific emission value, kg/t of product (year)
Nitrogen oxides (in NO <sub>2</sub> equivalent)	≤0.06
Carbon monoxide (CO)	≤0.2
Methane (CH <sub>4</sub> )	≤0.02
Sulphur dioxide (SO <sub>2</sub> )	≤0.001
Saturated hydrocarbons (C1-C5) (except methane)	≤0.02

Table 2.2: BAT Technological indicators applicable to gas condensate stabilization

Besides the sector-specific reference documents, there is a whole range of cross-sectoral BAT reference documents, the requirements of which are also partially applicable to the Project. In particular, these relate to emissions and discharges treatment, waste management processes, storage, implementation of environmental management and energy management systems:

- ITS 38-2017 Fuel combustion on large plants for production of energy;
- ITS 8-2015 Wastewater treatment in the production of products (goods), performance of works and provision of services at large enterprises;
- ITS 15-2016 Recycling and disposal of waste (except for thermal disposal of waste (waste incineration));
- ITS 9-2015 Thermal waste treatment (waste incineration);
- ITS 22-2016 Purification of atmospheric discharge (pollutants) in manufacturing of products (goods), as well as performing works and providing services at large enterprises;
- ITS 22.1-2016 General principles of industrial environmental monitoring and its metrological support;
- ITS 46-2019 Reduction of pollution emissions and discharges from storage of products (goods);
- ITS 48-2017 Increasing energy efficiency of economic and/or other activities.

The formulations of the most requirements of the cross-sectoral reference documents are general in nature and substantially duplicate the existing requirements of the RF environmental law and Company's commitments enshrined in policies, corporate standards, and other internal documents. However, certain BAT requirements are quite specific and shall be considered during selection of process technologies and subsequent development of the relevant design solutions for the Project.

### 2.2.1.5 Air Protection

*Federal Law dated 04.05.1999 No. 96-FZ "On Air Protection"* establishes a legal framework in ambient air protection, including requirements concerning air protection measures to be taken by those engaged in economic activity of any kind.

In order to protect ambient air in residential areas, enterprises (or their groups) are required to establish Sanitary Protection Zones (SPZ) around their sites. The standard size of SPZs is determined on the basis of air pollutant dispersion modeling and in line with the industry sanitation classification.

The SPZ is established in compliance with the Government Decree dated 03.03.2018 No. 222 "On the Approval of Rules of Allocation of Sanitary Protection Zones and Use of Land Plots within the Boundaries of Sanitary Protection Zones".





In accordance with paragraph 6 of the Rules, the developer is to file an application on approval of SPZ in the process of project construction planning no later than 30 days prior to application for construction permit being submitted to the Rospotrebnadzor.

It is forbidden to use the land plots situated within the SPZ boundaries for construction of residential real estate, educational and health care facilities, etc.

Within the one-year period from the date of commissioning of constructed facility, for which the SPZ is set up, its owner shall ensure, that there are measurements (investigations) of air quality parameters and levels of physical and (or) biological impact on ambient air around the perimeter of the facility conducted, and, in case it is found necessary to introduce changes to the SPZ set up on the basis of estimated levels of chemical, physical, and (or) biological impacts of the facility on the living environment, the owner is to file an application on approval of such changes in the SPZ to the Authorized body.

In line with the sanitation classification of industrial facilities in accordance with SanPiN 2.2.1 / 2.1.1.1200-03 "Sanitary Protection Zones and sanitary classification of enterprises, installations, and other facilities" (approved by the Decree of the Chief State Sanitary Doctor of the Russian Federation dated 25.09.2007 No. 74), the dimensions of the SPZ for the LNG Plant Project are to be 1000 m (Class I).

From January 1, 2019, air pollutant emissions are permitted for category I facilities under an Integrated Environmental Permit containing permissible emission levels. The procedure for the development and approval of maximum permissible emissions into the ambient air is set out in *the RF Government Decree dated 02.03.2000 No. 183 "On Maximum Permissible Emissions into the Atmospheric Air and Adverse Physical Impacts".* 

The development of standards for air pollutant emissions (emission limits) is carried out on the basis of methods for calculation of pollutant dispersion in the atmospheric air approved by the Order of Ministry of Natural Resources and Environment of the Russian Federation dated 06.06.2017 No. 273.

Technological standards for natural gas processing framed as BAT process parameters are provided in BAT reference documents (ITS) and additionally set out by the the Ministry of Natural Resources and Environment of the Russian Federation:

- *RF Ministry of Natural Resources Order dated 21.05.2019 No.319 "On approval of environmental regulation document "Process parameters of the best available technologies for natural and accompanying gas processing";*
- *RF Ministry of Natural Resources Order dated 17.07.2019 No.471 "On approval of environmental regulation document "Process parameters of the best available technologies for natural gas recovery".*

### Greenhouse gas (GHG) emissions reporting

The model of state regulation of greenhouse gas emissions currently existing in the Russian Federation is based on a voluntary inventory of GHG emissions in the federal subjects of Russia; however, an integrated regulatory system is being actively developed, which includes development of legal support for GHG emissions monitoring, reporting, and control.

At the moment, the policy and structure of state regulation of GHG emissions in Russia is determined by the following list of basic laws and regulations:

- Climate Doctrine of the Russian Federation approved by the Decree of the President of the Russian Federation dated 17.12.2009 No. 861-rp;
- Comprehensive plan of implementing the Russian Federation's Climate Doctrine for the period until 2020 approved by the RF Government Decree dated 25.04.2011 No. 730-r;
- Executive Order of the President of the Russian Federation dated 30.09.2013 No. 752 "On reduction of greenhouse gas emissions" down to a maximum level of 75% of GHG emissions in 1990;
- Action plan aimed at reduction of GHG emissions by 2020 approved by the RF Government Decree dated 02.04.2014 No. 504-r;
- Concept for development of the system of monitoring, reporting, and verification of GHG emission volumes in the Russian Federation (approved by the RF Government Decree dated 22.04.2015 No. 716-r).

In 2016, the Russian Federation signed the Paris Agreement on climate change. The "*Plan of implementing a set of measures to improve the state regulation of greenhouse gas emissions and preparing for ratification of the Paris Agreement"* has been approved by the Government Decree dated 03.11.2016 No. 2344-r in order to prepare for ratification of the Agreement.





The Climate Doctrine (as amended by the RF Government Decree dated 30.04.2018 No. 842-r) establishes the requirement to develop and adopt legal and regulatory, methodological, and other documents to ensure that the major industrial and energy organisations with the direct emission volume of over 150,000 tonnes of  $CO_2$  equivalent units per year will present their annual reports on GHG emissions starting from 2019. However, there are still no requirements for the inventory procedure, schedule and form of reporting defined.

In order to establish a methodological basis for the GHG inventory process, the following two documents were developed defining approaches to the calculation of direct and indirect GHG emissions by Russian enterprises:

- *RF Ministry of Natural Resource Order dated 30.06.2015 No. 300 "On approval of "Guidelines and instructions on quantitative assessment of GHG emissions from entities conducting business operations and other activities in the Russian Federation";*
- *RF Ministry of Natural Resource Order dated 29.06.2017 No.330 "On approval of "Guidelines and instructions on quantitative assessment of indirect GHG emissions".*

A draft RF Federal Law "On state regulation of greenhouse gas emissions and on amendments to certain laws and regulations of the Russian Federation" was developed in late 2018 / early 2019. The legislative document has been prepared in order to mitigate anthropogenic impacts on the global climate system in the context of transition of the global economy and energy sector to a development pathway towards low GHG emissions, as well as stimulate step-by-step transition to low-carbon technologies, types of fuel, and energy sources.

In the period from 26.03.2019 to 22.04.2019, The Ministry of Economic Development of the Russian Federation held public consultations on the draft law; the next version of the document is currently being prepared. The draft law shall introduce a number of restrictive regulations, which are expected to go into effect in 2022–2025, including sector-specific performance targets for GHG emissions and introduction of fees for exceeding the allowable emission limits.

### 2.2.1.6 Waste management

The Federal Law dated 24.06.1998 No. 89-FZ "On production and consumption waste" regulates relations in the field of waste management. In particular, in the process of construction of new facilities (Article 10), legal entities shall:

- observe the ecological, sanitation, and other requirements in the field of environmental protection and human health protection;
- have technical and technological documentation on the use and decontamination of the waste generated at all stages of the project.

Waste management measures shall be developed taking into account waste hazard classes and regulatory requirements applicable to their treatment and disposal.

Article 12 establishes requirements to waste placement (disposal) facilities. Waste disposal facilities shall be entered in the State register of waste disposal facilities.

2.2.1.7 Protection of subsoil resources, soils, and lands

The RF Law dated 21.02.1992 No. 2395-1 "On Subsoil Resources" regulates relations arising in the field of use and protection of subsoil resources, groundwater, and water used by subsoil users for their process and technological needs.

The Land Code of the Russian Federation dated 25.10.2001 No. 136-FZ regulates the relations of use and preservation of land as the basis of life and activities of the peoples residing on a given territory. The use of land shall be performed by methods ensuring conservation of ecological systems, the ability of land to be means of production in agriculture and forestry, the basis of economic and other types of activity (Article 12).

The Code establishes the obligation of owners of plots of land, users of land, tenants and lessees of plots of land to implement measures for land preservation, as well as to prevent chemical contamination of land, industrial and consumption waste dumping, and other negative (harmful) impacts resulting in land deterioration; to eliminate the aftermath of pollution and waste dumping.

Lands are used in compliance with the purpose established for them. Reclassification of lands from one category to another is performed in compliance with *the Federal Law dated 21.12.2004 No. 172-FZ "On reclassification of lands and land plots"*. The structure and procedure for preparation of documents for





reclassification of lands from one category to another are set out by Articles 2 and 3. Reclassification of land is effected on the basis of an Application (Khodataystvo) submitted by an interested party to state or local executive authorities. Article 7 regulates the characteristics of the process of reclassification of agricultural-purpose lands under another category. The content of the Application (Khodataystvo) for reclassification of agricultural lands owned by the Russian Federation is set out by the Order of the RF Ministry of Agriculture dated 17.05.2010 No. 168 "On description of the content of the application for reclassification of land areas used for agriculture or land plots within such areas owned by the Russian Federation from lands of agricultural purpose to another category and the content of documents attached to it." In case the lands are reclassified to category of lands for industrial use, the Application shall contain information on the cadastral value of the requested land plot and on the average cadastral value of lands of this category in the Municipal District (City District), where the land plot is located.

*RF* Government Resolution On Land Remediation and Conservation dated 10.07.2018 No. 800 establishes the rules for land reclamation and conservation. In line with the document, the remediation of lands shall ensure that the lands are restored to conditions suitable for their use as permitted and in compliance with the purpose established for them by ensuring that the land quality is in compliance with environmental quality standards and RF legislative requirements in the field of sanitary and epidemiological welfare of the population.

## 2.2.1.8 Water Resources Protection

The Water Code of the Russian Federation dated 03.06.2006 No. 74-FZ establishes a legal framework for management in the field of use and protection of water bodies, basic requirements for the use of water bodies, as well as liability for violation of water legislation.

The use of surface water bodies is performed on the basis of water use agreements for the following purposes:

- water intake (withdrawal) from water bodies (with or without the return of water into water bodies);
- use of the water areas (unless otherwise provided in Sections 3 and 4 of Article 11).

The use of surface water bodies is performed on the basis of a decision to grant a water body for use for the following purposes:

- discharge of effluents;
- construction of floating and fixed offshore platforms;
- construction of submerged or underground crossings, pipelines, and other linear facilities causing any change in the bottom and shores of a water body;
- performing dredging and other activities causing any change in the bottom and shores of a water body.

In order to prevent contamination, littering, and siltation of said water bodies and depletion of their water reserves, as well as to protect habitats of aquatic biological resources, wildlife, and vegetation, water protection zones with special conditions of economic or other activities are set up along shorelines of the water bodies (Article 65).

The following activities are prohibited within the boundaries of water protection zones with regard to the planned activities:

- locating disposal sites for industrial wastes and wastes of consumption, chemical, explosive, toxic, poisonous substances.
- traffic and parking of vehicles (except for special transport vehicles, traffic on paved roads, and parking in special areas with hard pavement);
- location of fueling stations, fuel and lubricants stores (with an exception of refueling stations and fuel stores at port sites, shipyards, and waterways infrastructure), as well as technical maintenance workshops used for technical inspection, repair, and washing of motor vehicles;
- discharge of wastewater, including drainage water.

It is permitted to plan, construct, refurbish, commission, and operate any commercial or other facilities provided that such facilities are equipped with means ensuring protection of water bodies against contamination, littering, siltation, and depletion of water resources.

Near-shore protective belts are provided within water protection zones where additional restrictions apply to economic or other activities. In particular, in addition to the above restrictions, it is prohibited to dispose of erodible waste banks within the boundaries of near-shore protective zones.





The strips of land along the shoreline of a water body (shoreline strips) are set up for public use.

For the Gulf of Ob, the width of the water protection zone is 500 m (for more details on the width of the water protection zones of water bodies located in the Area of Influence of the planned activities, see Section 7.5, Table 3.5, of the Project Standards Document).

From the year 2019, wastewater discharge into water bodies is performed for category I facilities under an Integrated Environmental Permit containing standards for permissible discharge. Standards for permissible discharge are developed individually for each water user on the basis of the *Methods for developing permissible standards for substances' and microorganisms' discharge into water bodies for users of the water bodies (approved by the Order of the Ministry of Natural Resources of the Russian Federation dated 17.12.2007 No. 333)* and approved in accordance with the RF Government Resolution dated 23.07.2007 No. 469 "On the procedure for adoption of permissible standards for substances' and microorganisms' discharge into water bodies of the water bodies for users of the water bodies for users of the water bodies for users of the procedure for adoption of permissible standards for substances' and microorganisms' discharge into water bodies for users of the water bodies for users' and microorganisms' discharge into water bodies for users of the water bodies."

The surface water quality standards shall be met in the process of effluent discharge into a water body. Maximum permissible concentrations (MPC) applied to the Gulf of Ob are the ones for water bodies of fishery significance approved by the Order of the Ministry of Agriculture of Russia dated 13.12.2016 No. 552 "On the approval of water quality standards for fishery water bodies including the Maximum Permissible Concentrations (MPCs) of polluting substances in fishery water bodies".

Standards for permissible impact on water bodies in the Taz river basin within the water management areas were approved by the Federal Water Resources Agency on 08.18.2014.

Protection of internal waters, which include the Gulf of Ob, is regulated by the Federal Law dated 31.07.1998 No. 155-FZ "On internal waters, territorial sea and contiguous zone of the Russian Federation".

The basic principles for protection and preservation of the marine environment and natural resources of internal sea waters and territorial sea are (Article 32.1):

- ensuring biodiversity in the marine environment;
- ensuring environmental safety when carrying out works;
- preventing marine pollution;
- prohibition or restriction of economic and other activities that may cause damage to specially
  protected nature territories of the internal waters and territorial sea, as well as of economic and
  other activities in the fishery protection zone.

Disposal of waste and other materials, with the exception of disposal of soil extracted during dredging, as well as discharge of pollutants (including effluents containing polluting substances) from vessels and other watercraft, artificial islands, installations, and structures in internal waters and territorial sea is prohibited.

Disposal (burial) of soil extracted during dredging in internal waters and territorial sea is prohibited within the boundaries of specially protected nature territories and their protection zones, within the boundaries of fishery protection zones, as well as if this soil contains noxious substances, the list of which is approved statutorily in compliance with international treaties of the Russian Federation (*RF Government Decree dated 30.12.2015 No. 2753-r* "On approval of the list of polluting substances, which, in case of their presence in soil extracted during dredging in concentrations above the chemical characteristics of soil at the burial site prior to disposal of this soil, make it prohibited to dispose of this soil in the internal marine waters and territorial sea of the Russian Federation").

Disposal (burial) of bottom soil in internal marine waters and in territorial sea is carried out on the basis of a permit issued by the federal executive body authorized to conduct state environmental supervision in internal waters and territorial sea (Rosprirodnadzor) (Article 37).

Activities associated with construction, operation, and use of structures and installations in internal marine waters and territorial sea of the Russian Federation are regulated by the *RF Government Resolution dated* 19.01.2000 No. 44 "On the approval of the procedure of construction, operation, and use of artificial islands, installations, and structures in internal waters and territorial sea of the Russian Federation".

#### 2.2.1.9 Protection of flora, fauna, and habitats

*Federal Law On Wildlife dated 24.04.1995 No. 52-FZ* regulates relationships in the field of protection and use of animal resources, as well as preservation and remediation of habitats, in order to conserve biological diversity, keep intact the wildlife gene pool, and otherwise protect wild animals as an integral part of the natural environment.





It is prohibited to undertake activities that may result in loss, reduction of populations, or damage being caused to habitats of the animal species listed in the Red Data Books (Article 24). Legal entities and citizens guilty of violating habitat protection regulations, killing animals of rare or endangered species, breaching regulations established for hunting or fishing, failing to meet the requirements aimed at prevention of loss of wildlife resources as a result of economic activities or transport operations, can be charged under civil, administrative, or criminal law (Article 55).

*RF* Government Resolution dated 13.08.1996 No. 997 "On approval of Requirements for the prevention of animal loss as a result of implementation of industrial processes, as well as operation of transport links, pipelines, communication and power lines" regulates industrial activities so as to prevent animal population losses as a result of: altered habitats and disrupted migratory routes, getting into water intake installations, parts of industrial equipment, under moving vehicles and agricultural machines; construction of production and other types of facilities, extraction, processing, and transportation of raw materials; colliding with power lines and electrocution, impacts from electromagnetic fields, noise, and vibrations; crop farming and cattle breeding practices (technological processes).

In particular, there shall be measures provided to avoid contamination of the aquatic environment in the process of discharge of industrial and other types of wastewater from industrial sites. It is prohibited to discharge wastewater of any kind in spawning and wintering sites of aquatic and semi-aquatic species, as well as in their rookeries. To minimize disturbance factors (noise, vibration, shock waves, etc.) affecting animals, it is necessary to be guided by applicable instructions and recommendations for measuring, estimating, and reducing their levels;

*RF* Government Resolution dated 29.04.2013 No.380 "On the endorsement of Provision on measures for conservation of aquatic biological resources and their habitats" sets out measures aimed at conservation of the aquatic biological resources and their habitats that are to be implemented in the course of the planned activities associated with both direct and indirect impact on the biological resources and habitats, and a procedure for implementation of these measures.

Federal Law dated 20.12.2004 No. 166-FZ "On fishery and conservation of aquatic biological resources" regulates relations in the field of fishery and conservation of aquatic biological resources. The law provides for the implementation of necessary measures on conservation of aquatic biological resources and their habitat during construction, modernisation, major renovation of capital construction facilities (Article 50), as well as compensation for damage caused to aquatic biological resources (Article 53), which is performed on a voluntary basis or pursuant to a court order, and is calculated either in accordance with the rates and methodologies approved in the prescribed manner, or on the basis of aquatic bioresources' restoration costs.

*Federal Law dated 14.03.1995 No. 33-FZ "On specially protected natural areas"* regulates relations in organization, protection, and use of specially protected natural territories in order to preserve unique and typical natural complexes and sites, natural landmarks, flora and fauna, and their gene pool, in research concerning natural processes in the biosphere and monitoring of changes in it, as well as environmental education of the public.

The Arctic LNG 2 Project facilities are located away from the existing specially protected natural areas (for more details, see Section 7.7); the closest specially protected natural area (the Gydan Nature Reserve) is located 110 km from the boundaries of the Project's license area.

In accordance with the Fisheries Regulation for the West-Siberian fishing basin (approved by the Order of the Ministry of Agriculture of the Russian Federation dated 22.10.2014 No. 402, as amended on 28.06.2017) (paragraph 2.1), the Gulf of Ob with its tributaries belongs to the migratory routes and spawning sites of salmonids, whitefishes, and sturgeons.

#### 2.2.1.10 Indigenous Low-numbered Peoples

Government Decree dated 04.02.2009 No. 132-r approved a Concept of sustainable development of the Indigenous low-numbered peoples of the North, Siberia and Far East of the Russian Federation, which is based on the following principles:

- sound and consistent use of land and other natural resources in the areas of traditional residence and traditional economic activities;
- recognition of the right of the low-numbered peoples of the North to priority access fishing and hunting grounds, and biological resources in areas of their traditional residence and traditional economic activities;





- required participation of representatives and associations of the low-numbered peoples of the North in decision making process on issues affecting their rights and interests in development of natural resources in areas of their traditional residence and traditional economic activities;
- required assessment of the cultural, environmental, and social effects of the proposed projects and works in areas of traditional residence and traditional economic activities of the low-numbered peoples of the North;
- Compensation for damage caused to the primordial habitat, traditional way of life, and health of the low-numbered peoples of the North.

Enforcement of the rights of the indigenous low-numbered peoples in the Russian Federation is regulated by the Federal Law dated 30.04.1999 No. 82-FZ "On guarantees of the rights of Indigenous low-numbered peoples of the Russian Federation". More specifically, indigenous low-numbered peoples has the right (Article 8):

- to own and use lands of different categories, as may be required to pursue traditional husbandry and engage in traditional crafts and occupations, free of charge at the territories of their traditional residence and economic activities.
- to take part in environmental and ethnological expert assessments during the development of federal and regional State programmes for development of natural resources and environmental protection in the areas of traditional residence and traditional economic activities of the lownumbered peoples;
- to receive a redress for losses associated with damage inflicted on the traditional areas of residence
  of the indigenous small-numbered peoples by economic activities of enterprises of any form of
  ownership, by natural persons, etc.

According to the *RF Government Decree dated 08.05.2009. No. 631-r* "On approval of the list of areas of traditional residence and traditional economic activities of the indigenous low-numbered peoples of the *Russian Federation and the list of their customary economic activities*", the Tazovsky Municipal District of the YNAO is on the list of areas of traditional residence and traditional economic activities of the indigenous low-numbered peoples of the indigenous low-numbered peoples of the Russian Federation.

Federal Law dated 07.05.2001 No. 49-FZ "On Areas of Traditional Natural Resource Use of the Indigenous low-numbered peoples of the North, Siberia and Far East of the Russian Federation" is aimed at protection of original habitats and traditional ways of life of indigenous peoples, preservation and development of their authentic cultures, and preservation of biodiversity in areas of their traditional natural resource use.

*The Federal Law* provides for certain restrictions on economic and other activities within the boundaries of the areas of traditional use of natural resources. More specifically, natural resources located within these areas shall be used by persons belonging to indigenous small-numbered peoples to sustain their traditional way of life and by communities of indigenous peoples in accordance with their customs and traditions (Article 13). Historical and cultural heritage sites within the areas of traditional use of natural resources (ancient settlements, other historical and cultural monuments, sacred sites and structures, ancestors' burial sites, and other sites of cultural and historical value) can be used only in accordance with their intended purpose (Article 15).

Currently, there are no areas of traditional use of natural resources formed within the YNAO. There is legislation adopted by the YNAO at the regional level in support of this Federal Law (see sub-section 2.2.3). However, the law may be potentially applicable in the event of such areas being formed within the Tazovsky Municipal District.

### 2.2.1.11 Cultural heritage

The main law of the Russian Federation in the field of cultural heritage protection is *Federal Law dated* 25.06.2002 No. 73-FZ "On cultural heritage sites (historical and cultural monuments) of peoples of the *Russian Federation"*. The law establishes requirements for the implementation of activities within the boundaries of cultural heritage sites and a special status of the use of a land plot, a water body or a part thereof, within the boundaries of which the archaeological heritage site is located (Article 5.1); measures to ensure preservation of the identified cultural heritage sites, sites possessing the characteristics of a cultural heritage site, which are to be taken in the course of survey, design, excavation, construction, ameliorative, economic activities and other types of works (Article 36).

2.2.1.12 Industrial and fire safety (including for oil and gas production facilities) and emergency prevention and response

The Federal Law dated 21.07.1997 No. 116-FZ "On industrial safety of hazardous industrial facilities" defines the legal, economic, and social framework to ensure safe operation of hazardous industrial facilities





(HIF) and is aimed at prevention of emergencies and ensuring preparedness of HIFs operating organizations to localize and eliminate the consequences of these emergencies. All HIFs are divided into four classes: Hazard class is assigned to a HIF when it is registered in the state registry. HIFs of Hazard Classes I and II are subject to obligatory declaration. HIF construction Project design documentation containing a declaration for industrial safety, is subject to examination in accordance with the legislation of the Russian Federation on urban planning.

In accordance with the Federal Law dated 27.07.2010 No. 225-FZ "On mandatory insurance of civil liability of a hazardous facility's owner for bringing harm as a result of an emergency at hazardous production facility", a hazardous facility's owner is obliged at its own expense to insure property interests related to the obligation to compensate damage caused to the victims as a result of an emergency by concluding a compulsory insurance contract with the insurer during the entire period of operation of the hazardous facility.

The Federal Law dated 21.07.1997 No. 117-FZ "On the Safety of Hydraulic Structures" regulates relations arising from the implementation of safety activities in design, construction, overhaul, operation, modernisation, mothballing, and closure of hydraulic structures.

Article 8 sets out the general safety requirements for hydraulic structures. Among the main requirements, there are submitting of declarations of safety of hydraulic structures and implementation of federal state supervision in the field of safety of hydraulic structures. As indicated in Article 7, hydraulic structures are to be registered into the Russian State Register of hydraulic structures.

In accordance with Article 10, the owner or operator of a hydraulic structure shall draw up a declaration on hydraulic structure safety, which shall be submitted to the authority for safety supervision over such facilities. The hydraulic structure safety declaration is a key document that contains information on the compliance of the hydraulic structures with safety criteria. When designing a hydraulic structure of classes I, II, III, and IV, the declaration of hydraulic structure safety is drawn up as part of the Project design documentation.

*SP 58.13330.2012 Hydraulic Structures. Main provisions. Updated version of SNiP 33-01-2003* sets out general requirements for design of hydraulic structures to ensure safety and environmental protection.

*Federal Law dated 22.07.2008 No. 123-FZ* "*Technical Regulation of fire safety*" is adopted to protect life, health, property of persons and legal entities, state and municipal property against fires; it determines main provisions of technical regulation related to the fire safety, and specifies general fire safety requirements for the protected objects (products), including buildings and facilities, industrial objects, fire-fighting technical products and general use products.

The Federal Law dated 30.12.2009 No. 384-FZ "The technical regulation about safety of buildings and constructions" establishes minimum necessary requirements for buildings and structures, and for the processes of design (including research), construction, installation, adjustment, operation and utilization (demolition) related to the buildings and structures. Buildings and structures shall be designed to avoid risks of an adverse environmental impacts in the course of their construction and operation.

Safety rules in oil and gas industry (approved by the Rostekhnadzor Order dated 12.03.2013 No. 101) establish industrial safety requirements for organizations and workers operating in the field of industrial safety at hazardous oil and gas industrial facilities, including in the process of field development for collection, preparation, and storage of gas, and gas condensate.

Rostekhnadzor Order dated 26.11.2018 No.588 "On approval of the Federal rules and regulations in the field of industrial safety "Safety rules for liquefied natural gas facilities". The rules establish requirements aimed at ensuring industrial safety at LNG HIFs, where LNG production, storage, loading/offloading, and re-gasification processes are implemented.

Rostekhnadzor Order dated 11.03.2013 No. 96 "On approval of Federal rules and regulations in the field of industrial safety "General explosion safety rules for explosive- and fire-hazardous chemical and petrochemical plants and oil refineries". The rules establish requirements aimed at ensuring industrial safety, prevention of emergencies and incidents at hazardous chemical, petrochemical and oil and gas refining facilities, at which hazardous substances, including those capable of forming vapor, gas, and dust-air explosive and flammable mixtures are being produced, generated, used, processed, stored, and transported, including HIFs for storage of oil, petroleum products, LFG, HFL, and combustible liquids (CL).

Rostekhnadzor Order dated 21.11.2013 No. 559 "On approval of Federal rules and regulations in the field of industrial safety "Safety rules for chemically hazardous industrial facilities". The rules establish





requirements aimed at ensuring industrial safety, prevention of emergencies and industrial accidents (injuries) at chemically hazardous industrial facilities, where toxic, highly toxic, oxidizing chemically hazardous substances, as well as chemically hazardous substances dangerous to the environment are being produced, generated, used, processed, stored, transported, and destroyed. The rules also establish requirements for heating and ventilation systems, water supply and sewage systems for chemically hazardous industrial facilities, as well as for safety of workers.

Rostekhnadzor Order dated 18.03.2014 No.105 "On approval of Federal rules and regulations in the field of industrial safety "Safety rules for offshore oil and gas production facilities". The rules establish mandatory industrial safety requirements that are to be implemented at hazardous offshore oil and gas production facilities, which include, inter alia: fixed platforms; fixed and floating oil loading and cargo-handling terminals.

Rostekhnadzor Order dated 26.12.2012 No.779 "On approval of the Safety Guidelines for flare systems" sets out recommendations on ensuring industrial safety in the process of design, construction, operation, expansion, reconstruction, technical modernisation, mothballing, and abandonment of flare systems, and assessment of flare system industrial safety; and it is not a legally binding document.

Federal Law dated 21.12.1994 No. 68-FZ "On protection of the population and of the territories from environmental and technological emergencies" regulates the protection of population, the entire land, water, and airspace within the Russian Federation, industrial and social facilities, and natural environment from natural and technogenic emergencies. The law obliges organizations:

- to ensure the development, preparation, and maintenance of preparedness for the use of forces and means to prevent and eliminate emergencies, to provide emergency response trainings for employees of organizations;
- to ensure organisation and performance of emergency response and other urgent measures at subordinate industrial and social facilities and in the territories adjacent to them in accordance with emergency response plans;
- to create reserves of financial and material resources for emergency response, etc. (Article 14).

Citizens of the Russian Federation have the right to protection of life, health, personal property in the event of emergency, to compensation for damage caused to their health and property (Article 18).

In accordance with the Federal Law dated 31.07.1988 No. 155-FZ "On internal waters, territorial sea and contiguous zone of the Russian Federation", operation, use of installations and structures during shipment and storage of oil and petroleum products, transshipment of oil and petroleum products are allowed within the internal waters and territorial sea only if there is an oil spill prevention and response plan in place (Article 16.1).

The operating organization in the course of implementation of oil spill response measures is obliged:

- to implement an oil spill prevention and response plan;
- to develop a system of monitoring of the state of the marine environment in the area of its activities (including a system of oil spill detection), as well as oil spill related communication and alert system, and to ensure such systems being implemented and maintained;
- to ensure financial support for the implementation of measures provided for by the oil spill prevention and response plan, including full compensation for damage to the environment, including aquatic biological resources, life, health, and property of citizens, and property of legal entities in the result of oil spills;
- to have its own rescue services and (or) emergency response and rescue teams, forces, and means
  of constant preparedness, designed to prevent and eliminate oil spills, and (or) to engage such
  emergency response and rescue services on a contractual basis.

*RF* Government Decree dated 21.08.2000 No. 613 "On emergency oil spill prevention and response measures" defines the principles for development of oil spill prevention and response plan in relation to emergencies of site-specific, local, territorial, regional, and federal importance, as well as for organization of interaction of forces engaged and resources appointed for their liquidation.

The Order of the EMERCOM of Russia dated 28.12.2004 No. 621 "On the approval of guidelines for development and approval of oil spill prevention and response plans in the Russian Federation" establishes general requirements for the planning of measures for prevention and elimination of oil spills and oil spill associated emergencies, and also determines the procedure for the coordination and approval of the oil spill prevention and response plan, including for organizations engaged in field exploration, oil extraction, and processing, transportation, storage, and use of oil and oil products. Organizations develop Plans





corresponding to the level of possible emergency: site-specific, local, territorial, regional, and federal, and in the water areas - local (facility), regional, and federal.

2.2.1.13 Maritime navigation and navigation in the water area of the Northern Sea Route

The basic requirements for maritime navigation in the field of protection of the marine environment are regulated by the Federal Laws dated 31.07.1998 No. 155-FZ "On internal marine waters, territorial sea, and contiguous zone of the Russian Federation", dated 17.12.1998 No. 191-FZ "On the exclusive economic zone of the Russian Federation", and dated 30.11.1995 No. 187-FZ "On the continental shelf of the Russian Federation".

As it has been discussed in sub-section 2.2.1.8, the disposal of any types of waste and materials from ships, as well as any discharge of pollutants within the internal waters and territorial sea is prohibited. The requirements for the prevention, reduction, and control of pollution from ships effective within the internal waters and territorial sea of the Russian Federation are applicable to the exclusive economic zone having regard to international regulations and standards and international treaties of the Russian Federation (for more details see Project Standards document and Section 2.3).

RF Government Resolution dated 24.03.2000 No.251 "On approval of the list of noxious substances prohibited for discharge from ships and other vessels, aircraft, artificial islands, installations and structures within the exclusive economic zone of the Russian Federation" sets out a list of noxious substances prohibited for discharge from ships within the exclusive economic zone. This list includes all types of plastics, garbage, substances of unknown chemical composition, for which there are no maximum allowable discharge concentrations established, chemicals (classified as MARPOL 73/78 category A), ballast water, wash/flush water, and other residues and mixtures containing the above mentioned chemicals<sup>14</sup>.

In case of any marine accident occurring in the internal marine waters or territorial sea / exclusive economic zone, the Government of the Russian Federation is entitled to take appropriate measures, including against the vessel that suffered the damage and the responsible party of the accident, which are commensurate with actual or potential damage, in order to protect the coast of the Russian Federation or related interests (such as fishing) from pollution or the threat of pollution.

RF Government Resolution of 03.10.2000 No. 748 "On approval of maximum permissible concentration levels and conditions for discharge of noxious substances within the exclusive economic zone of the Russian Federation" establishes maximum permissible concentration levels for noxious substances, which are allowed to be discharged only under the normal operating conditions of vessels, and conditions for discharge of noxious substances<sup>15</sup>.

Activities at seaports, including those aimed at ensuring environmental safety, are regulated by the Federal Law dated 08.11.2007 No. 261-FZ "On the seaports in the Russian Federation and on the introduction of amendments into the individual laws and regulations of the Russian Federation" and the Order of the Ministry of Transport of the Russian Federation dated 26.10.2017 No.463 "On approval of general rules for navigation and mooring of vessels in the seaports of the Russian Federation and approaches to them". In compliance with these Rules, for the vessels staying/navigating in the water area of the seaport and in approaches to it, it is prohibited: to discharge overboard effluent, except as otherwise provided by Rule 11 of Chapter 3 of Annex IV to MARPOL; to dispose of waste of any kind overboard; make open fire and burn waste of any kind on board; to emit noxious substances into the ambient air in amount exceeding the established standards; to carry out works on cleaning and painting of hulls, including underwater hull cleaning, without the harbourmaster's permission; to wash holds, decks, and superstructures with overboard water discharge. Oil-contaminated water, oil residues, wastewater, and otherwise contaminated water shall be discharged to specialized onshore reception facilities or specialized bilge water collection vessels. When carrying cargo handling operations with oil and petroleum products, containment booms are to be deployed to ensure the localization of possible oil spills.

Navigation in the water area of the Northern Sea Route (NSR) is regulated by Article 5.1 of the Federal Law dated 30.04.1999 No. 81-FZ "The Mercantile Marine Code of the Russian Federation" and he "Rules of navigation in the water area of the Northern Sea Route" (approved by the Order of the RF Ministry of Transport dated 17.01.2013 No. 7 "Concerning approval of the Rules of navigation in the water area of the Northern Sea Route"). The Rules establish procedure of the navigation of ships, rules of the icebreaker assistance of ships, rules of the pilot ice assistance of ships, rules of the assistance of ships on seaways,

2-16





<sup>&</sup>lt;sup>14</sup> http://ivo.garant.ru/ - /document/12119091/entry/1000

<sup>&</sup>lt;sup>15</sup> http://ivo.garant.ru/ - /document/12120810/entry/1000http://ivo.garant.ru/ - /document/12120810/entry/2000

provision about the navigational-hydrographic and hydrometeorological support of the navigation of ships, rules of the radio communication during the navigation of ships, requirements to ships pertaining to the safety of navigation and protection of the marine environment from the pollution from ships the water area of the Northern Sea Route, Other provisions in relation to the organization of the navigation of ship in the water area of the Northern Sea Route.

Section VIII specifies the requirements to ships pertaining to the safety of navigation and protection of the marine environment from the pollution from ships. Therefore, the following requirements are among those that should be met on ship navigating in the water area of the Northern Sea Route:

- tank or tanks capacity for the collection of oil residues<sup>16</sup> should be sufficient taking into consideration type of ship power plant and duration of voyage in the water area of the Northern Sea Route;
- on board ship there should be storage tanks of sufficient capacity for the collection of waste (sludge)
  produced in the operation of ship taking into consideration duration of voyage in the water area of
  the Northern Sea Route.

Discharge of oil residues into the water area of the Northern Sea Route is prohibited. The rules of the assistance of ships on seaways of the water area of the NSR also instruct a ship master to immediately inform the NSR Administration about pollution of the environment in case of its detection.

In the water area of the Northern Sea Route the authorization-based order of the navigation of ships is in force. Icebreaker assistance involves ensuring safety of navigation of ship in the water area of the Northern Sea Route with the ship being in the zone covered by radio communication with icebreaker on channel 16 of very high frequency (VHF), namely the ice reconnaissance by icebreaker, making channels in ice, formation of a group of ships and allocation of ships following the icebreaker/icebreakers, sailing of ship through the channel behind icebreaker in tow, without towing in the independent mode or within a group of ships. Information on the necessity to use the icebreaker assistance under heavy, medium, and light ice conditions while sailing in the water area of the Northern Sea Route is provided by the NSR Administration in the permission.

Pilot ice assistance of ships is carried out with the purpose of ensuring safety of the navigation of ships and prevention of accidents, as well as protection of the marine environment in the water area of the Northern Sea Route.

Icebreaker assistance and pilot ice assistance in the water area of the NSR are rendered only by vessels authorized to navigate under the State flag of the Russian Federation. Maritime shipping of natural gas (including in a liquefied state) and gas condensate produced on the territory of the Russian Federation and loaded onto ships in the water area of the Northern Sea Route is also carried out by vessels under the State flag of the Russian Federation to the first unloading or transshipment point, with the exception of international treaties providing for the use of vessels navigating under the flags of foreign states. In line with the RF Government Decree dated 14.03.2019 No. 435-r "On permission of sea transportation by vessels navigating under the flags of foreign states up to and including December 30, 2043", the following is allowed for the purpose of implementation of projects carried out in accordance with decisions of the Russian Federation.

the use of vessels navigating under the flags of foreign states on the approved list, for which the time charter agreements have been concluded for a period of at least 15 years, up to and including December 30, 2043:

- international maritime shipping of natural gas (including in a liquefied state) and gas condensate produced on the territory of the Russian Federation and loaded onto referred ships at the Sabetta seaport to the first unloading or transshipment terminal.
- international maritime shipping of natural gas and gas condensate loaded onto referred ships at the Sabetta seaport to the first unloading or transshipment terminal at the seaports of Murmansk or Petropavlovsk-Kamchatsky.

the use of vessels navigating under the flags of foreign states not on the approved list, for which the time charter agreements have been concluded for a period of less than 6 months, up to and including December 30, 2021; international maritime shipping of natural gas and gas condensate loaded onto referred ships at the Sabetta seaport to the first unloading or transshipment terminal.

<sup>&</sup>lt;sup>16</sup>Rule 12 of part A, chapter 3, Annex 1 to the International Convention for the Prevention of Pollution from ships, 1973, as amended by the Protocol 1978 (MARPOL 73/78).





### 2.2.1.14 Occupational health and safety

Labor relations and labor protection are regulated by the *Labor Code of the Russian Federation dated* 30.12.2001 No. 197-FZ. The Code contains provisions aimed at establishment of the state guarantees of labor rights and freedoms of citizens, to create favourable working conditions, and to protect the rights and interests of workers and employers. The labor code covers all aspects of the regulation of labour relations:

- collective bargaining and agreements;
- conclusion, amendment, and termination of the employment contract;
- working time and leisure time, daily time of rest, work-free holidays (leaves), payment and work standardization, wages;
- guarantees and compensation;
- labour discipline;
- occupational safety and ensuring the rights of workers to occupational safety, including the right to work in conditions meeting safety and hygiene requirements;
- special provisions on the regulation of labour of women and persons with family responsibilities.
- special provisions on the regulation of labour of minors.

The Labor Code also contains obligations regarding the provision of equal rights and opportunities in the field of labor relations, ensuring non-discrimination on any grounds other than the professional qualities of the employee, and prohibition of forced labor.

Federal Law dated 24.07.1998 No. 125-FZ "On compulsory social insurance against industrial accidents and occupational diseases" sets forth the legal, economic, and organizational basis for compulsory social insurance against accidents and occupational diseases suffered in the workplace and establishes the procedure by which workers may seek compensation for damage caused to life and health in the course of their contractual duties, and in other circumstances defined by law.

### 2.2.1.15 Operational Environmental Control/Monitoring

In accordance with the Article 67 of *the Federal Law dated 10.01.2002 No. 7-FZ* "On Environmental *Protection"*, Operational environmental control / monitoring (OEC) is carried out in order to ensure the implementation of measures aimed at environmental protection, rational use and restoration of natural resources, as well as compliance with environmental protection requirements established by environmental legislation, in the course of economic or other activities.

Class I, II and III facilities have OEC Programmes developed and approved, OEC carried out in accordance with the established requirements, information documented, and data obtained from the results of the OEC performance stored.

The overall content of the OEC Programme and the deadlines for submitting a report on the implementation and results of the OEC are determined in accordance with the Order of the RF Ministry of Natural Resources dated 28.02.2018 No. 74 "On approval of requirements for the content of the Operational Environmental Control, the procedure and schedules for submitting a report on organization and on results of Operational Environmental Environmental Control".

OEC Programme for the class I facilities includes additional programme for establishment of an automated control system or information on existing automated control system in place.

At the category I facilities, the stationary sources of emissions/discharges of pollutants generated in the course of operation of the technical devices, equipment or combination of thereof (installations-units) are to be equipped with automatic equipment for measurement and registration of pollutant emission and/or discharge indicators and equipment for registration and transfer of data on pollutant emission and/or discharge indicators to the State Register of facilities that have a negative impact of the environment based on a programme for establishment of an automated control system.

At the LLC Arctic LNG 2 facilities, the automatic equipment for measurement is installed at:

1. Off-gas incineration units for natural gas processing;

2. Waste incineration units for waste of hazard class I, II, and III with a design capacity of 200 kg per hour and more.

In line with paragraph 23 of the RF Government Decree dated 13.03.2019 No. 428-r "On approval of types of technical devices, equipment or combination of thereof (installations-units) for category I facilities, where stationary sources of pollution emissions/discharges are to be equipped with automatic equipment for measurement and registration of pollutant emission and/or discharge indicators and equipment for





registration and transfer of data on pollutant emission and/or discharge indicators to the State Register of facilities causing an adverse environmental impact", the "wastewater discharge outlets, including deepwater discharges into water bodies, with the exception of wastewater discharges from facilities causing an adverse environmental impact, which operate exclusively in coke production, extraction of crude oil and (or) natural gas, natural gas processing, extraction and enrichment of iron ores, electric power, gas and, steam supply, manufacture of drug substances, treatment of surfaces, items, and products" are to be equipped with automatic equipment for measurement.

It is planned to discharge treated wastewater at the facility; however, according to paragraph 89 of GOST R 53521-2009 "National Standard of the Russian Federation. Natural gas processing. Terms and definitions", natural gas liquefaction comes under the primary natural gas processing. Therefore, as the requirements of the above document are not applicable to the wastewater discharge outlet, its equipment with automatic measurement devices is not required.

Requirements for individual components of OEC are disjointed and distributed between several federal regulations. In particular, the Federal Law of the Russian Federation "On Air Protection" sets out responsibility of owners of sources of adverse chemical, biological, and physical impacts on the ambient air to carry out environmental control of their impacts, including inspections for compliance with established emission standards. This requirement is detailed by the sanitary regulations: *SanPiN 2.2.1/2.1.1.1200-03 Sanitary protection zones and sanitary classification of enterprises, structures, and other facilities (approved by the RF Chief State Sanitary Inspector Resolution dated 25.09.2007 No. 74) and SanPiN 2.1.6.1032-01 Hygienic Standards for atmospheric air quality in settlements (approved by the RF Chief State Sanitary Inspector Resolution No. 14) require monitoring being conducted at the boundaries of the SPZ and nearest subject territories, regulate sampling, provide for submitting of the results of the OEC to the territorial authorities and the state sanitary and epidemiological supervisory agencies.* 

The requirements for water bodies monitoring within the OEC are set out in the Water Code, Orders of the Ministry of Natural Resources and Environment of the Russian Federation (e.g., the Order dated 08.07.2009 No. 205 "On the approval of registration of amounts of water resources taken (withdrawn) from water bodies and discharges of wastewater and/or drainage water, and the quality thereof, by owners of water bodies and water users"), decisions on the provision of water bodies for use. More specifically, it has been established that water users shall keep a continuous record of discharges by the use of automatic means included in the State Register, and agree with the territorial authorities of the Federal Agency for Water Resources upon the program of measurement, including the scheme establishing the sampling points, to determine the composition of discharges using appropriate measuring instruments.

The objects of monitoring under the OEC can and in certain cases shall be not only surface, but also groundwater bodies. The schedule of such monitoring is regulated by the sanitary regulations SP 2.1.5.1059-01 Hygienic standards for underground water protection against pollution (approved by the RF Chief State Sanitary Inspector Resolution of 25.07.2001 No. 19) and its necessity is also prescribed for underground water supply facilities, mining operations, waste disposal facilities operation.

The objectives of industrial environmental monitoring (IEM) are mainly focused on collecting information on environmental status of the project area of influence: 1) qualitative and quantitative monitoring of environmental status of individual components of the natural environment and ecosystems as a whole; 2) an integrated assessment of ecosystem change during the planned activities being performed; 3) forecast of development of natural-anthropogenic complexes created as a result of controlled activities; 4) identification of areas of environmental risk; 5) assessment of efficiency and adequacy of environmental design solutions; 6) development of recommendations for making decisions to reduce and prevent negative impacts of controlled activities on the environment.

Operational environmental control and industrial environmental monitoring are one of the basic forms of environmental support of economic activity. Development of measures for Operational environmental control and industrial environmental monitoring is carried out at all stages of environmental support of economic activity. The first proposals on the organisation of environmental monitoring are formulated based on the results of surveys (SP 47.13330.2012, clause 8.5.2). Their further specification is performed in the EIA and Project materials (being framed in a form of a Programme, which is provided for by paragraph 40 of the Russian Federation Government Resolution dated 16.02.2008 No. 87 "On the structure of the project design documentation and requirements to its contents"). The commencement of the project also launches monitoring, the procedure or program of which is prepared by the implementing organization and approved by the client in its final and most detailed form.





#### 2.2.2 Yamalo-Nenets Autonomous Okrug Legislation

The environmental, health, and safety legislation of the Yamal-Nenets Autonomous Okrug (YNAO) is focused on addressing issues typical for the region and is constantly evolving. The key regional laws and regulations containing YNAO specific requirements, which are to be taken into account in the course of this Project implementation, are provided below.

YNAO Law dated 27.06.2008 No. 53-ZAO "On Environment Protection in the Yamal-Nenets Autonomous Okrug". The law is aimed at ensuring favorable environment, environmental safety, biodiversity conservation, creating conditions needed to protect natural environment and critical needs of the population from potential adverse impacts coming from economic or other activities, acts of God, natural and technogenic accidents and their consequences.

The law provides for the development of regional environmental quality standards and standards for permissible levels of impact on the environment from economic or other activities, which are to be below the federal standards.

Pursuant to the Law, the YNAO Red Data Book is established to protect and keep track of rare and endangered species of animals, plants, and other organisms within the Okrug<sup>17</sup>. There is a Red Data Book of Soils of the Autonomous Okrug established in order to take stock of and protect rare and endangered soils.<sup>18</sup>

YNAO Law of dated 28.12.2005 No. 114-ZAO "Concerning State support of the Indigenous low-numbered peoples of the North and organizations engaged in traditional economic activities within Yamal-Nenets Autonomous Okrug". The law lays down legal foundations and types of governmental support to ILNP communities and organizations engaged in traditional economic activities within YNAO and registered as a legal person therein.

As part of State support, YNAO executive authorities ensure that:

- ILNP exercise their rights to use biological resources in areas of their traditional residence and traditional economic activities practiced for food self-sufficiency;
- support for the production and sale of traditional products (traditional economic economic activities include reindeer herding, reindeer product processing, including collection, storage, and currying of skins, ossified antlers, velvet antlers, endocrine glands, meat, and byproducts; fishing and selling of aquatic biological resources; fur farming, processing and selling of fur farming products; commercial hunting, processing and selling of hunting products; gathering of edible forest resources and medicinal plants);
- development of local popular arts and crafts (production of kitchenware, house appliances, boats, sledges (narts), other traditional means of transport, musical instruments, birch bark products, souvenirs from reindeer fur, animal skins, bird feathers, etc.).

The law makes it mandatory to disclose information to ILNP communities and organizations engaged in traditional economic activities about planned use of areas of their residence and economic activities for the purposes not relevant to ILNP activities.

YNAO Law N 49-ZAO of 06.10.2006 "On the protection of traditional habitats and lifestyles of the Indigenous low-numbered peoples of the North (ILNP) in Yamal-Nenets Autonomous Okrug". The law sets out guidelines for implementing governmental policy on protection of traditional habitats and lifestyles of ILNP, including environment protection:

- ensuring conservation and development of ILNP traditional types of natural resource use;
- creating conditions for preservation and revival of authentic traditional lifestyles of ILNP in order to support the development of authentic culture of the Indigenous small-numbered peoples of the North, preserving their customs and beliefs.

The law provides for mandatory environmental assessment of impacts on traditional habitats and lifestyles of ILNP.

<sup>&</sup>lt;sup>18</sup> Red Data Book of Soils has not been developed for the YNAO





<sup>&</sup>lt;sup>17</sup> Red Data Book of the YNAO is available online at https://www.yanao.ru/activity/2837/.Provision for the Red Data Book is approved by the Resolution of the YNAO Government dated 11.05.2018 No. 552-P "On Red Data Book of the Yamal-Nenets Autonomous Okrug".

YNAO Law dated 05.05.2010 No. 52-ZAO "On the areas of traditional natural resource use of regional significance in the Yamal-Nenets Autonomous Okrug". It sets out the rules for establishment, use, and protection of the areas of traditional natural resource use.

Traditional Natural Resource Use subjects within such areas are:

- persons representing the Indigenous low-numbered peoples of the North and communities of the Indigenous low-numbered peoples of the North in the YNAO;
- persons not belonging to the Indigenous low-numbered peoples of the North, but permanently dwelling in the areas of their traditional residence or economic activities, and engaged in the same traditional types of natural resource use and leading the same traditional way of life as the ILNP in the Autonomous Okrug.

Subjects of the traditional types of natural resource use are given precedence in the use of natural resources. In case of acquisition of land plots and other isolated natural sites within such areas for state or municipal needs, the subjects of traditional types of natural resource use shall receive compensation.

YNAO Law dated 27.02.2017 No. 1-ZAO "On aquaculture (fish farming), fishing, and conservation of aquatic biological resources in the Yamal-Nenets Autonomous Okrug". The law regulates relations in the field of fisheries and the conservation of aquatic biological resources (including for the purposes of maintaining traditional way of life and traditional economic activities of the ILNP) in the YNAO.

Fishing for the purpose of maintaining traditional way of life and carrying out traditional economic activities is practiced by indigenous people individually and by their communities in the Autonomous Okrug with or without the granting of fishing grounds.

Fishing for the purpose of maintaining traditional way of life and carrying out the traditional economic activities of the ILNP without the granting of fishing grounds is carried out with no need for permits to harvest (fish in) aquatic bioresources, with the exception of the harvesting (fishing) of rare and endangered species of aquatic bioresources.

YNAO Law dated 18.04.2007 No. 36-ZAO "Yamal-Nenets Autonomous Okrug Urban Planning Statute". The law regulates urban planning activities within the Autonomous Okrug, and stipulates that the primary objectives of such activities, inter alia, include:

- ensuring health and safety, as well as protection of the areas from the impacts of hazardous natural and technogenic processes and phenomena;
- preservation of traditional business and lifestyles of the Indigenous low-numbered peoples of the North and ethnic communities, historical territories of their residence and activities;
- conservation of cultural heritage sites (cultural and historical monuments) of the peoples of the Russian Federation;
- creating conditions for development of the production sector of the area.

YNAO Law dated 10.01.2007 No. 12-ZAO"On Health Care in the Yamal-Nenets Autonomous Okrug". The law provides for health care support to Indigenous low-numbered peoples of the North and other ethnic communities that lead traditional lifestyles within YNAO, including providing free medical services.

YNAO Law dated 26.06.2012 No. 56-ZAO "On Subsoil use in the Yamal-Nenets Autonomous Okrug". The law establishes the authorities of the executive bodies of the Autonomous Okrug, regulates the aspects of use of subsoil areas of local importance (types, terms, licences, accrual, transfer, and termination of rights to use) and subsoil rational use and protection.

YNAO Law dated 26.05.2015 No. 52-ZAO "On cultural heritage sites (historical and cultural monuments) of peoples of the Russian Federation within the Yamal-Nenets Autonomous Okrug". The law regulates relations arising in the field of preservation, use, promotion, and state protection of cultural heritage sites (historical and cultural monuments) of the peoples of the Russian Federation located in the territory of the YNAO.

YNAO Law 26.06.2012 dated No. 59-ZAO "On the regulation of certain relations in the field of hunting and conservation of hunting resources within the Yamal-Nenets Autonomous Okrug". The law specifies the list of hunting resources in the Autonomous Okrug. The objective of the Law is to establish rules and procedures for issuing permits to harvest game (hunting resources) on public hunting grounds: for which harvest limits has been established and not established (Article 5).





YNAO Law dated 06.06.2016 No. 34-ZAO "On reindeer herding in the Yamal-Nenets Autonomous Okrug" regulates relations in the field of reindeer herding in order to preserve traditional habitats and lifestyles of the Indigenous low-numbered peoples of the North (ILNP) in the Yamal-Nenets Autonomous Okrug.

YNAO Resolution dated 25.12.2013 No. 1135-P "On approval of the Yamal-Nenets Autonomous Okrug State Programme "Environmental Protection for 2014-2020" (as amended on 14.02.2020).

YNAO Government Resolution dated 28.12.2017 No. 132-PG "On approval of Popular Programme for the Indigenous low-numbered peoples of the North in the Yamal-Nenets Autonomous Okrug" highlights the importance of environmental protection as one of the factors of the protection of original habitats of the Indigenous low-numbered peoples of the North, provision for reclamation of lands and liquidation of accumulated environmental damage sites, formed in the previous century, in a timely manner, as well as importance of environmental monitoring and its improvement, including engagement of the representatives of the ILNP communities and ILNP civil society organisations into the monitoring process in the areas of traditional residence and practices of indigenous communities.

YNAO Law dated 02.03.2016 No. 1-ZAO "On the guarantees of the rights of persons leading the way of life traditional for the Indigenous low-numbered peoples of the North (ILNP) in the Yamal-Nenets Autonomous Okrug". The law provides for the distribution of powers among the authorities of the Autonomous Okrug , as well as financing of the main aspects of guarantees of the rights of persons leading the way of life traditional for the low- numbered peoples of the North, addressed in the text of the Law: public health and safety and social protection of the population; education; material security; legal assistance.

YNAO Government Resolution dated 27.10.2011 No. 792-P "On the endorsement of the Requirements on the prevention of loss of wildlife resources related to operation of industrial processes, as well as traffic arteries, pipelines, communication and power transmission lines within the territory of the Yamal-Nenets Autonomous Okrug". The document contains a set of obligatory measures and recommendations aimed at the prevention of animal losses in the course of performance of different types of economic activities associated with adverse environmental impacts. In particular, specific requirements are applied to design of water intake facilities, traffic arteries, communication systems, minimization of disturbance factors affecting animal species and compliance with standards established for impacts, installation of lighting at sites and structures.

YNAO Government Resolution dated 14.02.2013 No. 56-p "On the territorial system of environmental monitoring within license areas subject to the right to use subsoil for oil and gas extraction in the Yamal-Nenets Autonomous Okrug" sets out the procedure for implementation and performance of local environmental monitoring within license areas subject to the right to use subsoil for oil and gas extraction in the YAMO. The functions imposed on the enterprises, users of license subsoil areas, regardless of their organizational and legal forms and forms of ownership, include development of the local environmental monitoring programs; ensuring the implementation of territorial monitoring system within the boundaries of the license areas; development of information resources and reports, and provision of monitoring results; incorporation of these results into decision making process and implementation of relevant environmental measures.

YNAO Government Resolution dated 29.05.2014 No. 429-P "On approval of the Requirements for development of oil spill prevention and response plans in the Yamal-Nenets Autonomous Okrug". The document establishes requirements for the development of oil spill prevention and response plans (Appendix 1), information on emergencies (Appendix 2), and improvement of the report system (Appendix 3 and 4), as well as contains recommendations for organizations operating in the YNAO, regional authorities, and heads of the YNAO municipalities.

YNAO Government Resolution dated 31.01.2018 No. 69-P "On approval of regional standards for urban planning design of the Yamal-Nenets Autonomous Okrug", establishes regional standards for urban planning at the regional level. With respect to gas and oil refineries, this Resolution regulates the minimum density of land development.

YNAO Government Resolution dated 09.01.2020 No. 2-P "On approval of the Territorial Planning Scheme of the Yamal-Nenets Autonomous Okrug". Territorial Planning Scheme was developed for the following periods: initial year - the end of 2016, first line - the end of 2017, design lifetime - the end of 2037.

The Order of the Department of Natural and Resource Regulation, the Forest Relations, and Development of the Oil and Gas Complex of the Yamal-Nenets Autonomous Okrug dated 27.03.2017 No. 348 "On establishment of environmental quality standards "Background concentrations of polluting substances in snow cover, bottom sediments of surface water bodies, and vegetation in the Yamal-Nenets Autonomous





*Okrug".* The standards have been developed taking into account the environmental conditions of the YNAO and establish the background concentration of polluting substances in snow cover, bottom sediments of surface water bodies, and vegetation to limit and regulate the levels of pollution.

## 2.2.3 Tazovsky District Legislation

Among the laws and regulations at the municipal level, the following documents may be applicable to the Project:

- The District Head Resolution dated 09.11.2015 No. 51-pg "On the council for the protection of aquatic biological resources within the territory of the Tazovsky Municipal District";
- Tazovsky Municipal District Administration Resolution dated 11.01.2016 No. 1100 "On the approval
  of the procedure for exercising municipal function of "Supervision over the use and protection of
  the subsoil in the course of extraction of widespread mineral resources, as well as in the process
  of construction of underground structures not related to mining in the inter-settlement territories
  in the Tazovsky Municipal District";
- Tazovsky Municipal District Administration Resolution dated 06.06.2012 No. 346 "On approval of the Provision on the procedure for public hearings on the selection of land plots for construction and on consideration of the materials on the assessment of environmental impacts from the planned economic and other activities in the Tazovsky Municipal District";
- According to the Provision, "public hearings are considered eligible with the participation of more than half of the residents who have the right to vote, permanently or mainly residing in the areas planned for withdrawal, where they pursue traditional husbandry and engage in traditional crafts and economic activities". To ensure these requirements is met in case of public hearings among the tundra population, the company implementing the planned activity, as a rule, conducts a survey among representatives of the indigenous peoples of the North. According to paragraph 2.1.5 of the Provision, in the process of public discussions, it is required to seek opinions of citizens dwelling in the Tazovsky District on permissibility of the implementation of the planned economic and other activities within the District in a form of personally made entries to the survey journal.
- Tazovsky Municipal District Administration Resolution
- dated 17.08.2017 No. 1032 "On approval of the Procedure for organisation of public discussions of socially significant issues and draft decisions of the local authorities of the Tazovsky Municipal District;
- Decision of the District Duma (Counsil) of the Tazovsky Municipal District dated 18.05.2018 No. 8-5-38 "On approval of the Provision on the procedure for organising and conducting public discussions or public hearings on urban planning activities in the Tazovsky Municipal District";
- Decision of the District Duma of the Tazovsky Municipal District dated 16.12.2009 No. 7-8-91 "On approval of the Schematic layout map of the Tazovsky Municipal District" (as amended on 20.12.2019);
- Decision of the District Duma of the Tazovsky Municipal District dated 28.11.2012 No. 9-11-80 "On approval of the Strategy of the social and economic development of the Tazovsky Municipal District until 2025" (as amended on 05.12.2018).

## 2.3 International treaties and conventions

The RF has ratified a number of international conventions concerned with environmental and social protection, the requirements of which shall be met in the course of development and implementation of the planned activities. In addition, there are also listed some international conventions not ratified at the national level, but included here as the Russian Federation contemplates their ratification and / or some of the requirements set by the IFC Performance Standards (section 2.4.2) are based on the principles stated in these international agreements and relevant guidelines. In this case, the provisions of these conventions are informative and persuasive rather than conclusive. The conventions that are not ratified by the Russian Federation are provided with a footnote reference. A description of the relevant international treaties and conventions is provided in the Project Standards Document.

## **Environmental Impact Assessment**

 Convention on Environmental Impact Assessment in a Transboundary Context, 1991 (amended in 2004) (Espoo Convention<sup>19</sup>).

<sup>&</sup>lt;sup>19</sup>The Espoo Convention has not been ratified by the Russian Federation; this document is listed here as the Russian Federation contemplates its ratification. The Espoo Convention lays down the general obligation of states to notify and consult each other on all major projects under





#### **Biodiversity**

- Convention on Biological Diversity, 1992;
- Convention on the Protection of Migratory Species, 1979 (Bonn Convention)<sup>20</sup>, 1979;
- Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (came into force in 1999)<sup>21</sup>
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)<sup>22</sup>, 1979;
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971 (the Ramsar Convention);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora,, 1973 (CITES).

#### Air quality and climate change

- United Nations Framework Convention on Climate Change, 1992
- Kyoto Protocol, 1997
- Paris Agreement, 2015
- Vienna Convention for the Protection of the Ozone Layer, 1988
- Montreal Protocol on Substances that Deplete the Ozone Layer, 1989
- Sofia Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes, 1988

#### Waste

- Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989 (Basel Convention)
- Minamata Convention on Mercury, 2013<sup>23</sup>

#### **Stakeholder Engagement**

 United Nations Economic Commission for Europe (UNECE), "Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention<sup>24</sup>), 1998

#### **Cultural Heritage**

- Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972
- International Convention for the Safeguarding of the Intangible Cultural Heritage, 2003.<sup>25</sup>

### Conventions concerning the rights of indigenous peoples

- ILO Convention No. 169 Concerning Indigenous and Tribal Peoples in Independent Countries, 1989<sup>26</sup>
- International Covenant on Civil and Political Rights, 1966

**Shipping** (in the context of vessels used during the construction phase, as well as associated facilities/activities in the operations phase of the Project)

- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention), 1972
- International Convention for the Prevention of Pollution from Ships, 1973, as amended by the Protocol of 1978 (MARPOL 73/78).

<sup>&</sup>lt;sup>26</sup>The Convention has not been ratified by the Russian Federation. Guide to IFC Performance Standard 7 on Indigenous Peoples refers to the Convention.





consideration that are likely to have a significant adverse environmental impact across boundaries. The Espoo Convention requirements are not applicable to the Project as its impacts are expected not to extend beyond the borders of the Russian Federation.

<sup>&</sup>lt;sup>20</sup> Russia is not a party to the Convention. IFC Performance Standard 6 relies on and supports the implementation of applicable regulations of international law and conventions, including Bonn Convention.

<sup>&</sup>lt;sup>21</sup> AEWA Agreement was established in accordance with the Article IV of the Convention on the Conservation of Migratory Species of Wild Animals. Russia is not a party to the Agreement.

<sup>&</sup>lt;sup>22</sup> Russia has been a party to the Council of Europe since 1995, but is not a party to the Bern Convention. The representative of the Ministry of Natural Resources and the Environment of the Russian Federation participates in the events in the capacity of observer.

<sup>&</sup>lt;sup>23</sup> At the time of writing the report, the Convention has been signed but not ratified by the Russian Federation.

<sup>&</sup>lt;sup>24</sup>The Aarhus Convention has not yet been ratified by the Russian Federation; however, this document is listed here as the Russian Federation contemplates to ratify it and mostly complies with its requirements.

<sup>&</sup>lt;sup>25</sup> Russia is not a party to the Convention yet.

- International Convention on Civil Liability for Oil Pollution Damage, 1969, and the Protocol of 1992 to amend the Convention
- International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971, and the Protocol of 1992
- Convention relating to the Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969
- International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004
- International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001
- United Nations Convention on the Law of the Sea, 1994 (UNCLOS)
- International Code for Ships Operating in Polar Waters (Polar Code), 2014
- Convention on the International Regulations for Preventing Collisions at Sea, 1972
- International Convention on Oil Pollution Preparedness Response and Co-operation, 1990 (OPRC 90)
- International Convention for the Safety of Life at Sea (SOLAS), 1974
- International Convention on Civil Liability for Bunker Oil Pollution Damage (Bunker Convention), 2001
- International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances<sup>27</sup> by Sea, 1996, as amended by the 2010 Protocol (HNS Convention)

# Industrial Safety

• Convention on the Transboundary Effects of Industrial Accidents, 1992.

# **Community and workforce**

- International Labor Organisation (ILO)<sup>28</sup> conventions including the core conventions protecting the rights of workers and indigenous population:
  - $_{\odot}$  ILO Convention 87 concerning Freedom of Association and Protection of the Right to Organise;
  - ILO Convention 98 concerning the Application of the Principles of the Right to Organise and to Bargain Collectively;
  - ILO Convention 29 concerning Forced or Compulsory Labour;
  - ILO Convention 105 concerning the Abolition of Forced Labour;
  - ILO Convention 138 concerning Minimum Age for Admission to Employment;
  - ILO Convention 169 concerning Indigenous and Tribal Peoples in Independent Countries;
  - ILO Convention 182 concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour (Worst Forms of Child Labour Convention);
  - ILO Convention 100 concerning Equal Remuneration for Men and Women Workers for Work of Equal Value (Equal Remuneration Convention);
  - ILO Convention 111 concerning Discrimination in Respect of Employment and Occupation (Discrimination (Employment and Occupation) Convention);
- The United Nations Convention on the Rights of the Child, 1989;
- International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families, 1990<sup>29</sup>.

## Human Rights

• The International Bill of Human Rights, 1948.

## **Regional agreements**

- Agreement on the Conservation of Polar Bears, 1973;
- Arctic Environmental Protection Strategy (AEPS) and Declaration on the Protection of the Arctic Environment ("Rovaniemi Declaration"), 1991
- Nuuk Declaration on Environment and Development in the Arctic, 1993.

<sup>&</sup>lt;sup>29</sup> Russia is not a party to the Convention. IFC PS2 refers to the requirements of this Convention.





<sup>&</sup>lt;sup>27</sup>At the time of the report being issued, the Convention has not yet entered into force.

<sup>&</sup>lt;sup>28</sup> Up to this moment, Russia has ratified 69 ILO conventions, including all essential ones.

In the year 1996, a leading intergovernmental forum – the **Arctic Council**<sup>30</sup> was established to provide means for cooperation, coordination, and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues; in particular, issues of sustainable development and environmental protection in the Arctic. The Council consists of the eight Arctic States: Canada, the Kingdom of Denmark, Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America.

The following six Working Groups are the essential part of the Council: Arctic Monitoring and Assessment Programme (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR, Protection of the Arctic Marine Environment (PAME) Sustainable Development Working Group (SDWG), Arctic Contaminants Action Program (ACAP). The output of the work of these Working Groups regularly includes advanced comprehensive assessment surveys on environmental and social issues, issues on development of the region and its environmental safety, and so on.

The Council also provides a space for international negotiations on development of legally binding agreements. There has already been three agreements concluded by the eight Arctic States as a result of this work:

- Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, Nuuk (Greenland), 2011;
- Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, Kiruna (Sweden), 2013;
- Agreement on Enhancing International Arctic Scientific Cooperation, Fairbanks (Alaska), 2017.

Among the latest documents issued by the Arctic Council, the following documents may be singled out as relevant in the context of the Project implementation:

- The Arctic Migratory Birds Initiative (AMBI) Work Plan 2019-2023 a project of the Conservation of Arctic Flora and Fauna (CAFF) Working Group (CAFF, May 2019);
- Good Practices for Environmental Impact Assessment and Meaningful Engagement in the Arctic including recommendations (SDWG, May 2019)<sup>31</sup>.

## **Bilateral agreements**

- Declaration of Friendship and Cooperation between Canada and the Russian Federation, 1992;
- Agreement Between the Governments of the Kingdom of Norway and the Government of the Russian Federation on Cooperation in the Field of Environmental Protection, 1992;
- Agreement Between the Governments of the United States of America and the Government of the Russian Federation on Cooperation in the Prevention of Pollution of the Environment of the Arctic, 1994.

## 2.4 International Financial Institutions Policies and Standards

The Arctic LNG 2 Project is being developed in accordance with the following International Financial Institutions (IFIs) standards:

- The Equator Principles (2020)<sup>32</sup>;
- The IFC Performance Standards (2012)<sup>33</sup>;
- The World Bank/IFC EHS Guidelines, including the General Guidelines and applicable Industry Sector Guidelines<sup>34</sup>;
- The Organization for Economic Cooperation and Development (OECD) Common Approaches (2016)<sup>35</sup>;
- World Bank Environmental and Social Framework (2018)<sup>36</sup>;

<sup>&</sup>lt;sup>36</sup> http://www.vsemirnyjbank.org/ru/programs/environmental-and-social-policies-for-projects/brief/the-environmental-and-social-framework-esf





<sup>&</sup>lt;sup>30</sup> https://arctic-council.org/ru/

<sup>&</sup>lt;sup>31</sup> https://oaarchive.arctic-council.org/handle/11374/2377

<sup>&</sup>lt;sup>32</sup> http://equator-principles.com/about/

<sup>&</sup>lt;sup>33</sup>http://www.ifc.org/wps/wcm/connect/topics\_ext\_content/ifc\_external\_corporate\_site/sustainability-at-ifc/policies-standards/performancestandards

<sup>&</sup>lt;sup>34</sup> http://www.ifc.org/wps/wcm/connect/topics\_ext\_content/ifc\_external\_corporate\_site/sustainability-at-ifc/policies-standards/ehs-guidelines

<sup>&</sup>lt;sup>35</sup>http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/ECG%282016%293&doclanguage=en

- Japan Bank for International Cooperation (JBIC) Guidelines for Confirmation of Environmental and Social Considerations (2015)<sup>37</sup>;
- NEXI (Nippon Export and Investment Insurance) Guidelines on Environmental and Social Considerations in Trade Insurance (2017)<sup>38</sup>.

### 2.4.1 Equator Principles

The Equator Principles (EP) is a set of ten volunteer environmental and social standards to be adhered to if the Project is to be financed by Equator Principles Financial Institutions (EPFIs). The Equator Principles were first launched in 2003 and subsequently updated by the Equator Principles Association in 2006 (EP II), 2013 (EP III), and 2020 (EP4). In November 2019 the Equator Principles Association released the latest iteration of the Equator Principles (EP4), which EPFIs are to put in place by October 1, 2020<sup>39</sup>.

The Equator Principles are applicable where total project capital costs are US\$10 million or more and focused on project environmental and social standards, as well as responsibilities to adhere thereto. The Equator Principles, in particular, highlight the protection of indigenous peoples, labor standards, and the importance of consultations with local population potentially affected by the intended activities.

The key changes introduced by EP4 and potentially applicable to the Project are outlined below in description of the relevant standard. In large part, the requirements of the new version of the Equator Principles (EP4) are in sync with the provisions of the IFC Performance Standards and international best practices.

The Equator Principles include:

- Principle 1: Review and Categorisation
- Principle 2: Environmental and Social Assessment
- Principle 3: Applicable Environmental and Social Standards
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan
- Principle 5: Stakeholder Engagement
- Principle 6: Grievance Mechanism
- Principle 7: Independent Review
- Principle 8: Covenants
- Principle 9: Independent Monitoring and Reporting
- Principle 10: Reporting and Transparency

Principles 1 to 6 are most applicable to the ESIA procedure.

**Principle 1: Review and Categorisation** includes the steps to be taken by the EPFIs to determine the project category in relation to its potential impacts. This procedure is based on the IFC classification of environmental and social risks.

Projects are categorised by the following criteria:

- *Category A* Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;
- Category B Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and
- *Category C* Projects with minimal or no adverse environmental and social risks and/or impacts.

Arctic LNG 2 Project corresponds to category A with consideration to existing spatial and technological solutions. For the Project, this category implies that the scale and nature of potential impacts of the intended activities extends beyond the boundaries of the Project sites, which requires the development of a wide range of specific measures aimed to limit these impacts in order to eliminate / mitigate the risks of various environmental and social impacts.

**Principle 2: Environmental and Social Assessment** highlights the need to conduct a Social and Environmental Assessment (e.g. a full-scale ESIA process, a limited or focused audit, or a straight-forward

<sup>&</sup>lt;sup>39</sup> EP4 was due to come into effect on July 1, 2020; however, due to Covid-19 situation, the EP Association has approved a 3 month extension of the current transition periodhttps://equator-principles.com/ep-association-news/additional-grace-period-for-ep4-transition-to-reflect-covid-19-challenges/.





<sup>&</sup>lt;sup>37</sup> https://www.jbic.go.jp/en/business-areas/environment.html

<sup>&</sup>lt;sup>38</sup> https://www.nexi.go.jp/en/environment/pdf/ins\_kankyou\_gl-e.pdf

assessment on site with immediate application of pollution standards, design criteria, or construction standards depending on the categorisation and significance of impacts) to address relevant social and environmental impacts and risks associated with the Project implementation. The assessment should also propose measures aimed at mitigation of impacts and risks as appropriate to the nature and scale of the Project.

EP4 introduce requirements for assessments of human rights impacts and climate change risk assessment as integral part of the ESIA or other type of assessment included in the project design documentation.

The client shall follow the UN Guiding Principles on Business and Human Rights in the process of human rights due diligence.<sup>40</sup>

Climate change risk assessment shall be conducted adopting the risk categories (transition risks, physical risks) identified by the Task Force on Climate-related Financial Disclosures (the TCFD).<sup>41</sup> The assessment of these risks is:

- required for all Category A projects and, as applicable, Category B projects and is to include consideration of all relevant physical risks specified by the TCFD.
- applicable for all projects in all locations, when combined Scope 1<sup>42</sup> and Scope 2<sup>43</sup> Emissions are expected to be more than 100,000 tonnes of CO<sub>2</sub> equivalent annually, and is to include consideration of relevant transition risks specified by the TCFD and alternative analysis to evaluate less greenhouse gas (GHG) emission intensive alternatives.

**Principle 3: Applicable Environmental and Social Standards** sets out a requirement to establish through assessment the Project's overall compliance with (or justified deviation from) the relevant host country laws, IFC Performance Standards on Environmental and Social Sustainability and EHS Guidelines.

The application of the Principal 3 is specified in EP4 as follows:

- for Designated Countries (Russia is a non-designated country), assessment of the project related risks is required to determine whether the IFC Performance Standards could be used as guidance to successfully address those risks, in addition to host country law;
- for all Category A and B projects regardless of their location, environmental and social due diligence is to be performed by the financial institutions (EPFIs) in order to review and confirm how the Project and the planned transaction meet each of the 10 Equator Principles.

**Principle 4: Management System and Action Plan** defines the need for Category A (and B) projects to maintain or establish an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree to an Equator Principles Action Plan (EPAP).

**Principle 5: Stakeholder Engagement** establishes the requirement to demonstrate effective Stakeholder Engagement, as an ongoing process in a structured and culturally appropriate manner, with affected communities and, where relevant, other stakeholders for all category A and category B projects. For Projects with potentially significant adverse impacts on affected communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to the risks and impacts of the project, the project's phase of development, the language preferences of the affected communities, their decision-making processes, and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion, and intimidation.

The client will take account of, and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. For the projects with environmental or social risks and adverse impacts, the disclosure of information should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis.

EP4 strengthen the obligations for stakeholder engagement with indigenous communities, which now specify requirements for the FPIC (Free, Prior and Informed Consent) obtaining procedure with reference

<sup>&</sup>lt;sup>43</sup> Scope 2 Emissions are indirect GHG emissions associated with the off-site production of energy used by the Project.





<sup>&</sup>lt;sup>40</sup> https://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR\_RU.pdf

<sup>&</sup>lt;sup>41</sup> https://www.fsb-tcfd.org/wp-content/uploads/2017/12/FINAL-TCFD-Annex-Amended-121517.pdf

<sup>&</sup>lt;sup>42</sup> Scope 1 Emissions are direct GHG emissions from the facilities owned or controlled within the physical Project boundary.

to the paragraphs 13-17 of the IFC Performance Standard 7. It is required by the EPFIs, that the process of engagement with indigenous communities and its results are assessed for compliance with the requirements of the host country and IFC PS7 requirements by the qualified independent consultant.

EP4 broadly interpret requirements for stakeholder engagement and for providing access to the appropriate feedback and grievance mechanism for workers. The proposed definition of *workers* covers all personnel engaged in the Project implementation including contractors' and subcontractors' personnel, but excluding personnel of the primary suppliers (supply chain workers).

**Principle 6: Grievance Mechanism** sets out responsibility to establish a grievance mechanism as part of the management system that allow the proponent of certain measures to receive and facilitate resolution of concerns and grievances about the project's social and environmental performance raised by individuals or groups. The proponent should inform the Affected communities about the grievance mechanism in the course of its community engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a structural and culturally appropriate manner.

**Principle 7: Independent Review** establishes the requirement to carry out an Independent Review of the Assessment process documentation, including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation, by an independent environmental and social consultant with no direct relation to the client for all category A and, as appropriate, category B projects.

**Principle 8: Covenants** establishes requirement to covenant in the client's financing documentation to comply with environmental and social regulations.

Furthermore, for all category A and category B projects, the client will covenant in the financial documentation:

- to comply with the ESMPs and EP action plan (where applicable) during the construction and operation of the Project in all material respects;
- to provide periodic reports in a format agreed with the EPFI (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually); such reporting documents should be prepared by in-house staff or third party experts and should i) document compliance with the ESMPs and EP action plan (where applicable), and ii) provide representation of compliance with relevant local, state, and host country environmental and social laws and regulations and appropriate permits being in place; and
- to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.

**Principle 9: Independent Monitoring and Reporting** establishes the requirement to ensure continuous monitoring and reporting being performed after Financial Close and over the life of the loan by appointing an Independent ES Consultant or qualified and experienced external experts to verify monitoring information shared with EPFIs for category A and, as appropriate, category B projects.

**Principle 10: Reporting and Transparency** establishes the minimum client reporting requirements for all Category A projects and, as appropriate, Category B projects:

- the summary of the ESIA shall be made publicly accessible and available online; it shall contain findings on human rights associated risks and impacts, as well as on climate change, as applicable;
- Annual public reports on GHG Emission levels (combined Scope 1 and Scope 2 emissions and, where applicable, comparison of the sector-specific performance indicators for GHG emissions) shall be issued during the operational phase for projects with emission levels over 100,000 tons of CO<sub>2</sub>-equivalent annually.
- It is encouraged by PE4 to share commercially non-sensitive biodiversity data with the Global Biodiversity Information Facility (GBIF) and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications.

## 2.4.2 IFC Performance Standards (2012)

2012 IFC Environmental and Social Sustainability Policy provides for performance of mandatory screening and categorisation of every proposed project in order to identify structure and type of required environmental assessment. The resulting category also specifies IFC's institutional requirements for disclosure in accordance with IFC's Access to Information Policy. One of the four categories is assigned to a project depending from the project's type, location, sensitivity, and scale, as well as from the nature and scale of its potential environmental impact. For a description of the various categories, see Table 2.3 below.





Category	Description
Category A	Business activities with potential significant adverse environmental or social risks and/or
	impacts that are diverse, irreversible, or unprecedented.
Category B	Business activities with potential limited adverse environmental or social risks and/or
	impacts that are rew in number, generally site-specific, largely reversible, and readily
	addressed through mitigation measures.
Category C	Business activities with minimal or no adverse environmental or social risks and/or
	impacts.
Category FI	Business activities involving investments in FIs or through delivery mechanisms involving
	financial intermediation. The project under consideration can not be categorized as such.

#### Table 2.3: IFC project categories:

The Project under consideration can potentially result in significant adverse environmental and social impacts. Due to this, the Project is categorised as Category A. However, most of the Project impacts may be limited and controlled through the use of appropriate environmental and social management procedures and monitoring implementation, which will be defined in the Stakeholder Engagement Plan, the Environmental and Social Action Plan, and the ESIA report, as well as in the relevant management plans for construction and operations phases.

IFC is a member of the World Bank Group and is recognized for its worldwide leadership in development and implementation of policies aimed at achievement of environmental and social sustainability. Within the framework of "sustainable development" defined in the IFC Policy on Environmental and Social Sustainability, the corporation reviews projects using the set of E&S Performance Standards (PSs).

- PS 1: Assessment and Management of Environmental and Social Risks and Impacts
- PS 2: Labor and Working Conditions
- PS 3: Resource Efficiency and Pollution Prevention
- PS 4: Community Health, Safety, and Security
- PS 5: Land Acquisition and Involuntary Resettlement
- PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- PS 7: Indigenous Peoples
- PS 8: Cultural Heritage

**PS1** applies to all projects that have environmental and social risks and impacts. The Performance Standards should be read together and cross-referenced as needed. The requirements section of each Performance Standard applies to all activities financed under the project, unless otherwise noted in the specific limitations described in each paragraph.

PS1 sets out seven minimum requirements or elements, which shall be taken into account in the course of ESMS development and can be defined as follows:

- establishing a framework concept (policy) for achieving and maintaining in working condition compliance with national legislative and regulatory legal requirements, as well as achieving the environmental and social goals of the project;
- identification of the processes of identification of risks and impacts with constant consideration of changes in the project during the entire life cycle of the Project;
- developing management programs or procedures to reduce the identified environmental and social risks and impacts of the project, and mitigate the adverse environmental and social impacts associated with them in linking these programs to changes in the project;
- providing support for the organizational structure of staff competence;
- establishing acceptable mechanisms for emergency preparedness and response;
- supporting the process of ongoing engagement of / engaging with stakeholders; and
- establishing a process for monitoring and analyzing the performance of activities in the field of environmental protection and the social sphere as the basis for continuous improvement.

In accordance with **PS2**, establishing constructive relationships between employees and management, as well as ensuring fair treatment and safe and healthy working conditions for employees, allows clients implementing infrastructure projects to receive material benefits, such as improved production efficiency and productivity growth.





The requirements of this standard are developed taking into account several international conventions and agreements, including ILO and UN documents. The specific objectives of this standard are:

- to establish, maintain, and improve the worker-management relationship;
- to promote the fair treatment, non-discrimination, and equal opportunity of workers, as well as to promote compliance with national employment and labor laws;
- to protect workers through addressing the problem of forced and child labor;
- to create safe and healthy working conditions;
- to protect and promote the health of workers.

**PS3** recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention, and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world. These are often implemented through continuous improvement methodologies similar to those used to enhance quality and productivity, which are generally well known to most industrial sector companies.

The PS3 specific objectives are:

- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- To promote more sustainable use of resources, including energy and water.
- To reduce project-related GHG emissions.

**PS4** recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the client's responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups. Therefore, the particular objectives of this PS are:

- to anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances; and
- to ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

**PS5** recognizes that project-related acquisition of land plots and land use restrictions associated with project implementation can have a negative impact on communities and individuals using these lands. Involuntary resettlement implies both physical relocation (relocation to a new place or loss of a home) and economic displacement (loss of property or access to resources for income generation or other means of livelihood) due to land acquisition and/or restrictions on land use. The primary objectives of this Performance Standard are:

- to avoid, and when avoidance is not possible, minimize forced eviction;
- to anticipate and avoid or, where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost<sup>44</sup> and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected;
- to improve, or restore, the livelihoods and standards of living of displaced persons;
- to improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.

**PS6** recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological

<sup>&</sup>lt;sup>44</sup> Replacement cost is defined as the market value of the assets plus transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account.





Diversity, which defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems."

Objectives of this PS:

- to protect and conserve biodiversity.
- to maintain the benefits from ecosystem services defined as various ecosystem functions and benefits for people and other resources; and
- to promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

For the purposes of implementation of this Performance Standard, habitats are divided into modified, natural, and critical. Critical habitats are a subset of modified or natural habitats.

<u>Modified habitats</u> are areas that may contain a large proportion of plant and/or animal species of nonnative origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. This Performance Standard applies to those areas of modified habitat that include significant biodiversity value, as determined by the risks and impacts identification process. The client should minimize impacts on such biodiversity and implement mitigation measures as appropriate.

<u>Natural habitats</u> are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.

The client will not significantly convert or degrade natural habitats, unless all of the following are demonstrated:

- no other viable alternatives within the region exist for development of the project on modified habitat;
- consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation; and
- any conversion or degradation is mitigated according to the mitigation hierarchy.

In areas of natural habitat, mitigation measures shall be designed to achieve no net loss<sup>45</sup> of biodiversity where feasible. Appropriate actions include:

- avoiding impacts on biodiversity through the identification and protection of set-asides46;
- implementing measures to minimize habitat fragmentation, such as biological corridors;
- restoring habitats during operations and/or after operations;
- implementing biodiversity offsets.

<u>Critical habitats</u> are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated:

- no other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- the project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- the project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and

<sup>&</sup>lt;sup>46</sup>Set-asides are land areas within the project site, or areas over which the client has management control, that are excluded from development and are targeted for the implementation of conservation enhancement measures. Set-asides will likely contain significant biodiversity values and/or provide ecosystem services of significance at the local, national and/or regional level. Set-asides should be defined using internationally recognized approaches or methodologies (e.g., High Conservation Value, systematic conservation planning).





<sup>&</sup>lt;sup>45</sup>No net loss" is defined as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g., local, landscape-level, national, regional).

• a robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

In such cases where a client is able to meet the above requirements, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains<sup>47</sup> of those biodiversity values for which the critical habitat was designated.

In instances where biodiversity offsets are proposed as part of the mitigation strategy, the client must demonstrate through an assessment that the project's significant residual impacts on biodiversity will be adequately mitigated to meet the above requirements.

**PS7** recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat.

Objectives of this PS:

- to ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.
- to anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts.
- to promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.
- to establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle.
- to ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present.
- to respect and preserve the culture, knowledge, and practices of Indigenous Peoples.

Affected Communities of Indigenous Peoples may be particularly vulnerable to the loss of, alienation from or exploitation of their land and access to natural and cultural resources. In recognition of this vulnerability, in addition to the General Requirements of this Performance Standard, the client will obtain the FPIC of the Affected Communities of Indigenous Peoples in the following circumstances:

- Impacts on lands and natural resources subject to traditional ownership or under customary use;
- Relocation of Indigenous Peoples from lands and natural resources subject to traditional ownership or under customary use;
- Critical cultural heritage.

There is no universally accepted definition of FPIC. FPIC builds on and expands the process of Informed Consultation and Participation (ICP) and is established through good faith negotiation between the client and the Affected Communities of Indigenous Peoples. The client documents: (i) the mutually accepted process between the client and Affected Communities of Indigenous Peoples, and (ii) evidence of agreement between the parties as the outcome of the negotiations. FPIC does not necessarily require unanimity and may be achieved even when individuals or groups within the community explicitly disagree.

**PS8** recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities.

Objectives of this PS:

- To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To promote the equitable sharing of benefits from the use of cultural heritage.

<sup>&</sup>lt;sup>47</sup>Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated. Net gains may be achieved through the development of a biodiversity offset and/or, in instances where the client could meet the requirements of this Performance Standard without a biodiversity offset, the client should achieve net gains through the implementation of programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity.





Performance Standards are supported by Guidance Notes. The Guidance Notes offer guidance on the requirements contained in the Performance Standards, including reference materials, and on good environmental and social sustainability practices to help improving the project performance. In July of 2019, the Guidance Note providing guidance for application of one of the Standards – NG6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources) - has been updated and reissued.

## 2.4.3 Applicable IFC EHS Guidelines

The World Bank / IFC Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), as defined in IFC Performance Standard 3 on Resource Efficiency and Pollution Prevention. The EHS Guidelines contain the performance levels and measures that are normally acceptable to the IFC and are generally considered to be achievable in new facilities at reasonable costs using existing technology.

The IFC EHS Guidelines comprise both general and industry-specific guidelines. The IFC General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. It is designed and should be used together with the relevant industry sector specific guidelines.

The following IFC guidelines are relevant to the intended activities:

- General EHS guidelines (April 2007);
- EHS Guidelines for Liquefied Natural Gas (LNG) Facilities (April 2017);
- EHS Guidelines for Onshore Oil and Gas Development. (April 2007);
- EHS Guidelines for Offshore Oil and Gas Development. (June 2015) (in regard to hydrocarbons storage and loading facilities);
- EHS Guidelines for Thermal Power Plants (December 2008);
- EHS Guidelines for Ports, Harbors, and Terminals (February 2017);
- EHS Guidelines for Crude Oil and Petroleum Product Terminals (April 2007);
- EHS Guidelines for Waste Management Facilities (December 2007);
- EHS Guidelines for Water and Sanitation (December 2007);
- EHS Guidelines for Shipping (April 2007);

Other applicable IFC guidelines and procedures, including:

- IFC Environmental and Social Review Procedures, 2016;
- Environmental and Social Management System (ESMS) Implementation Handbook (General), 2015;
- Environmental and Social Management System (ESMS) Implementation Handbook (Construction), 2014;
- Stakeholder Engagement (A Good Practice Handbook for Companies Doing Business in Emerging Markets), 2007;
- Good Practice Note: Managing Contractors' Environmental and Social Performance (October 2017);
- Good Practice Handbook: Use of Security Forces: Assessing and Managing Risks and Impacts (February 2017);
- Workers' accommodation: processes and standards (A guidance note by IFC and the EBRD), 2009;
- Good Practice Handbook: on Cumulative Impact Assessment and Management. Guidance for the Private Sector in Emerging Markets (August 2013)
- 2.4.4 The Organization for Economic Cooperation and Development (OECD) Common Approaches (2016)

Export Credit Agencies (ECAs) of OECD-member countries apply the Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (the Common Approaches) revised in 2016.

The Common Approaches provide guidance to ECAs on screening, classification, and review of projects under their consideration. Review includes the benchmarking of projects against the relevant aspects of creditor-country's standards and one or more international standards listed below:

- all ten World Bank EHS Standards;
- all eight IFC Performance Standards;
- relevant provisions of the standards applied by regional development banks (such as EBRD);
- relevant internationally accepted standards, such as European Union (EU) Standards.



RAMBOLL



In addition, member-countries can also benchmark projects against appropriate provisions of the internationally recognised sector-specific and issue specific standards, which are out of scope of the World Bank Group Standards.

#### 2.4.5 World Bank Environmental and Social Framework (2018)

On August 04, 2016, the World Bank approved a new version of the Environmental and Social Framework, which came into effect in October, 2018.

The framework brings the World Bank's environmental and social protections into closer harmony with those of other development institutions, and makes important advances in areas such as transparency, non-discrimination, social inclusion, public participation, and accountability – including expanded roles for grievance redress mechanisms.

The approved Environmental and Social Framework introduces comprehensive labor and working condition protection; an over-arching non-discrimination principle; community health and safety measures that address road safety, emergency response and disaster mitigation; and a responsibility to include stakeholder engagement throughout the project cycle.

The ES Framework comprises a Vision for Sustainable Development, the World Bank Environmental and Social Policy for Investment Project Financing, and ten Environmental and Social Standards (ESS). They set out the mandatory World Bank requirements for Borrowers and the requirements that the Bank must follow regarding projects it supports through Investment Project Financing.

### **Environmental and Social Standards:**

- Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Environmental and Social Standard 2: Labor and Working Conditions
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management;
- Environmental and Social Standard 4: Community Health and Safety;
- Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Environmental and Social Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
- Environmental and Social Standard 8: Cultural Heritage;
- Environmental and Social Standard 9: Financial Intermediaries;
- Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.
- 2.4.6 Japan Bank for International Cooperation (JBIC) Guidelines for Confirmation of Environmental and Social Considerations (2015)

In 2015, the JBIC has reviewed its Guidelines for Confirmation of Environmental and Social Considerations, which were adopted on April 1, 2012.

The Guidelines' objective is to ensure consideration of the environmental and social aspects in all projects subject to lending or other financial operations by JBIC.

In the process of confirmation of environmental and social considerations, JBIC places importance on dialogue with the host country (including local governments), borrowers, and project proponents ("borrowers and related parties") regarding environmental and social considerations, while respecting the sovereignty of the host country. JBIC also takes note of the importance of transparent and accountable processes, as well as the participation in those processes of stakeholders in the project concerned, including local residents and local NGOs affected by the project ("stakeholders").

For confirmation of environmental and social considerations, JBIC undertakes:

(a) classification of the project into one of four categories: A, B, C, and FI ("screening");

(b) reviews on environmental and social considerations when making a decision on funding, to confirm that the requirements are duly satisfied;

(c) monitoring and follow-up after the decision on funding has been made.





A proposed project is classified as Category A if it is likely to have a significant adverse impact on the environment. A project with complicated impact or impact, which is difficult to assess due to lack of precedence, is also classified as Category A. The impact of Category A projects may affect an area broader than the sites or facilities subject to physical construction. Category A, in principle, includes projects in sensitive sectors or with sensitive characteristics and projects located in or near sensitive areas. An illustrative list of sensitive sectors, characteristics, and areas is given in Section 3 of Part 2.

JBIC list of "Sensitive Sectors" includes Oil and natural gas development (2), Pipelines (3), Oil, gas and chemical terminals (8), Ports and harbors (18).

JBIC classification of socially "sensitive" areas include areas inhabited by indigenous peoples with traditional ways of life.

For Category A projects, JBIC checks the extent of stakeholder participation and information disclosure being undertaken for the project, in accordance with the environmental impact assessment systems of the host country.

JBIC ascertains whether a project complies with environmental laws and standards of the host national and local governments concerned, as well as whether it conforms to their environmental policies and plans.

JBIC also ascertains whether a project meets the relevant aspects of the World Bank Safeguard Policies and the IFC Performance Standards regarding environmental and social considerations. In addition, where appropriate, JBIC also uses, as reference points or benchmarks, standards established by other international financial institutions, other internationally recognized standards and/or good practices established by developed countries such as Japan regarding environmental and social considerations.

Environmental reviews for Category A projects examine the potential negative and positive environmental impact of projects. JBIC evaluates measures necessary to prevent, minimize, mitigate or compensate for potential negative impact, if any such measures are available. Borrowers and related parties must submit Environmental Impact Assessment (EIA) reports and environmental permit certificates issued by the host governments or other appropriate authorities for Category A projects.

When third parties point out in concrete terms that environmental and social considerations are not being fully undertaken, JBIC forwards such claims to the borrowers and, if necessary, encourages them to request the project proponents to take appropriate action.

If JBIC judges that there is a need for improvement in the situation with respect to environmental and social considerations, it may ask the project proponent to take appropriate actions through the borrower and in accordance with the loan agreement. If the response of the project proponent is inappropriate, JBIC may consider taking its own actions in accordance with the loan agreement, including the suspension of the disbursement.

### Environmental and Social Considerations Required for Funded Projects

The principles of environmental and social compliance are the following:

- Environmental impact, which may be caused by a project, must be assessed and examined from the earliest planning stage possible. Alternative proposals or mitigation measures to prevent or minimize adverse impact must be examined, and the findings of such examinations shall be incorporated into the project plan. Such examination must include analysis of environmental costs and benefits in as quantitative terms as possible and be conducted in close harmony with economic, financial, institutional, social, and technical analysis of the project;
- For projects that have particularly significant adverse impact or are highly contentious, a committee of experts may be formed to seek their opinions as appropriate, in order to increase accountability.

Examination of mitigation Measures:

- Multiple alternative proposals must be examined to prevent or minimize adverse impact. In examination of measures, priority is to be given to the prevention of environmental impact, and when this is not possible, measures aimed at minimization and mitigation of environmental impact must be considered next.
- Compensation measures must be examined only when impact cannot be prevented by any of the aforementioned measures;
- Appropriate follow-up plans and systems, such as monitoring plans and environmental management plans, must be prepared; and costs of implementing such plans and systems, and





financial methods to fund such costs, must be determined. Plans for projects with particularly large potential adverse impact must be accompanied by detailed environmental management plans.

Scope of Impact to be Examined

- Environmental impacts to be investigated and examined include impact on human health and safety, as well as the natural environment through air, water, soil, waste, accidents, water usage, ecosystem and biota; social concerns including respect for human rights, such as involuntary resettlement, indigenous people, cultural heritage, landscape, gender, children's rights, communicable diseases, working conditions; and impact that may lead to trans-boundary and global environmental problems; and
- In addition to the direct and immediate impact of projects, derivative, secondary, and cumulative impact are also to be examined and investigated to a reasonable extent.

Compliance with Laws, Standards, and Plans

- Projects must comply with laws and regulations, and standards relating to environmental and social considerations established by the governments governing the project site; and
- Projects must, in principle, be undertaken outside protected areas that are specifically designated by laws or regulations of the government for the conservation of nature or cultural heritage. Projects also shall not impose significant adverse impact on specially protected natural territories.

Social Acceptability and Social Impacts

- For projects with a potentially large environmental impact, sufficient consultations with stakeholders, such as local residents, must be conducted via disclosure of information from an early stage where alternative proposals for the project plans may be examined. The outcome of such consultations must be incorporated into the contents of the project plan; and
- Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, the poor, and ethnic minorities.

Ecosystem and Biota

- Projects must not involve significant conversion or significant degradation of critical natural habitats including critical forests areas; and
- In case the project involves the significant conversion or degradation of natural habitats including natural forests, priority is to be given to the prevention of environmental impact. When this is not possible, appropriate mitigation measures must be established. Evaluation of the impact on natural habitats by the project and consideration for the offset measures should be based on expert opinion.
- Illegal logging of forests must be avoided.

Involuntary Resettlement

• Involuntary resettlement and loss of means of livelihood are to be avoided where feasible.

The following conditions for development of ESHIA Reports for Category A projects are to be met:

- When assessment procedures already exist in host countries, and projects are subject to such procedures, borrowers and related parties must officially complete those procedures and obtain the approval of the government of the host country.
- In preparing ESHIA reports, consultation with stakeholders, such as local residents, shall take place after sufficient information has been disclosed. Records, etc. of such consultations shall be prepared.
- Consultations with relevant stakeholders, such as local residents, should take place if necessary throughout the preparation and implementation stages of a project. Conducting consultations is highly desirable, especially when the items to be considered in the ESHIA are being selected, and when the draft report is being prepared.

### Information Disclosure Requirements

1) General Principles

JBIC welcomes information provided by concerned organizations and stakeholders, so that it may consider a diverse range of opinions and information in its environmental reviews and monitoring.

In order to encourage concerned organizations and stakeholders to provide information to JBIC at an early stage and to ensure its accountability and transparency in the environmental review process, JBIC makes available important information on environmental reviews in ways appropriate to the nature of the project,





while the environmental review is in progress. JBIC may also, when necessary, seek the opinions of concerned organizations and stakeholders.

In addition to the aforementioned principles, if requested by third parties, JBIC will provide them with information regarding environmental and social considerations within its capacity to do so.

JBIC respects the confidentiality of the commercial and other matters of the borrowers and related parties, and observes concurrently the principles of information disclosure and such confidentiality. Following such approach, JBIC encourages the borrowers and related parties to exclude such confidential information from any documents on environmental considerations submitted by them that may later be subject to public disclosure. Furthermore, information that is prohibited from public disclosure in the agreement between JBIC and the borrower may be disclosed only with either the agreement of the borrowers or in accordance with legal requirements.

2) Timing of Disclosure and Content of Disclosed Information

### <u>Overview</u>

JBIC discloses information depending on the nature of the project. Usually, the information is made promptly available on the JBIC website, as soon as it is received by the Bank.

#### Information disclosure during environmental review

Prior to making decisions on funding, JBIC discloses the following information:

- Upon completion of the screening of a project, JBIC discloses the project name, country, location, an outline and sector of the project, and its category classification, as well as the reasons for that classification;
- For category A and category B projects, JBIC discloses the status of acquirement of the ESHIA reports and environmental permit certificates, as well as such reports and permits obtained from the borrowers and related parties for confirming environmental and social considerations.
- JBIC discloses the status of acquirement of the documents other than the ESHIA reports and environmental permit certificates and such documents obtained from the borrowers and related parties for confirming environmental and social considerations if those being made available to the public in the host country.
- 3) Information Disclosure after Executing a Loan Agreement
  - For Category A, B, and FI projects the results of environmental reviews
  - For Category A and B projects the results of monitoring

### 2.4.7 NEXI Guidelines on Environmental and Social Considerations in Trade Insurance

Upon receiving the application for insurance services, NEXI verifies whether the project sponsors take into consideration environmental and social consequences of the project implementation. NEXI confirms whether the environmental and social considerations for the project are adequate and sufficient based on the Guidelines on Environmental and Social Considerations in Trade Insurance.

Procedures to confirm environmental and social considerations include:

1) screening – the applicant for insurance services for projects with maturity period of two years or more shall submit a filled screening form.

2) categorization of the project - a screening form, filled and submitted by the applicant, is used to classify the project into one of the three categories: A, B, or C, according to their environmental impact (similar to those of JBIC) Category A and B projects are subject to environmental review.

3) Environmental review - after the screening process, NEXI carries out environmental reviews of the project according to its category.

The applicant for insurance services for category A projects shall submit to NEXI the following documents:

- Environmental and Social Impact Assessment (ESIA) reports and environmental permit certificates;
- Resettlement plans, including livelihood restoration plans, in the case of projects involving largescale involuntary resettlement or significant loss of means of livelihood;
- Plans for indigenous peoples in the case of projects in which measures for indigenous peoples are required.





The project shall meet the requirements of national law, IFC standards, and applicable World Bank / IFC EHS Guidelines.

4) Ensuring compliance with environmental and social requirements

In cases where results of the environmental review indicate that a certain project might have a significant adverse environmental impact, NEXI will encourage the project sponsors (via the applicants for insurance services such as exporters and others) to undertake appropriate environmental and social considerations. In case the compliance with requirements is not sufficient, NEXI may refuse to conclude an insurance contract.

After conclusion of an insurance contract, the project sponsor (or exporter) is to provide NEXI with the results of monitoring for a certain period of time.

5) Disclosure of Information Regarding Confirmation of Environmental and Social Considerations - paying due consideration to the commercial confidentiality, NEXI discloses information on its website in Japanese and English languages, including information obtained upon completion of the screening process (as soon as possible, the project name, country, location, an outline and sector of the project, and its category classification, as well as the reasons for that classification), in the process of environmental review (on the status of preparation of ESHIA prior to conclusion of an insurance contract); after conclusion of an insurance contract (the results of the environmental review and monitoring).

6) Ensuring Compliance with the Guidelines - in order to ensure compliance with the Guidelines, NEXI accepts objections regarding non-compliance with the Guidelines and takes the necessary action.

## 2.5 European Union Environmental and Social Standards

The following EU Directives might be applicable to the intended activities:

- Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU;
- Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control);
- Directive 2003/35/EC providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment;
- Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage;
- Directive 2008/50/EC on ambient air quality;
- Regulation (EC) 2037/2000 on substances that deplete the ozone layer;
- Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control);
- Directive 2002/49/EC relating to the assessment and management of environmental noise;
- Directive 2000/60/EC establishing a framework for Community action in the field of water policy;
- Directive 2008/105/EC on environmental quality standards in the field of water policy;
- Directive 2006/118/EC on the protection of groundwater against pollution and deterioration;
- Directive 2008/98/EC on waste;
- Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances;
- Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora;
- Directive 2009/147/EC on the conservation of wild birds;
- Directive 98/83/EC on the quality of water intended for human consumption;

Directive 2010/75/EU establishes fixed emission limit values and lays out recommended schemes for equipment design and use to ensure a high level of protection of the environment as a whole through the use of the best available techniques (BAT).

The following EU BAT Reference Documents (BREF)<sup>48</sup> may be applicable to the Project:

- Refining of Mineral Oil and Gas, 2015;
- Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector, 2016;
- Large Combustion Plants, 2006;
- Emissions from Storage, 2006;
- Energy Efficiency, 2009.

<sup>48</sup> http://eippcb.jrc.ec.europa.eu/reference/




#### 2.6 Corporate Policies and Standards

Arctic LNG policy No. 109-PR on occupational health and safety, environment protection, and social responsibility has been approved on 24.05.2019. Currently, the development of the Integrated Management System in line with ISO 14001:2015 and ISO 45001:2018 is in progress for *LLC Arctic LNG 2*. Corporate standards and procedures are detailed in Chapter 14.

In 2016, NOVATEK approved a new version of the Environmental, Industrial Safety and Occupational Health Policy, including the company's obligations in compliance with the best Russian and international practices. The main controlled entities have an Integrated Health, Safety & Environmental Management System (HSE IMS), that complies with the requirements of ISO 14001:2004 and OHSAS 18001:2007 international standards, in place.





## 3. ESHIA PROCESS

#### 3.1 ESHIA Approach

The ESHIA is a process of identification, description and evaluation of the potential environmental, health and safety and social impacts of proposed activities, and determination of available corrective actions, i.e. measures to prevent the adverse impacts which can be avoided or reduced to an acceptable level, and to enhance any beneficial impacts.

The ESIA is intended to provide an accurate and comprehensive assessment of adverse impacts, benefits and potential risks of the planned implementation of Arctic LNG 2 Project, and develop prevention, mitigation and remediation measures for the identified environmental and social impacts, as well as the approaches to monitor and control them.

The methodology used for the ESHIA has been developed and successfully applied by Ramboll for assessment of impacts of major complex projects seeking loan finance from International Financial Institutions and Export Credit Agencies. The methodology is based on the provisions of the EU Directive 2011/92/EU "On the assessment of the effects of certain public and private projects on the environment"<sup>49</sup> and Performance Standard 1 of the International Finance Corporation (IFC) of the World Bank Group<sup>50</sup>. These two documents describe environmental and social impacts as any change to an environmental or social receptor (including community, workers, etc.), whether potential or actual, resulting from the business activity to be financed.

To ensure a robust and comprehensive impact assessment, the ESHIA process is structured around a series of progressive and iterative stages (Figure 3.1). Stakeholders, entities and individuals responsible for development/implementation of the Project design, the ESHIA team provide inputs to these stages. Public engagement is maintained at all stages of the ESIA process using the approaches which are discussed in Chapter 4.

From the methodology perspective, the ESIA process includes all necessary steps: from scoping, stakeholder identification and consultations, review of alternatives, identification and assessment of benefits and adverse impacts of the Project, to development of mitigation and remediation measures, and proposals for the control and monitoring to be undertaken.

In 2017-2018, the Consultant conducted the ESHIA for GBS LNG and SGC Plant which was approved by the Company and disclosed to interested parties<sup>51</sup>. That ESHIA findings were based on preliminary design stage of the Plant and duly considered in the framework of the current ESHIA of the Project. This ESHIA is informed by the relevant survey reports, environmental monitoring reports, national environmental impact assessments, planning, design and other documentation which have been prepared for the Arctic LNG 2 Project, as well as scientific publications, statutory reports, etc. Potential uncertainties which are discussed in Chapters 7 and 8 in the framework of the Arctic LNG 2 Project development are explained by limited accuracy in environmental and social scientific forecasts, and overall level of knowledge about the Arctic Region in general.

In order to ensure the Arctic LNG Project is fully compliant with the applicable requirements during its lifetime, the ESHIA provision included the update of applicable national and international requirements (Chapter 2), specific recommendations are developed for provision of further studies and management, corrective and compensation measures, as well as approaches to monitoring and control (Chapters 8-11).

<sup>&</sup>lt;sup>51</sup> «Plant for production, storage, loading of liquified natural gas and stabilized gas condensate on gravity-based structures», including three process trains and coastal infrastructure





<sup>&</sup>lt;sup>49</sup> Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the Assessment of the Effects of Certain Public and Private Projects on the Environment (amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014)

<sup>&</sup>lt;sup>50</sup> Performance Standard 1. Assessment and management of environmental and social risks and impacts. / Performance Standards on Environmental and Social Sustainability. - IFC, 2012.

Can be accessed at https://www.ifc.org/wps/wcm/connect/topics\_ext\_content/ifc\_external\_corporate\_site/sustainability-at-ifc/policies-standards/performance-standards



#### Figure 3.1: ESHIA Process<sup>52</sup>

<sup>&</sup>lt;sup>52</sup> ESMP – Environmental and Social Management Plan to be developed to ensure compliance with the applicable requirements. Wording of the title may vary depending on the terminology adopted by each specific project.





#### 3.2 ESHIA Scoping

Scoping of the project impact assessment activities is a key element of the preparation stage for international ESHIA.

Scoping is the process of identification of the content and extent of environmental and social information to be investigated and reported within the ESHIA, and methods to be used for the assessment. The scoping process is intended to identify the types of the environmental and social impacts to be examined and documented by the ESHIA, and define the most significant potential aspects and risks.

The main tasks at this stage include the following:

- Initial review (screening) of the documents provided by the Company with information on the project and its alternatives;
- Collection and initial review of the available information on environmental and social status of the concerned areas and water bodies, including identification of the most sensitive (vulnerable) receptors;
- Identification of similar projects for benchmarking of the proposed operations;
- Identification of applicable national and international requirements;
- Preliminary identification of stakeholders and initial consultations with them; and
- Initial identification of the Project impacts.

Outputs from fulfilment of the above tasks inform the following:

- Identification and definition of general methodology for assessment of the impacts;
- Listing further information needs for the assessment;
- Development of Stakeholder Engagement Plan;
- Preliminary identification of the project area of influence;
- Definition of structure of the ESHIA report.

The ESHIA scoping included a close review of the Project facilities and key design solutions as well as potential cumulative impacts of other new projects in the region, in compliance with international standards.

Results of the scoping stage are described in the report titled "Environmental and Social Impact and Risk Assessment for Arctic LNG 2 Project in compliance with International Finance Institutions' requirements. Scoping Report".

#### 3.3 Baseline Studies

Baseline studies are primarily undertaken at two key stages, i.e. scoping and impact assessment. However, as shown in Figure 3.1, they are an ongoing activity throughout the ESHIA Process. During scoping work, 'high-level' environmental baseline data are required to assist identification of likely gaps and key impacts to be considered in more detail at later stages. Where gaps are identified at the scoping stage between available baseline data and data required for the ESHIA, then additional surveys or studies are undertaken to collect the required data.

It is important to ensure that receptors are identified and analysed, and their sensitivity is determined during scoping and baseline studies. Receptors are environmental and social components that may be affected, adversely or beneficially, by the planned activities. Three high-level categories of receptors can be identified:

- Environmental (such as air quality, water bodies, landscapes, terrestrial soils, marine sediments, etc.);
- Biodiversity and biological resources (such as habitats, ecosystem, species and ecosystem services, for example, flood protection provided by nearby wetlands); and
- Social (such as local communities, businesses, land and other resource users, heritage resources).

Details of receptor categorization and the approach to assessment of their sensitivity to impacts are provided in subsection 3.5.6.





### 3.4 Impact Identification and Evaluation of Significance

#### 3.4.1 Identification of Impacts

The following approach supports identification of environmental, social and cumulative impacts:

- Review of previous studies, surveys, impact assessments, environmental monitoring data in the proposed location area of the planned operations and associated facilities of the Project;
- Review of the design documentation, including potential alternatives, as well as characteristics of the proposed operations (separately for construction, operation, decommissioning) and associated activities which may cause environmental, social and human health impacts;
- Consideration of the local area development plans and strategic development programmes for the region;
- Review of applicable national and international requirements and standards, and requirements of the International Financial Institutions;
- Stakeholder consultation, including their input to identification, mitigation and control of impacts of the proposed operations. Stakeholder engagement should be initiated early in the planning stage, to ensure open access to all relevant information;
- "Source Path Receptor" Analysis<sup>53</sup>. Potentially significant social and environmental impacts are also identified by structured analysis of potential sources of impacts, ways they can impact the environment and human health (e.g. direct impact or transport of pollution emissions/discharges in the environment), and sensitivity of potentially affected receptors.

Potential impacts on individual components of the environment are identified for all phases of the planed operations, and their magnitude is assessed.

#### 3.4.2 Project Implementation Phases

A **phase** of any project is a period of time when certain activities are implemented that collectively shape a stage in the project life cycle. The following phases are considered by the ESIA Report:

- Construction;
- Start-up and commissioning;
- Operation; and
- Decommissioning (including demolition/dismantling and reclamation).

The above phasing of the Project Extension may be combined (integrated) for the assessment, or they may be separated for a more detailed review, as appropriate.

#### 3.4.3 General Approach to Impact Assessment

An **impact** is any change to an environmental or social (including community health and safety) receptor, whether direct or indirect, expected to result from the construction, operation and decommissioning of a proposed Project<sup>54</sup>. Impacts on individual receptors may be negative (adverse) or positive (beneficial).

The actions undertaken to determine and evaluate the significance of potential Project impacts are illustrated in Figure 3.2 and involve four key steps:

- **Prediction**: What will happen to the status of specific receptors as a consequence of this Project (direction, extent, duration, reversibility);
- **Evaluation of significance**: How significant is the impact? What is its relative significance when compared to other impacts;
- **Mitigation**: If there are impacts of concern (adverse), can anything be done to avoid, minimise, or offset the impacts? Or to enhance potential beneficial impacts; and
- Residual impact assessment: After mitigation, are the impacts still of concern?

If yes, the process needs to be repeated at least once before the 'final' determination of residual impact significance occurs. A **residual impact** is the impact that remains following the application of mitigation measures.

<sup>&</sup>lt;sup>54</sup> This definition reflects the wording provided in the internationally recognized standard ISO 14001:2015: "Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects. Environmental aspect - element of an organization's activities or products or services that can interact with the environment".





<sup>&</sup>lt;sup>53</sup> Hereinafter, term "receptors" is used to describe objects affected by impacts of the proposed operations.



#### Figure 3.2: Impact Evaluation Process

#### 3.4.4 Prediction

Impact prediction involves determining the magnitude or extent of a change or changes in the status of a receptor or linked receptors resulting from the planned operations, through application of forecast models, analysis of experience of similar operations, or environmental science. Impact prediction provides valuable information to determine the broader characteristics of impacts.

#### 3.4.5 Impact Types

Impacts can be divided into types and, also, exhibit a number of characteristics. The degree to which an impact may be managed or modified by the mitigation measures is dependent upon the impact type and its characteristics. Table 3.1 provides definitions of key impact types.

All of these impact types exhibit certain characteristics in terms of:

- Reversibility;
- Extent;
- Duration; and
- Probability.

#### **Table 3.1: Classification of Project Impacts**

Classification of Impacts	Definition	Characteristics	
By overall effect	Beneficial	Impacts expected to result in positive changes at the identified receptors	
by overall effect	Adverse	Impacts expected to result in negative changes at the identified receptors	
	Direct	An impact that results from a direct interaction between a planned activity and the receiving environment (receptors)	
By origin	Indirect	An impact that follows on from the primary interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g. increased demand for resource as a result of workforce drift to the area of planned activities from other regions, or feedback effects in ecosystems affected by direct impacts)	
By the nature of secondary effects	Cumulative	Project impacts which may be amplified if combined with impacts caused by third party operations (projects) on the same resources and/or receptors	





3-5



Cumulative impacts are those that result from the incremental impact of the Project when added to other existing, planned or reasonably defined projects (in the studied area). As assessment of cumulative impacts for the Plant identified in the framework of the ESHIA 2018 is adjusted considering the additional cumulative impacts of the whole Arctic LNG 2 Project. The ESHIA approach to assessment of cumulative impacts is provided in Section 3.6.

#### 3.4.6 Evaluation of Significance: Planned Events

Impacts significance is assessed in this Report using the qualitative, and where possible quantitative methods applicable for major project ESIAs. The quantitative methods provide a projection for the measurable changes induced by the Project, based on available design documentation or experience of similar facilities. Quantitative assessment of the impacts on receptors can be also provided using the official Russian Federation methodologies for estimation of potential damage associated with specific impacts.

The qualitative methods are based on expert estimations, experience of other projects of similar nature and scale, and follow a structured format to produce consistent and logical projections. It should be noted that environmental impacts are sometimes difficult to evaluate in quantitative terms, due to their intangible nature (e.g. emotional impacts or sensitivity), or due to interrelation of the change and specific local situation (e.g. scale of migrant inflow compared to the baseline population).

The impacts are assessed in a structured and coordinated manner throughout the ESHIA process. The approach adopted enables attribution of potential impacts to specific environmental and social aspects. For adverse impacts, significance is assigned based on determining impact magnitude and receptor sensitivity, after which mitigation is identified depending on impact characteristics.

Beneficial impacts are identified, assessed and evaluated, making use of impact magnitude (as per the guidance below), but not receptor sensitivity. Instead, beneficial impacts are described and evaluated based on available data, alignment with government policies/targets, stakeholder inputs and professional expert judgement. Measures to enhance them will be identified to try to maximize the expected benefits.

The magnitude of an impact is identified first, to describe the scale of a change from baseline conditions for a receptor. This measure of change can be described by considering the following factors in combination:

- **Reversibility:** Restoration of the pre-impact status of a receptor.
- **Extent:** Spatial extent (e.g. pollution dispersion or habitat impacted) or population / community extent; and
- **Duration:** Period of time over which an impact will interact with a receptor. This factor may also cover the frequency and regularity criteria.

The magnitude of each impact is assessed using the above parameters and the characteristics provided in Table 3.2.

Criterion	Description	Definition			
	Irreversible	Impacts that cause a permanent change in the affected receptor			
Reversibility	Reversible	Restoration of the pre-impact status of a receptor due to mitigation/reinstatement measures and/or natural recovery. Duration of the impact and duration of subsequent recovery period should be considered			
	Site	Within the boundaries of land and water area allocated for the Project and associated use-restricted zones (sanitary protection, security, etc.)			
Extent (spatial)	Local	Within the boundaries of local municipality (Tazovsky District of Yama Nenets Autonomous Region, Russia)			
	Regional	Within the boundaries of a region, territory, republic (YNAO)			

#### Table 3.2: Description of impact criteria





Criterion	Description	Definition		
	National	Impacts that affect more than one regions or constituent entities of the Russian Federation, water flows/bodies of the national significance		
	Transboundary	Impacts that affect receptors, beyond the boundaries of the country in which the project is located and producing transboundary / global effects (e.g. impacts of greenhouse gas emissions, vection of invasive species, etc.)		
Duration	Short-term irregular or occasional	Impact caused by short-term single or recurrent events		
	Mid-term regular or associated with a phase of activities	Impacts with duration equal or nearly equal to that of certain activity or a phase of the planned operations		
	Long-term	Impacts with duration equal or comparable to the Project lifetime. Impacts of this category may cease after completion of Project activities		

Assessment of duration of an impact also considers its frequency (e.g., single, rare, periodic, constant) for a more detailed characterization of duration of time when impact is felt. All characteristics listed above are factored into the assessment of impact magnitude.

Table 3.3 provides generic criteria to be used to determine the impact magnitude. Taking the results derived from the previous step a decision can be made on impact magnitude (negligible, low, moderate, high). In case discipline specific criteria are developed, these are presented Chapters 9 and 10, respectively.

Impact	Criteria
Negligible	No persistent discernible impact. The change is essentially indistinguishable from natural background variation
Minor	Limited impacts that can be identified by the available means of monitoring, with no effect on functions of ecosystems and communities
	Extent: site-specific / local
	Duration: short / medium term
	Reversibility: reversible
Moderate	Noticeable impacts which may result in quantitative changes in ecosystems, however without their quality transformation, and without loss (partial or complete) of their natural functions
	Extent: local / regional
	Duration: medium / long term
	Reversibility: reversible / irreversible
Major	Prominent impacts that may result in temporary or permanent transformation of ecosystems, with loss of their functions, and transformation of communities' lifestyle and quality
	Extent: regional / national / transboundary
	Duration: medium / long term
	Reversibility: reversible / irreversible

#### Table 3.3: Impact Magnitude





Once the respective magnitudes of each impact have been allocated the next step is to determine receptor sensitivity. Receptor sensitivity is based on two components: the degree to which a receptor is resilient to a change and the value attributed to the receptor by stakeholders or applicable regulations/policies.

Receptor resilience takes into consideration not only activity – receptor – impact pathways, but also the characteristics of a receptor that might make it more or less resilient to change. As such, a receptor can be considered as existing within a spectrum of 'vulnerable' to 'resilient'.

Receptor value considers importance represented by conservation status, socio-cultural importance and/or economic value. Certain receptors are deemed to be of greater importance than other receptors.

The final step is to combine the impact magnitude and receptor sensitivity results to determine impact significance in relation to its receptors. For known (planned) impacts, significance is determined by their intensity, based on the impact magnitude and sensitivity of the receptor. For example, an impact of low magnitude affecting a receptor of moderate sensitivity is an impact of low/moderate significance (the actual significance determination – low or moderate – in this case can be made by the ESIA team) or an impact of high magnitude affecting a receptor of moderate sensitivity results in an impact of high significance.

Table 3.4 provides an account of the key features (definitions) of each of the impact significance classifications (form Insignificant to High); specifically linking them to need for mitigation measures.

		Receptor Sensitivity						
		Insignificant	Low	Moderate	High			
٩	Insignificant	Negligible	Negligible	Negligible	Negligible / Low <sup>55</sup>			
Impact Aagnitud	Minor	Negligible	Low	Low / Moderate	Moderate			
	Moderate	Negligible	Low / Moderate	Moderate	High			
	Major	Low	Moderate	High	High			

#### **Table 3.4: Impact Significance Matrix**

Definitions of the above significance ranks adopted in international ESHIA practice are provided in Table 3.5.

Table 3	.5: Pro	iect im	pacts rai	ikina b	ov sian	ificance
Tuble 5			Juces i ui	inting is	, sign	neunce

Impact significance	Description
Negligible	Impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.
Low	Impacts with a "Low" significance are expected to be noticeable changes to baseline conditions, beyond natural variation, however well below the applicable standards (e.g. environmental quality standards, and are not expected to cause hardship, degradation, or impair the function and value of receptor. These impacts warrant the attention of decision-makers, and should be avoided or mitigated where practicable.
Moderate	Impacts with a "Moderate" significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of a receptor, although the overall function and value of a receptor is not disrupted. These impacts must be mitigated to avoid or reduce the impact.
High	Impacts with a "High" significance are likely to disrupt the function and value of a receptor, and may have broader systemic consequences (e.g. ecosystem or social well-being). They may also result in a failure to maintain adverse effects within the permissible regulatory levels. These impacts are a priority for mandatory mitigation to avoid or reduce the significance of the impact.

<sup>&</sup>lt;sup>55</sup> Allows technical discipline author to decide which significance level is applicable in the given situation





This method is applied at least twice: to both pre- and post-mitigation scenarios for all impacts identified. In general, residual impacts classed as "Insignificant" or "Low" are not considered to be of concern for the assessment<sup>56</sup>. For adverse impacts of "Moderate" and "High" significance, an iterative process is undertaken to further investigate opportunities for mitigation, according to the hierarchy above. Where the significance cannot be further reduced, an explanation is provided of why further reduction is not practicable. Monitoring may be required to confirm the measures used to mitigate adverse impacts are working properly and that the impact is not worse than predicted. Monitoring requirements are presented in Chapters 9 and 10.

#### 3.4.7 Risks and Unplanned Events<sup>57</sup>

Where there is uncertainty about occurrence of an event (e.g. intrinsically occasional event during normal operation and/or where impacts are caused by unplanned/emergency situations), the magnitude of **risk** associated with such event is determined as a function of its **occurrence probability** and **intensity** of potential impact. Probability criteria applicable to this ESIA are described below (Table 3.6). They are set for the whole ESIA process and are equally applicable to all types of impact.

Likelihood	Qualitative assessment of impact / event probability
High	Impacts/events which are observed in the sector (studied operations or region) all the time and reoccur more than once a week
Moderate	Impacts/events regularly observed in the sector and region, including seasonal cycling, which can be considered as very likely for the design lifetime of the planned operations
Low	Impacts/events which are rarely observed in the sector and region, or regularly observed in other sectors. These would generally occur 1 to 2 times per year
Negligible	Impacts/events that have never been observed in a wider range of sectors or in the region. Impact/event which can be considered as unlikely for the design lifetime of the planned activities

#### Table 3.6: Risk occurrence criteria

The criteria of general risk / impact (change) occurrence risk are shown in Table 3.7.

#### Table 3.7: General risk / event occurrence risk criteria

Impact	Impact intensity						
probability	Insignificant	Low	Moderate	High			
High	Insignificant	Medium / Minor	Medium / High	Critical			
Moderate	Insignificant	Minor	Medium	High			
Low	Insignificant	Minor	Medium / Minor	Medium / High			
Negligible	Insignificant	Insignificant	Minor	Medium			

Unplanned events will often result in a high impact significance, even with mitigation/remedial measures in place e.g. major oil spills. In such cases, not only the specific measures must be in place to manage an unplanned event, but the probability has to be minimised to levels seen to represent good industry practice. In this table, unplanned events with high <u>residual</u> impact significance would need to be minimized to extremely unlikely ("improbable") events. Sometimes, if such events can be assessed quantitatively, a special analysis of risks is required to define numeric value of the event probability. In this case the probability value should be less than  $1 \times 10^{-6}$ .

<sup>&</sup>lt;sup>57</sup> Unplanned events (ESIA Methodology – Ramboll, 2017)





<sup>&</sup>lt;sup>56</sup> A more stringent approach may apply for the assessment of ecological receptors of high sensitivity, such as critical habitat, or species classified as having vulnerable or above conservation status. In this case, residual impact significance of Low and above is very likely to be a concern to the further development of the Project.

#### 3.5 Impact Mitigation

As part of the ESIA process, when adverse impacts are identified, measures for mitigation, minimization and control of risks, and monitoring of residual impacts are developed (as necessary or appropriate).

The process of identifying design controls and mitigation measures must follow the sequence of the mitigation hierarchy (Figure 3.3), as specified in IFC's Performance Standard 1, which is widely regarded as the best practice approach to managing impacts.

First, efforts are made to avoid or prevent, then minimize or reduce adverse impacts. If the impact cannot be fully avoided by application of design controls, they are supplemented by further engineering measures for minimization and mitigation of the adverse impacts. These measures are supported by additional mitigation measures to be applied through the effective management of project-related activities during construction, operation and decommissioning. Any remaining residual impacts are then addressed via mitigation measures such as restoration and remediation (e.g. at the end of construction) and/or offsetting and compensation. The measures are developed and implemented in the same order as they are listed above.

Development of mitigation measures will be primarily focused on minimization of the impacts of "High" significance. However, where possible and appropriate, mitigations will be also proposed for the impacts of "Moderate" and "Low" significance, in order to reduce environmental and social effects / risks to the lowest level.



**Figure 3.3: Mitigation Hierarchy** 

#### 3.6 Cumulative Impacts

#### 3.6.1 Definition and Applicable Guidelines

Cumulative impact assessment (CIA) is one of the requirements set for a comprehensive ESIA. Performance Standard 1 defines the Area of Influence (AoI) to encompass "cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned, or reasonably defined developments at the time the risks and impact identification process is conducted." Performance Standard 1 offers some context to limit the cumulative impacts to be addressed to "those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities".

The CIA methodology is based on provisions and recommendations of the IFC Performance Standards on Environmental and Social Sustainability (Performance Standard 1)<sup>58</sup> and respective Guidance Notes (G37-

<sup>&</sup>lt;sup>58</sup> Performance Standards on Environmental and Social Sustainability, IFC 2012 https://www.ifc.org/wps/wcm/connect/016cbec1-c7ba-4b05-bc54eea855381c23/PS\_Russian\_2012\_Full-Document.pdf?MOD=AJPERES&CVID=jvd.RaF







G43)<sup>59</sup>, the Good Practice Handbook (GPH) "Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets" (IFC 2013)<sup>60</sup>, Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (EC 1999)<sup>61</sup>. In recognition of the challenges facing private sector in the process of assessment of cumulative impacts, GPH introduces the concept of a simplified rapid cumulative impact assessment (RCIA) involving only a desk review of available information.

#### 3.6.2 CIA Objective

The CIA analysis has two objectives:

- To determine if the combined impacts of the project, other projects and activities, and natural environmental drivers will result in a condition of valued environmental and social component (VEC, refer to subsection 3.7.3) that may put the sustainability of a VEC at risk (i.e., exceed a threshold for VEC condition which is an unacceptable outcome); and
- To determine what management measures could be implemented to prevent unacceptable VEC condition, this may include additional mitigation of impact of the project being assessed, or of other existing or predictable future projects, or other regional management strategies that could maintain VEC condition within acceptable limits.

#### 3.6.3 CIA Methodology

The RCIA methodology for the ESIA is adopted from the IFC GPH and includes the following steps:

- Scoping phase I VECs, spatial and temporal boundaries
- Scoping phase II Other activities and environmental drivers
- Establish information on baseline status of VECs
- Assess cumulative impacts on VECs
- Assess significance of predicted cumulative impacts
- Management of cumulative impacts design and implementation

#### Step 1. Scoping phase I - VECs, Spatial and Temporal Boundaries

The first stage of the CIA is aimed at identifying potential VECs and defining the spatial and temporal boundaries.

#### Valued Environmental and Social Components

VECs are those receptors that are considered to be important when assessing the risks posed from cumulative impacts. VECs have been identified by the previous ESHIA 2018 studies for the Plant and clarified as part of the current ESHIA process.

The assessment should be limited to only those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities. Potential impacts that occur in the subject area without the project or independently of the project, are examined with regard to significance of predicted change in the environment for specific receptor (including impact of climate change on the Project). In addition, only those environmental and social receptors on which the Project itself is assessed to have potentially significant effects are included in the CIA. In practical terms, this means that:

- If impact of the Project on a receptor has been assessed **negligible** then it is not considered as a VEC in the CIA (i.e. scoped out in all cases); and
- Receptors on which the assessed Project impact is **low** are considered on a case-by-case basis for inclusion as a VEC in the CIA.

The assessment boundaries shall consider geographical scale and duration in impacts (in respect to another, past, present and predictable future activities / development), which influence the VECs conditions at the same period of time that the Project impacts.

<sup>&</sup>lt;sup>61</sup> Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, European Commission , May 1999 https://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf





<sup>&</sup>lt;sup>59</sup> International Finance Corporation's Guidance Notes: Performance Standards on Environmental and Social Sustainability, 2012 https://www.ifc.org/wps/wcm/connect/86d03c9b-fbd6-4c39-befe-d3202160c70b/GN\_Russian\_2012\_Full-Document.pdf?MOD=AJPERES&CVID=mS3eoNK

<sup>&</sup>lt;sup>60</sup> Good Practice Handbook on Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, 2013 https://www.ifc.org/wps/wcm/connect/topics\_ext\_content/ifc\_external\_corporate\_site/sustainability-atifc/publications/publications\_handbook\_cumulativeimpactassessment

**Spatial Boundaries.** The CIA considers a larger spatial area outside of the Project AoI that would be normally defined by ESHIA. The precise spatial boundaries are defined on the basis of the geographic range of specific VECs as well as the spatial distribution of third-party activities or influences that might impact the VECs. The spatial boundaries are set in the positions where VECs are not exposed to a significant impact anymore.

**Temporal Boundaries**. In accordance with the IFC PS 1, non-project activities that are carried out, planned or reasonably foreseeable are taken into account. The IFC's Good Practice Handbook recommends that the temporal boundaries should be set to coincide with the expected lifetime of the Project.

Consistent with established EU guidance, consideration is normally given to projects expected to be initiated within a period of 5 years from the date of the completion of the scoping phase. Five years' timeframe is accepted a reasonable period for the Project CIA.

Nevertheless, considering the potential extensive development of the Gydan Peninsula, Ob Bay and the Yamal Peninsula in a longer term, the assessment takes into account potential cumulative impacts of large-scale long-term development projects which are not yet adopted or clearly formulated but can be reasonably predicted. Only a high-level assessment of such undefined/unformulated development plans can be provided, as detailed assessment of their potential impacts is not possible at this stage.

#### Step 2. Scoping phase II - Other Activities and Environmental Drivers

Scoping Phase II is aimed at identification of the past, present and planned activities as well as existing natural impact factors / load with a potential for negative impacts on VECs determined at Scoping Phase I which require further cumulative impact assessment.

Identification of the VECs, spatial and temporal boundaries, another activities and significant environmental factors is based on systematic review of the assessed Project impacts on each of the social and environmental receptors. After that, the following aspects are considered:

- 1. All the different types of the Project impacts, and the assessed significance of the residual impact;
- 2. Spatial extent of a receptor in this particular region;
- 3. Consideration of how the spatial extent of the receptor may overlap with the influence of other industrial activities identified through the Phase II Scoping process;
- 4. Consideration of the relative temporal boundaries of the different stressors (e.g. whether or not such stressors are concurrent, consecutive etc.) and the duration of such impacts;
- 5. Other non-industrial influences that may affect a receptor (within the determined spatial and temporal boundaries).

The above aspects are determined, and the potentially affected receptors identified in the CIA process are taken into consideration for the above factors, which are then considered as VECs.

#### **Step 3. Baseline Conditions**

Baseline data for the Project area of influence (AoI) is based on environmental surveys and records of the local environmental monitoring conducted by OJSC Yamal LNG (refer to Chapters 7 and 8). This was supplemented by the environmental survey reports for the Obsky LNG Project and available information at the regional scale beyond the Project AoI.

#### Step 4. Assessment of Cumulative Impacts

The VECs and their resilience have been identified / clarified in the Project CIA. This was followed by identification/clarification of the impacts of various third-party activities (including non-industrial influences) on these VECs that.

Due to the inherent uncertainties, the CIA has by necessity been performed in a qualitative manner, but nevertheless provides useful context for determining the significance of the contribution of the proposed operations to the overall impacts.

#### Step 5. Significance of Cumulative Impacts

The methodology described in Section 3.4 was developed primarily for assessing Project-specific impacts (direct and indirect), although can be broadly applied to cumulative impacts.





#### Step 6. Management of Cumulative Impacts

Many of the mitigation measures defined during the assessment of project-specific impacts will also be applicable to the mitigation of cumulative impacts. However, it is also recognized that the cumulative impact assessment may generate additional mitigation measures and/or strategic or long-term actions, for example, the need to share findings of assessments and cooperate with third parties such as future developers and regional authorities or local government bodies.

Consistent with the approach taken elsewhere in the ESIA and described in Section 3.5, the mitigation hierarchy, which broadly requires that consideration be given to avoidance, minimization, mitigation and offsetting damage to the environment, in that order of preference, has been applied.

#### 3.7 Presentation of ESIA Results

The table below (Table 3.8) contains a form of a summary table which is designed to provide a visual presentation of the environmental and social impact assessment (refer to Chapters 9 and 10), including types of activities, impacts and their receptors, description of mitigations, and assessment of the residual impact.

A key to the alphabetical symbols of stages of the planned activity, receptors sensitivity, impact significance and risk category is provided under the summary table form. The table can be adjusted or extended to accommodate for specific features of some types of impacts and provide an appropriate presentation of the results of assessment.





#### Table 3.8: Evaluation of impact significance: a form of a summary table

Impact	Sign	Receptor	Receptor Sensitivity	Stage	Impact significance	Risk	Mitigation measures	Residual impact

Parameter / Параметр	Abbreviation / Сокращение	Расшифровка / Description	Parameter / Параметр	Abbreviation / Сокращение	Расшифровка / Description
Stage / Этап	С	Construction / Строительство	Risk / Риск	Cr	Critical / Критический
	0	Operation / Эксплуатация	-	Н	High / Высокий
	Cm	Commissioning / Ввод в эксплуатацию	-	Μ	Medium / Средний
	DCm	Decommissioning / Вывод из эксплуатации и последующий период		Mr	Minor / Малый
Recipient Sensitivity / Чувствительность	Н	High / Высокая	-	I	Insignificant / Незначительный
реципиента	М	Moderate / Средняя	Impact significance / Значимость воздействия	Н	High / Высокая
	L	Low / Низкая		М	Moderate / Умеренная
	N	Negligible / Незначительная		L	Low / Низкая
Sign / Направленность	Р	Positive / Положительное (благоприятное)	-	Ν	Negligible / Пренебрежимо малая
	N	Negative / Отрицательное (неблагоприятное)			





## 4. STAKEHOLDER ENGAGEMENT

#### 4.1 General

Stakeholder engagement is of top priority for:

- Ensuring identification of potential positive and negative impacts and their management; and
- Organizing the process of Project and associated facilities construction with the least inconvenience for the population in the social area of influence<sup>62</sup>.

According to IFC Performance Standard 1 (PS1) the launch of the stakeholder engagement process in the early stages of the Project will ensure timely and open access to relevant information and the stakeholder input to the impact identification and assessment process, alongside with mitigation/strengthening measures. With a view to simplify stakeholder engagement as much as possible, a Stakeholder Engagement Plan (SEP) was developed in the ESHIA framework. The SEP is a living document to be updated on a regular basis. It includes:

- Description of standards and requirements for implementing stakeholder engagement activities;
- Identification of key stakeholders;
- Recording and accounting of stakeholder consultations and information disclosure activities;
- Planning of future activities and procedures as part of the stakeholder engagement process throughout the Project lifecycle;
- Resources for SEP implementation;
- Reporting and monitoring of the stakeholder engagement process; and
- Description of the Grievance Mechanism.

Some of the above aspects are crucial in the early stages of stakeholder engagement; they are briefly described in the upcoming sections.

#### 4.2 Identification of key stakeholders

Stakeholders<sup>63</sup> are individuals or groups which are directly or indirectly affected by the intended activity on construction and operation of the Project and associated facilities, as well as those who may have interest in them and/or ability to somehow influence their implementation, either favourably or unfavourably. Stakeholders may include affected local communities or individuals, or their formal or informal representatives, authorities at the Federal level and level of the Constituent Entity; also, these may be local self-government authorities, politicians, religious leaders, NGOs and special interest groups, academic community, companies/entrepreneurs, and mass media.

Stakeholders are categorised in line with common stakeholder identification practice as follows:

- Affected parties, including those exposed both to direct and to indirect impact;
- Interested organizations and individuals; and
- Vulnerable groups.

A more detailed description of stakeholders is provided below. The list of key stakeholders is given in the SEP which, alongside with the ESHIA, is a document subject to disclosure to stakeholders. It should be noted that this list can expand, become more exact and change during the entire lifecycle of the Project. The stakeholder list given below and cited in the SEP will be supplemented and/or amended, as necessary.

#### 4.2.1 Affected parties

This category of affected parties comprises individuals, groups and organizations within the Project's social area of influence which are directly exposed to its impact (actual or potential). The affected parties can be defined as the most susceptible to the Project-related changes. These stakeholders require extensive engagement both in the stage of impact identification and assessment of its significance and during decision making regarding impact mitigation and management system performance.

<sup>&</sup>lt;sup>63</sup> IFC, Stakeholder Engagement Handbook, 2007





<sup>&</sup>lt;sup>62</sup> Territories and communities that may be exposed to positive and negative impacts of the planned (under the Project) and associated activities.

The list of affected parties includes groups, individuals, communities, organizations, and other social institutes which are potentially exposed to either direct or indirect impact during ongoing implementation of the planned activity

Potentially exposed to direct impact during implementation of the planned activity may appear:

- Indigenous communities migrating and conducting customary activities (reindeer herding, fishing, harvesting, hunting, etc.) within the Project's social area of influence Such impact may be related to construction and operation of the Project and associated facilities;
- Agroindustrial enterprise MUE State Farm Antipayutinskiy The 2018 ESHIA studies for the Complex found that the MUE State Farm Antipayutinskiy may be a receptor of both positive and negative impacts (refer to Table 4.2)
- Personnel of contractors employed for the Project and associated facilities
   This category of affected parties includes personnel engaged in construction and operation of the
   Project and associated facilities who may be potential recipients of negative impact in the area of
   occupational conditions and labour relations. For example, these could be untimely wage payment
   or discriminatory practices.

Potentially exposed to indirect impact during implementation of the planned activity may appear:

• Communities<sup>™</sup> residing in Gyda and Antipayuta settlements and Yuribey and Tadebya-Yakha villages

Indigenous tundra dwellers come to these localities for shopping and medical services. In addition, indigenous communities migrating within Gydanskaya Tundra and Antipayutinskaya Tundra may periodically (on a seasonal basis) reside in them. Indigenous communities migrating within the Salmanovskiy (Utrenniy) LA are often registered in s. Gyda and s. Antipayuta. A more detailed description of environmental, socioeconomic and health impacts is provided in corresponding Sections 9 and 10 of the ESHIA.

- Indigenous population within Gydanskaya Tundra and Antipayutinskaya Tundra in general (and migrating within the Salmanovskiy (Utrenniy) LA in particular) which lead a customary lifestyle ISPN families engaged in customary activities within the boundaries of Gydanskaya and Antipayutinskaya Tundra may also experience indirect impact of the Project, e.g. in terms of shifting of customary migration routes of reindeer herders. It primarily refers to the indigenous communities migrating within the LA.
- Agroindustrial Enterprise GydaAgro LLC The planned activities may affect operations of GydaAgro LLC in case personnel of the Project and associated facilities practice unofficial purchase of products (fish) from GydaAgro personnel.
- Companies engaged in commercial fishing in the Ob Bay and other water bodies located within the Project's social area of influence
   Fishery businesses operating in the Ob Bay and other surface water bodies located within the Project's social area of influence may be exposed to indirect impact during implementation of planned activities related to construction and operation of the Project and associated facilities, e.g. resulting from dredging<sup>65</sup>.
- Health care institutions

The publicly funded health institution (PFHI) Tazovskiy District Central Hospital falls within this category. It may be exposed to potential impact due to increased load on social infrastructure of Tazovskiy District, primarily on health care facilities.

All the above stakeholder groups may interrelate or overlap.

#### 4.2.2 Interested organizations and individuals

This category groups individuals/groups/organizations which may be not exposed to direct impacts of the Project and associated facilities, but whose interests may appear affected, and those able to influence implementation of the planned activity.

<sup>&</sup>lt;sup>65</sup> Information on fishing enterprises operating in the water area of the Ob Bay is provided in accordance with the letter of the Federal Agency for Fishery (Rosrybolovstvo) V05-1611 dated 27.09.2017 "On providing information of the state register of fishery enterprises". The names of the organizations are not specified in accordance with №98-FZ "On trade secret" from 29.06.2004.





<sup>&</sup>lt;sup>64</sup> Hereinafter, by communities is meant a group of individuals united by geographical, economic, cultural or other characteristics.

This category is composed of:

- Local self-government authorities (Tazovskiy District Administration, Gyda Administration, and Antipayuta Administration);
- Public organizations, including the Tazovskiy branch of the regional group "Association of Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug "Yamal – potomkam!" (Tazovskiy branch of the "Association "Yamal – potomkam!") and Charity Foundation for Development of Indigenous Small-numbered Peoples of the North (Tazovskiy District of YNAO) (ISPN Development Foundation);
- Local divisions of Federal authorities functioning at the YNAO level, in particular Rosatom State Corporation, FSUE Gidrographicheskoye Predpriyatiye (Hydrographic Enterprise), Sabetta Seaport Administration, Department of the Federal Service for Nature Management Supervision (Rosprirodnadzor) for Yamal-Nenets Autonomous Okrug (YNAO Rosprirodnadzor Department), and others;
- Public authorities of YNAO (YNAO Government), in particular the Department for Natural Resource Regulation, Forestry Affairs and Development of Oil and Gas Industry of Yamal-Nenets Autonomous Okrug, Department for Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug, and others;
- Consumer associations that operate within the Project's social area of influence and provide support of trading stations such as Gydanskoye and Antipayutinskoye consumer associations;
- Tazovskoye Consumer Association (in s. Tazovskiy) and trading stations located, by preliminary estimates, outside the Project's social area of the influence;
- Other agricultural enterprises of Tazovskiy District;
- Nomadic indigenous population in Tazovskiy District and registered ISPN communities engaged in production of agricultural and other products;
- Other public organizations (e.g. regional group "Association of Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug "Yamal – potomkam!", YNAO Union of Reindeer Herders, World Wildlife Fund (WWF), Charity Foundation Wildlife Conservation Centre (WLCC), Greenpeace Russia, community organization of women "Zhenschiny Tasu'Yava», associations of veterans living in Tazovskiy District, etc.;
- Media at the federal, regional and local levels;
- Professional associations and unions (e.g. local branch of the Russian Union of Industrialists and Entrepreneurs in YNAO; and
- Academic institutions.

#### 4.2.3 Vulnerable groups

The vulnerable category includes those who may be disproportionately affected by construction and operation activities of the Project and associated facilities or who may be further disadvantaged in comparison with other groups of society due to their vulnerable status.

This status may originate from the ethnicity, property status, income, economic situation, gender, language, religion, social background, material position. ancestry, age, culture, literacy, physical or mental disability, and dependence on a unique natural environment and natural resource.

Stemming from the definition of this category of stakeholders, their list tentatively includes the following groups within the Project's social area of influence:

- ISPN individuals and their families who conduct customary economic activities on lands within the Project's social area of influence and whose wellbeing relies on public subsidies and on the status of components of ecosystem services;
- Low-income individuals and families whose wellbeing relies on public social support;
- Junior and senior individuals; and
- Individuals with ill health, disabilities and/or diagnosed socially sensitive diseases (tuberculosis, HIV/AIDS, etc.).

#### 4.3 Stakeholder engagement activities conducted by present

To date, the Company has used the following key methods of engagement with communities and other stakeholders:

• public consultations in the form of public hearings and surveys conducted in conformity to the Russian law, *and* 





• public consultations in the framework of the 2018 ESHIA for the Complex: disclosure of materials of ESHIA for the Complex, including the SEP, Scoping Report, etc. through meeting with key stakeholders, presentations and disclosure of relevant documents.

The conducted activities contribute to a regular dialogue with the communities and their awareness about the planned activity progress and potential impacts. Also, public consultations create opportunities for participation in development of relevant impact mitigation measures. To take in consideration views of a broader range of potential stakeholders, the Company fosters the interaction with nomadic communities through opinion polls conducted by the ISPN Development Foundation and Tazovskiy branch of the Association "Yamal – potomkam!" and consultations as part of the ESHIA process among population of inter-settlement territories within the Salmanovskiy (Utrenniy) LA and populated localities in the Project's social area of influence.

#### 4.3.1 Statutory consultations (2013-2019)

Public hearings and meetings with stakeholders on the following documents and topics were held in the framework of consultations both on Complex construction and on development of onshore/offshore areas of the associated and other facilities in the period from 2013 to 2019:

Year	Facility	Facility Topic/Engagement activity			
2013	Arctic LNG 2 Project	Declaration of Intent (DOI) "Salmanovskoye (Utrenneye) Oil, Gas, and Condensate Field Facilities Setup"	29.03.2013		
	GBS LNG & SCC Complex	Design survey programme for the "LNG-2 Complex on the RC gravity-based structure (RCGBS) in the area of the Salmanovskoye (Utrenneye) OGCF in the Ob Bay", including the EIA materials	01.07.2014		
2014	FIELD	Development of the berth facilities at the Salmanovskoye (Utrenneye) oil, gas, and condensate field, including the EIA materials	11.03.2014		
	FIELD	Review of the EIA materials during implementation of the "Salmanovskoye (Utrenneye) Oil, Gas, and Condensate Field Facilities Setup" project. Amendment of the dredging design for Arctic LNG 2 LLC	07.11.2014		
2015	FIELD	Review of documentation for the "Construction of exploration well No. R-281 at the Salmanovskoye (Utrenneye) oil and gas condensate field", including the environmental impact assessment materials – EIA for Arctic LNG 2 LLC	11.11.2014		
2016	FIELD	Establishing temporary public easement at the land plots with the total area of 153.156,4 ha for geocryological studies at the Salmanovskoye OGCF during the period from January 09, 2017 to December 08, 2019, for Arctic LNG 2 LLC	29.11.2016		
	GBS LNG & SCC Complex	Comprehensive design survey for the project: "LNG and SGC production, storage and offloading facilities at the Salmanovskoye (Utrenneye) OGCF. Complex for production, storage and offloading of LNG and SGC on gravity-based structures"	05.09.2017		
2017	GBS LNG & SCC Complex	Comprehensive design survey programme in the water area for development of design documentation for the projects: "Complex for production, storage and offloading of LNG and SGC on gravity-based structures", "LNG and SGC Terminal "Utrenniy", "General Purpose Terminal", including the EIA materials	18.07.2017 20.07.2017		
	FIELD	Review of design documentation: "Early development facilities at the Salmanovskoye (Utrenneye) OGCF", including the EIA materials for future operations of Arctic LNG 2 LLC	18.07.2017		
	FIELD	Establishing temporary public easement at the land plots with the total area of 5.272.985,3 ha for the period from July 01, 2017 to September 30, 2018, for the design survey of the project: "Salmanovskoye (Utrenneye) OGCF Facilities Setup in Tazovskiy District of YNAO" for Arctic LNG 2 LLC.	06.06.2017		

Table 4.1: Statutory consultations





Year	Facility	Topic/Engagement activity	Date of public consultations
	Port	Review of documentation for the "Maintenance dredging at the berth facilities of the Salmanovskoye (Utrenneye) OGCF" project, including EIA for future operations of Arctic LNG 2 LLC	14.02.2017
	FIELD         Review of documentation for the "Construction and exploration of well No.294 at the Salmanovskoye (Utrenneye) OGCF" project, including EIA for future operations of Arctic LNG 2 LLC		21.02.2017
	FIELD	Review of design documentation: "Early development facilities at the Salmanovskoye (Utrenneye) OGCF", including the EIA materials for future operations of Arctic LNG 2 LLC.	01.07.2017
	ArcticLNG2Primary disclosure of information on the Arctic LNG 2 Project to community of s. Gyda and the Tazovskiy District Administration		27.02.2018 – presentation made at the community meeting
	FIELD	Review of design documentation for: "Salmanovskoye (Utrenneye) OGCF Facilities Setup. MSIW Landfill. Development and Construction" and "Salmanovskoye (Utrenneye) OGCF Facilities Setup. Gas Supply Design for the Power Supply Facilities to Support Construction, Soil Jetting and Drilling Operations", including the environmental impact assessment (EIA) materials for Arctic LNG 2 LLC"	11.05.2018
	Port Review of design documentation "Terminal "Utrenniy", including the EIA materials for future operations of Arctic LNG 2 LLC		18.07.2018
018	GBS LNG & SCC Complex	Consultations within the ESHIA process (refer to 4.3.3)	03.2018 - 08.2018
20	FIELD	Construction of the prospecting and appraisal well No. 297 at the Salmanovskoye (Utrenneye) oil and gas condensate field, including the EIA materials	23.07.2018 – 23.08.2018
	FIELD Construction of well pads Nos. 2 and 16 at the Salmanovskoye (Utrenneye) oil and gas condensate field for the period of drilling and testing, including the EIA materials		24.07.2018 – 23.08.2018
	FIELD	"Salmanovskoye (Utrenneye) OGCF Facilities Setup", including the Section: "List of environmental measures", including the environmental impact assessment for Arctic LNG 2 LLC	13.10.2018 – 11.11.2018
	Port	"LNG and SGC Terminal "Utrenniy", including the EIA materials for Arctic LNG 2 LLC	
	FIELD	Salmanovskoye (Utrenneye) OGCF Facilities Setup. MSIW           Landfill", including the EIA materials	
2019	Port Public hearings on documentation giving grounds for implementation of the design survey programme for the "Sea Channel" project, including the EIA for Arctic LNG 2 LLC		07.11.2019 – 10.12.2019
	Port	Discussion on the topic "Terminal Utrenniy for liquefied natural gas and stabilised gas condensate. Changes and amendments»	15.04.2019 – 15.05.2019
	FIELD	Construction of 18 well pads at the Salmanovskoye (Utrenneye) oil and gas condensate field for the period of drilling and testing, including the EIA	01.11.2019 – 12.12.2019
	GBS LNG & SCC Complex	"Complex for production, storage, and offloading of liquefied gas and stabilised gas condensate on gravity-type bases", including under the Section on the Environmental Protective Measures Plan (EPMP), including the EIA	17.04.2019 – 17.06.2019

The public consultations included meetings with stakeholders mostly in the form of public hearings. Totally, 25 public consultations on the topics outlined above were held. Representatives of a variety of stakeholders participated in the discussions, including from:

• Settlements of Tazovskiy District (Tazovskiy, Gyda, Antipayuta, Gaz-Sale, and Nakhodka);





- Tazovskiy branch of the regional group "Association of Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug "Yamal potomkam!";
- Charity Foundation for ISPN Development (Tazovskiy District of YNAO);
- Tazovskiy District Administration (Land and Environmental Protection Board of the Department for Property and Land Relations and Inter-settlement Territory Communities and Customary Activities Board), administrations of rural municipalities;
- YNAO SPI (State Public Institution) Arctic Research Centre;
- YNAO Government (DPRR YNAO, SPI "Nedra Yamala", Department for ISPN); and
- YNAO Legislative Assembly (Committee for Industry, Nature Management and Environment).

All public consultations were advertised in media, and appropriate information was disclosed in advance through community liaison offices, including field reception offices arranged for residents of intersettlement territories. While arranging field reception offices, surveys<sup>66</sup> of Tazovskiy district tundra residents were conducted; the number of participants of each survey reached several hundred respondents. The majority of survey participants expressed their agreement with discussed planned activities provided that environmental standards are observed. It should be noted that as part of field reception offices 65 families permanently or temporarily migrating within the license Area were surveyed as confirmed by receptions' logs and by 'Yamal – Potomkam' association which was in charge of the survey.

Residents of the inter-settlement territories, so called Gydanskaya Tundra, Antipayutinskaya Tundra, Tazovskaya Tundra, and Nakhodkinskaya Tundra, participated in the public consultations, including through opinion polls. Their engagement was facilitated by the Association "Yamal – potomkam!" and/or ISPN Development Foundation which arranged opinion polls for these communities. Reports and results of the polls were presented at the public hearings. The participants expressed concerns, comments and wishes briefly described below together with the Company's feedback:

- Need for observance of traffic regulations by Project transport (speed limits, avoidance of collisions with reindeers of ISPN);
- Need for disclosure of detailed information on the Salmanovskoye (Utrenneye) field development project and construction of the Complex for LNG and SGC production, storage and offloading of (workforce numbers, geographic coverage, etc.), including via regular meetings with local communities and Tazovskiy District administration;
- Employment opportunities for residents of Tazovskiy District (including young professionals);
- Responsible attitude toward the natural environment and potential impact on ecosystem services of high significance for local land users (pollution of water bodies, air emissions of pollutants, impacts on landscape, on animals' migration routes, etc.);
- Responsible attitude towards customs (including via construction of reindeer crossings), cultural values and sacred sites of ISPN;
- Provision of assistance to local indigenous communities, including the targeted;
- Adequate management of contractor activities;
- Adequate environmental protection and potential damage compensation measures; and
- Construction of berth facilities and conducting dredging operations taking in account migration patterns of aquatic species, fishery researches of the areas adjacent to the territory of engineering survey in Ob Bay, study of water salinity;
- When installing the cellular towers, ensure that their connection coverage is available at some distance from the Project in order to enable cellular connection for ISPN without them approaching the Project sites.

In response to the concerns expressed, the Company takes or plans to take the following actions:

- Speed limit signs are installed within the License Area; traffic safety requirements are part of contractual agreements with Project contractors. Additionally, such contracts stipulate a potential for compensations to the ISPN in case of damages caused by contractors (e.g. in case of collisions with reindeer);
- The Company regularly provides necessary information at public reception offices (including field reception offices) in Tazovskiy, Gyda, Antipayuta, and directly to indigenous communities and at online venues. Information for affected parties is also provided by the Company CLO as part of regular visits to affected families. Regular meetings are held with representatives of the Tazovskiy

<sup>&</sup>lt;sup>66</sup> According to the Decree of the Administration of Tazovskiy District No. 346 dated 06.06.2012 "On approval of the Regulation on the procedure for public hearings on the selection of construction land plots and consideration of documents of environmental impact assessment of planned economic and other activities in Tazovskiy district municipality". More detailed information is available in Section 2.2.3 of this ESHIA.





District administration. Regular meetings with all stakeholder groups, including representatives of affected IP families and NGOs, are scheduled via SEP;

- The Company actively collaborates with local employment centers;
- As part of its design, the Project plans to construct 19 reindeer crossings, locations of which were
  agreed with affected indigenous communities and MUE State Farm Antipayutinskiy. In order to
  ensure preservation of cultural, archaeological, spiritual and historic heritage sites (including those
  of importance for indigenous communities) that might be found during Project implementation, the
  Company developed a chance finds procedure. Additionally, provisions on rules of conduct during
  communication with ISPN are implemented;
- As part of Ob Bay comprehensive study, fishery and water salinity researches are planned;
- Although the Company does not hold a cellular connection service license and cannot substantially
  affect cellular network operators' coverage, Arctic LNG 2 will encourage and facilitate expansion of
  network in order to satisfy the needs of ISPN;
- The Company implements a set of measures aimed at supporting ISPN communities and population of Tazovskiy district in general, In particular, the Company supported construction of a boarding school in Gyda, delivery of fuel to indigenous communities, construction of reindeer slaughterhouse in Gyda, etc. (see more details in Chapter 10).

As Project progresses, the Company will continue public consultations and meetings with local communities for due consideration of views of a broad range of stakeholders.

#### *4.3.2 Ethnographic survey (2015)*

Customary occupations of ISPN communities and their opinions regarding implementation of development projects in tundra were also studied in detail in the course of an ethnographic survey conducted by the non-profit partnership Ethno-ecological and Technological Studies Centre of Siberia for Purgeokom LLC in 2015. The survey was carried out in the area of the Salmanovskoye (Utrenneye) field for the purpose of the FIELD. The survey report contains information on 30 farms of reindeer herders (170-200 people in total) leading nomadic life in the Salmanovskiy (Utrenniy) LA and identifies the following points of concern expressed by the reindeer herders with respect to the interaction between ISPN customary economic activities and the Project:

- Potential adverse impact of license area development on reindeer health;
- Potential reduction of livestock caused by the Field;
- Depletion of pasture resources as a result of fragmentation by pipelines, overgrazing, and soil contamination (e.g. due to transportation of sand used for onsite roads filling);
- Mixing of herds and consequential conflicts with other reindeer herders;
- Negative impact on lakes and rivers; and
- Use of commercially exploited lakes and rivers for fishing by migrant workers.

Also, the ethnographic survey contains several proposals for potential impact mitigation prepared with account for findings obtained through opinion polls among the indigenous population of Tazovskiy District.

#### 4.3.3 Consultations as part of the international ESHIA (2018)

The Company and Ramboll carried out a number of stakeholder engagement activities as part of the international ESHIA procedure (Figure 4.1).

RAMBOLL





Figure 4.1: Consultations with representatives of indigenous communities migrating within the area of the Salmanovskoye (Utrenneye) field (2018)

Below is provided information on stakeholder engagement in Stages 1 and 2 for the 2018 ESHIA for the Complex.

# Stage 1. Disclosure and consultations on the Scoping Report for the ESHIA for the Complex (2018)

In the scope of the international ESHIA procedure (2018), community liaison offices were arranged in cultural centres of Gyda and Antipayuta and the Information Centre in the office of Arctic LNG 2 LLC in Tazovskiy for adequate disclosure of the international ESHIA Scoping Report, SEP and general description of the Complex to local communities (details are given below). Disclosure of the SEP, ESHIA Scoping Report and the Project information brochure was carried out through the liaison offices and the Information Centre in the period from April 5 to May 5. Communities were encouraged to leave their comments on the above documents at the disclosure venues.

Initially, the Information Centre was open in Tazovskiy on April 5, 2018 as part of the project for construction and operation of the Complex; currently, the Centre operates within the framework of the entire Arctic LNG 2 Project. The Information Centre will operate throughout the Project lifecycle. The Centre serves for disclosure of relevant information about the Project and for regular interaction of the Company with stakeholders via the Grievance Mechanism. However, due to the spread of coronavirus infection Covid-19, it is expected that operation of the Centre may be temporarily restricted for safety of the local population and Company employees.

The stakeholder engagement activities were announced to all interested parties well in advance using the following methods:

- Announcement of meetings through official requests by e-mail (Tazovskiy District Administration, Medical Director of the Tazovskiy District Central Hospital);
- Advertising of the scheduled consultations and disclosure activities for all stakeholders through mass media:
  - Rossiyskaya Gazeta ("Russian Newspaper") (05.04.2018);
  - Sovetskoye Zapolyarye ("Soviet Polar Region") newspaper (05.04.2018);
  - Krasny Sever ("Red North") newspaper (04.04.2018);
- Display of notices about the scheduled consultations and disclosure activities in public places in the settlements.

Moreover, some stakeholders were directly notified about the planned disclosure activities by e-mail, namely:

• YNAO Government;





- Tazovskiy District Administration, including individual notification of its relevant departments;
- Gyda and Antipayuta Administrations;
- PFHI Tazovskiy District Central Hospital;
- Agricultural enterprises of Tazovskiy District;
- Fish producing/processing enterprise of Tazovskiy District (Tazovskiy Agroindustrial Fish-farming Enterprise LLC);
- Public organizations:
  - o Local women organization LPO "Zhenschiny Tasu'Yava" of Tazovskiy District;
  - Regional group "Association of Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug "Yamal – potomkam!";
  - Tazovskiy branch of the regional group "Association of Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug "Yamal – potomkam!";
  - Charity Foundation for Development of Indigenous Small-numbered Peoples of the North (Tazovskiy settlement);
  - Association of Indigenous Small-numbered Peoples of the North, Siberia, and Far East of the Russian Federation (Moscow);
- Scientific research institutions of YNAO and Tyumen Region, including:
  - State Public Institution of YNAO "Arctic Research Centre";
  - Tyumen Research Centre of the Russian Academy of Sciences;
  - <sup>o</sup> Geoscience Institute of the Tyumen State University.
  - Local branches of Federal authorities operating in YNAO:
    - Rosprirodnadzor Department for Yamal-Nenets Autonomous Okrug;
    - Department for State Monitoring, Supervision, Protection of Aquatic Biological Resource and Habitats in Yamal-Nenets Autonomous Okrug;
    - Local branch of the Rosprirodnadzor Department for Yamal-Nenets Autonomous Okrug in Novy Urengoy city and Tazovskiy District.

The list of the stakeholder engagement activities to include their summary and indication of the disclosed materials is given below in Table 4.2.

RAMBOLL



Date	Place	Activity	Disclosed documents	Brief description and key issues
13.03.2018	Tazovskiy	Kick-off meeting with the Tazovskiy District Administration, Tazovskiy branch of the Association "Yamal – potomkam!", Charity Foundation for Development of Indigenous Small-numbered Peoples of the North	Presentation brochure	<ul> <li>The following issues were discussed at the meeting:</li> <li>Overview of the Complex construction process;</li> <li>Requirements of international standards, particularly IFC PS 1-8;</li> <li>International ESHIA process;</li> <li>Key methods of stakeholder engagement, including potential participation of Ramboll in the activities related to the Reindeer Herder's Day in Tazovskiy, Gyda and Antipayuta;</li> <li>Customary types of land use (fishery, reindeer herding) and potential impacts on them caused by the Company's construction activities for the Complex;</li> <li>Issues of transformation of the Ob Bay thermohaline structure as a result of dredging activities and operation of sea channels crossing the Ob Bar.</li> </ul>
31.03.2018	Tazovskiy	Consultations with residents of Tazovskiy settlement, Tazovskiy tundra and Nakhodka tundra on the Reindeer Herder's Day	Presentation brochure Scoping Report SEP	<ul> <li>The consultations were held in the format of information desk in the National Cultures Centre established by the Company and Ramboll supported by the Tazovskiy District Administration. The following matters were discussed with representatives of Tazovskiy District communities:</li> <li>Build-up of conditions contributing to degradation of permafrost soil, activation of exogenous geological processes with resulting disturbance of soil and vegetation cover, and increased risk of an epizootic outbreak of anthrax;</li> <li>Chemical pollution of surface water bodies resulting from spills of process fluids;</li> <li>Transformation of the aquatic species composition and population numbers (primarily fish fauna) in the traditional fishing areas of Nenets people;</li> <li>Degradation of reindeer pasture productivity (primarily of reindeer moss resource);</li> <li>Fragmentation of terrestrial vertebrate habitats and agricultural lands (pastures);</li> <li>Sale of reindeer herding and fishing products to personnel of the fuel &amp; energy sector.</li> </ul>
02.04.2018	Tazovskiy	Data collection meeting with the Tazovskiy District Administration	Presentation brochure Scoping Report SEP	<ul> <li>The Company and Ramboll presented the project for Complex construction and operation and the international ESHIA process to the Tazovskiy District Administration. An interview of the Administration representatives was conducted with a view to collect information on the socio-economic status of Tazovskiy District, its select settlements and inter-settlement territories. The following topics were discussed at the meeting:</li> <li>District budget basis and key budgeting features (availability of subventions and subsidies);</li> <li>Status and specific features of educational facilities in the district;</li> <li>Status and specific features of district transport infrastructure;</li> <li>Socio-economic conditions in the inter-settlement territories;</li> </ul>

#### Table 4.2: Stakeholder engagement activities at Stage 1 consultations under the international ESHIA process (2018)





Date	Place	Activity	<b>Disclosed documents</b>	Brief description and key issues
				<ul> <li>Customary economic activities of indigenous people in Tazovskiy district, including nomadic activities in the area of the Salmanovskoye (Utrenneye) OGCF;</li> <li>The issue of overgrazing;</li> <li>Administrative status and general state of the trading stations, including Mangty-Yakha, Yuribey, and Tadebya-Yakha;</li> <li>Employment of Tazovskiy District residents in general and of the nomadic population in particular;</li> <li>Satellite and mobile communication with the nomadic population. The Company and Ramboll also collected documentary information on the above issues. Some documents were provided electronically before and after the meeting.</li> </ul>
02.04.2018	Tazovskiy	Meeting with Medical Director of the PFHI Tazovskiy District Central Hospital	Presentation brochure	<ul> <li>The Company and Ramboll interviewed the Medical Director of PFHI Tazovskiy District Central Hospital and discussed the following topics:</li> <li>Anthrax outbreak in Yamal District in 2016 and risk of its recurrence in Tazovskiy District;</li> <li>Birth and death rates in Gyda and Antipayuta;</li> <li>Tuberculosis morbidity and its causes;</li> <li>Availability of the resource at the Tazovskiy District Hospital needed to serve the patients with residence and/or economic activities in the inter-settlement territories of Tazovskiy District.</li> </ul>
01.04.2018	Area of the Salmanovskoye (Utrenneye) field	Meetings with representatives of indigenous nomadic people migrating in the area of the Salmanovskoye (Utrenneye) Field	Presentation brochure	<ul> <li>Representatives of Arctic LNG 2 LLC and Ramboll interviewed members of an ISPN family migrating within the Salmanovskiy (Utrenniy) LA. Members of three other ISPN families migrating within the LA were also present at the interview. During the meetings</li> <li>Information was collected about nomadic indigenous families continuously migrating within the boundaries of the Salmanovskiy (Utrenniy) LA;</li> <li>Information was collected on the composition of one family and its customary business activities;</li> <li>Tentative list of reindeer herders (prepared as part of the ethnographic survey in 2015) migrating within the Salmanovskiy (Utrenniy) LA was confirmed;</li> <li>Potential locations of reindeer herds' crossing points over the linear facilities of the Arctic LNG 2 Project were discussed. Representatives of indigenous communities got familiar with the proposed crossing points and suggested their ideas about such layout. In particular, they marked a few additional locations for crossing points in the map.</li> </ul>
12.04.2018	Antipayuta	Meeting with teaching staff of the Antipayuta boarding school	Presentation brochure	<ul> <li>The Company and Ramboll presented the project of Complex construction and operation and the international ESHIA process to the boarding school faculty and answered questions regarding:</li> <li>Potential impact of the Project on water bodies and biological resource;</li> <li>Potential benefits for local communities from the Project;</li> <li>Increased community morbidity rates as an integral consequence of adverse impacts of the Project.</li> </ul>





Date	Place	Activity	<b>Disclosed documents</b>	Brief description and key issues
				The participants also expressed doubts about the expediency of the meeting when "the deal is done" and decision to build the Complex has been made. It was further noted that a quality assessment of potential impacts of the Project is desirable.
12.04.2018	Antipayuta	Consultations with representatives of Antipayuta and Antipayuta Tundra on the Reindeer Herder's Day	Presentation brochure Scoping Report SEP	<ul> <li>The Company and Ramboll presented the Project and the international ESHIA process to the residents who arrived for a concert on the Reindeer Herder's Day. Questions on the following topics were asked after the presentation:</li> <li>Adverse environmental changes resulting from industrial and municipal waste management practice (temporary storage, transportation, disposal);</li> <li>Adverse impact of the flare units (and pollutants emissions to air in general) on the air quality in Gyda Tundra;</li> <li>Potential impact of the Project on nomadic indigenous communities.</li> </ul>
12.04.2018	Antipayuta	Consultations with Antipayuta Administration	Presentation brochure Scoping Report SEP	<ul> <li>The key socio-economic parameters of s. Antipayuta were discussed, including:</li> <li>Demography;</li> <li>Main employers for the villagers;</li> <li>Operation of the Yara-Vonga trading station, etc</li> </ul>
12.04.2018	Antipayuta	Consultations with State Farm Antipayutinskiy	Presentation brochure	<ul> <li>The following topics were discussed at the meeting:</li> <li>Key characteristics of the entity;</li> <li>Land use issues related to the state farm operations;</li> <li>Information on reindeer herding and fishing activities;</li> <li>Plans for processing of reindeer herding products;</li> <li>Issues relating to business operations in the territory of the Salmanovskiy (Utrenniy) LA.</li> </ul>
12.04.2018	Antipayuta	Consultations with the Antipayuta rural district hospital	Presentation brochure	<ul> <li>The following topics were discussed at the meeting:</li> <li>Status of healthcare infrastructure in s. Antipayuta. Morbidity rates in Antipayuta;</li> <li>Specific arrangements for provision of medical services for nomadic indigenous communities migrating in the area of Antipayuta Tundra;</li> <li>Morbidity rates among indigenous communities.</li> </ul>
18.04.2018	Gyda	Consultations with representatives of Gyda and Gyda Tundra on the Reindeer Herder's Day	Presentation brochure Scoping Report SEP	<ul> <li>The consultations were held in the information desk format in the lobby of the Gyda Administration building. The event was arranged by the Company and Ramboll with support of the village Administration. Topics discussed with residents:</li> <li>Adverse changes in the geological environment due to extraction of hydrocarbons (natural gas, oil, condensate);</li> <li>Transformation of the aquatic species composition and population numbers (primarily fish fauna) in traditional fishing areas of Nenets people;</li> <li>Degradation of reindeer pasture productivity (primarily of reindeer moss resource);</li> <li>Potential adverse impacts of vibrations and noise from construction and operation of the designed facilities which , in the opinion of ISPN, may</li> </ul>





Date	Place	Activity	<b>Disclosed documents</b>	Brief description and key issues
				<ul> <li>induce changes in fish migration routes and transformation of the aquatic species composition;</li> <li>Reindeer herding and fishing products sale to personnel of the fuel &amp; energy sector.</li> </ul>
17.04.2018	Gyda	Consultations with Gyda Administration	Presentation brochure Scoping Report SEP	<ul> <li>Apart from the key socio-economic parameters of s. Gyda, a few other issues were discussed:</li> <li>Demography;</li> <li>Information on Yuribey, Tadebya-Yakha and Mangty-Yakha;</li> <li>Key employment providers for Gyda village residents;</li> <li>Information on nomadic people migrating within the Salmanovskiy (Utrenniy) LA.</li> </ul>
17.04.2018	Gyda	Consultations with representatives of the Gyda boarding school	Presentation brochure	<ul> <li>The following topics were discussed at the meeting:</li> <li>Specific features of education services for indigenous communities;</li> <li>Information on nomadic people migrating within the Salmanovskiy (Utrenniy) LA.</li> </ul>
18.04.2018	Gyda	Consultations with GydaAgro LLC and the Gyda Consumers Association	Presentation brochure	<ul> <li>During the meeting, key information on activities of GydaAgro LLC and the Gyda Consumers Association was collected and the following issues discussed:</li> <li>Information on fishing activities, including locations of commercial fishing areas of GydaAgro LLC;</li> <li>Information on personnel employed by GydaAgro LLC, including the indigenous;</li> <li>Activities of the Gyda Consumers Association;</li> <li>Operations of Yuribey, Mangty-Yakha, Tadebya-Yakha, and Tanamo trading stations.</li> </ul>
18.04.2018	Gyda	Consultations with representatives of the Gyda village kindergarten	Presentation brochure	<ul> <li>The following topics were discussed at the meeting:</li> <li>Main characteristics of pre-school education in Gyda and Yuribey;</li> <li>Special features of pre-school education services for indigenous communities;</li> <li>Details on the 'nomadic' group in the Yuribey kindergarten.</li> </ul>
18.04.2018	Gyda	Consultations with the Gyda rural district hospital	Presentation brochure	<ul> <li>The following topics were discussed at the meeting:</li> <li>Condition of healthcare infrastructure in Gyda. Community morbidity rates;</li> <li>Specific arrangements for provision of medical services for nomadic indigenous communities migrating in the area of Gyda Tundra;</li> <li>Morbidity rates among indigenous communities.</li> </ul>





The list and time of the meetings were determined jointly with the Tazovskiy District Administration, Tazovskiy branch of the ISPN association "Yamal – potomkam!", and the local Charity Foundation for Development of Indigenous Peoples of the North

#### Stage 2. Disclosure and consultations on the ESHIA materials for the Complex (2018)

Community liaison offices were set up in cultural centres in Gyda and Antipayuta for adequate ESHIA disclosure to local communities at Stage 2 consultations. These were also arranged in the Project Information Centre in the office of Arctic LNG 2 LLC and in the office of the local branch of the regional group "Association of Indigenous Small-numbered Peoples of the North of Yamal-Nenets Autonomous Okrug "Yamal – potomkam!" in Tazovskiy, as well as in the office of the Company in Moscow. The ESHIA (the SEP inclusive), the ESHIA Scoping Report and the Project brochure were disclosed through the liaison offices and Project Information Centres during the period from July 21 to August 21. Communities were encouraged to submit their comments on the above documents at the disclosure venues.

The consultations were preceded by informing the stakeholders about such meetings by

- Advertising the meetings through official invitations sent by e-mail to the Tazovskiy District Administration;
- Advertising information disclosure and scheduled consultations for all stakeholders through mass media:
  - Rossiyskaya Gazeta ("Russian Newspaperr") (20.07.2018);
  - Sovetskoye Zapolyarye ("Soviet Polar Region") newspaper (21.07.2018);
    - Krasny Sever ("Red North") newspaper (21.07.2018);
- Targeted notification of the stakeholders by e-mail. The list of such stakeholders is similar to that provided above for Stage 1.

In addition, residents of Yuribey and Gyda were informed on the date and venue of the Fisherman's Day celebration by the local administration (see below).

Since Stage 1 stakeholder consultations covered broader communities potentially exposed to indirect impacts of the planned activity (refer to Table 4.1), engagement activities in the ESHIA stage were focused on the stakeholders potentially affected by direct impacts, particularly on consultations with the indigenous communities migrating within the Salmanovskiy (Utrenniy) LA. To this end, meetings with ISPN communities in Gyda and Yuribey took place during the Fisherman's Day festivities which were expected to attract such ISPN representatives.

Consultations with all stakeholder groups were held through collection of queries/comments on the disclosed materials by e-mail or via the community liaison offices, and at meetings with administrations in the face-to-face format.

In addition, the Company and Ramboll held a meeting with the Department for Natural Resource Regulation, Forestry Affairs and Development of Oil and Gas Industry of Yamal-Nenets Autonomous Okrug (DPRR) on August 30, 2018 in Salekhard. Another meeting with the Tazovskiy District Administration, ISPN and other stakeholders was held in Tazovskiy on October 24, 2018.

Details of the Stage 2 consultations are summarised in Table 4.3 below.

RAMBOLL



#### Date Place Activity Disclosed Brief description and key issues documents 25.07.2018 Tazovskiy Meeting with the Presentation The meeting included the presentation of preliminary ESHIA findings and consultations Deputy Head of the on the following: materials Tazovskiv District Information brochure • Period of waste storage at temporary storage site; Administration Utilisation of gas recovered from the mercury adsorbent vessel: • • Geodynamic polygon and its functioning; Designing a vertical structure of biodiversity monitoring measures; • Potential impact on GydaAgro LLC; . Ban on hunting and fishing by personnel. The Administration representative suggested to set up cell communication towers with a broader coverage beyond the OGCF area, so that ISPN would not need to come near the field boundaries; establish a service centre in the field periphery for servicing ISPN; engage with an ISPN representative who would work at the field, for liaison with indigenous communities. The consultations were held through the information desk arranged near the kindergarten 26.07.2018 Yuribey Consultations with Information poster for children from nomadic families in Yuribey (near the main festivity venue). Topics Yuribev Information brochure the NTS discussed and questions asked: community and nomadic families SEP Informing community on the planned activities and ESHIA findings; migrating within the Complaints about drilling rig operation near the Yuribey River, about 40-50 km from the village (assumingly, the geological prospecting rig No.136 of the Arctic LNG 1 Salmanovskiy (Utrenniy) LA Project; noise and garbage ("operators discarded the hut straight into the river"); Reduction of aquatic bioresource in the Yuribey area (over some 5 past years). Concerns that the bioresource will decline even further due to drilling operations; Reduction of aquatic bioresource in the Ob Bay and its inflowing rivers (over past 8-10 years). Concern that dredging will cause a further decline. Potential benefits from the Project for tundra communities. In addition, 2 interviews were conducted with members of nomadic families migrating in the Salmanovskiv (Utrenniv) LA. 25.07.2018 The consultations were held in the format of information desk arranged near the cultural Consultations with Information poster Gvda the Gyda community Information brochure centre in Gyda (near the main festivity venue). Topics discussed and questions asked: nomadic Informing community on the planned activities and ESHIA findings: and NTS families migrating SFP • Complaints about failure to consider views of local communities in the decisionmaking process regarding implementation of the planned activities; within the Salmanovskiv Reduction of aquatic bioresource in the Ob Bay. Concern that the bioresource will (Utrenniy) LA decline even further due to implementation of the planned activities; Waste management at the GBS LNG & SGC Complex: a question was raised about possible waste discharge to the Ob Bay: Potential benefits from the Project for local communities. Additionally, a member of a nomadic family migrating in the Salmanovskiy (Utrenniy) LA was interviewed. 30.08.2018 The meeting included the presentation of the preliminary ESHIA findings and Salekhard Meeting at the DPRR Presentation consultations on the following issues: materials ESHIA Scoping Report Rationale for using gravity-based structures;

#### Table 4.3: Stakeholder engagement activities at Stage 2 consultations under the international ESHIA process (2018)





Date	Place	Activity	Disclosed	Brief description and key issues
			documents	
		(the list of attendees is included in Appendix 2)	NTS SEP	<ul> <li>Rationale for Complex construction in the Ob Bay and associated risks;</li> <li>Rationale for selecting the underwater dumping solution for soil disposal;</li> <li>Mutual influence of the planned activities and the Yamal LNG Project;</li> <li>Approval procedure at the Federal Fishery Agency; compensation amount for the damage caused to aquatic life;</li> <li>Transformation of the Ob Bay thermohaline structure;</li> <li>Risks of accidents at storage of condensate and process fluids;</li> <li>Support of local communities provided by the Company.</li> <li>In addition, suggestions on monitoring of the planned activities were voiced.</li> <li>Minutes of the meeting are included in the SEP.</li> </ul>
24.10.2018	lazovskiy	Consultations with stakeholders for provision of information on the final ESHIA findings (the list of attendees is provided in Appendix 3)	Presentation materials Information brochure NTS SEP	<ul> <li>Final ESHIA findings were presented at the meeting. The issues discussed:</li> <li>Prospects of expanding the resource base of the Complex as reserves of the Salmanovskoye (Utrenneye) field are depleted. Concomitant problems for customary land use are expected to relate to even greater fragmentation of reindeer pastures due to linear infrastructure construction as part of development of other fields;</li> <li>Concerns regarding reduction of aquatic bioresource, primarily fish (omul and other commercial species) in the Ob Bay and affluent rivers;</li> <li>Question regarding a growing frequency of saline seawater invasions into the central part of the Ob Bay and its potential relation to Yamal LNG and Arctic LNG 2 projects;</li> <li>Comment on destruction of bottom habitats in the Ob Bay near Cape Kamenniy (Yamal District of YNAO) in the dumping area as an example of irreversible adverse changes in marine ecosystems caused by underwater engineering works. Concern that this might happen while performing works as part of the planned activity;</li> <li>Question about potential utilisation of bottom soil (extracted by dredging) for onshore construction works (in order to avoid dumping and associated impacts on the water environment of the Ob Bay).</li> <li>The following proposals were made during the meeting:</li> <li>To set up service centres and storage sites at the Complex, Port and other facilities in the Salmanovskiy (Utrenniy) LA for supply of indigenous peoples with consumables (motor fuel, firewood, drinking water, etc.) in case of emergency (the list of the consumables might be prepared by the Company's positive experience of interacting with herders in other areas). Also, indigenous people might use the specially equipped premises of the centres for a short stay in case of extremee weather conditions or other emergencies, for minor repairs of machinery and equipment, etc.;</li> <li>To establish a search-and-secure service within the Arctic LNG 2 Project to be permanently based in the Salmanovskiy (</li></ul>





One comment was received through the liaison offices during the disclosure period from July 21 to August 21. The comment was left in the Comments and Queries Log in Gyda on 27.07.2018. The author of the comment asks to abolish restriction of fishery activities of local communities and to increase financial support for nomadic population<sup>67</sup>.

4.3.4 Consultations in the framework of the international ESHIA for the Arctic LNG 2 Project (2020)

In May 2020, the Company, together with Ramboll, held an introductory meeting in the form of a conference call with the representatives of the following stakeholders:

- Administration of the Tazovskiy district;
- Tazovskiy district branch of the Association "Yamal Potomkam!".

During the conference call, representatives of the Company and Ramboll presented the following information to the participants and discussed the issues listed below:

- Composition and schedule of the Project;
- Composition of the ESHIA and description of international standards;
- Schedule of ESHIA delivery;
- Two planned stages of consultation on ESHIA;
- Available means of consultation in the context of Covid-19 spread.

In addition, during the call Ramboll specialists outlined a range of topics for information request, which was subsequently provided to Tazovskiy District Administration and included the topics of socio-economic development, data on cultural heritage sites, information on ISPN migrating within Salmanovskiy (Utrenniy) LA, etc.

#### 4.4 Future stakeholder engagement activities

Future stakeholder engagement activities are determined by the relevant document (the SEP) and will be performed throughout the Project lifecycle. The SEP will be in open access during the overall lifecycle of the Project and will be updated on a regular basis at different Project phases in order to timely identify new stakeholders and draw them in the engagement process. The engagement methods will be subject to routine revision and updating to maintain their efficiency and accommodate for the changing context.

It is of note that the Project has introduced a grievance mechanism for both external stakeholders and the Project staff. For all stakeholders, a variety of grievance submission means are offered, including by e-mail, via grievance boxes, by phone, in a personal meeting with a responsible person of the Company and via written request by mail. Project staff grievance boxes are installed in frequently visited places (e.g. canteens) and near work sites.

Informing the public (population, indigenous peoples of the North) about the mechanism is carried out within the framework of public discussions, surveys of the population, by placing the SEP, including the grievance mechanism, on the Company's website.

#### 4.5 Gender Aspect of Consultations

The stakeholder engagement process, including engagement with indigenous peoples, should be gendersensitive and take account of women's participation and opinions. For example, women's views may differ from those of family heads or officials (usually men). In addition, women may be more vulnerable to some of the potential impacts of the Project. In some cultures, women may also be excluded from or have limited participation in the decision-making process.

During the ESHIA (2018) process, women's views were collected through consultations, which are described below:

• Consultation to gather information about families and way of life of the ISPN migrating within the boundaries of Salmanovsky (Utrenniy) LU.

During the process of ESHIA (2018), Ramboll consulted with representatives of ISPN families whose migration routes pass through the territory of Salmanovskiy (Utrenniy) LA and with whom it was

<sup>&</sup>lt;sup>67</sup> Financial aid payable to the representatives of the ISPN in Yamalo-Nenets Autonomous District under Law of Yamalo-Nenets Autonomous District No. 1-ZAO dated March 2<sup>nd</sup>, 2016 "On Guarantees of Persons Leading Traditional Way of Life of Indigenous Small-Numbered People of the North in the Yamalo-Nenets Autonomous District".





possible to meet during consultations in settlements or when visiting the territory of LA. Interviews with representatives of eight such families were conducted. One of the interviews was conducted with a woman whose family and relatives migrate within Salmanovskiy (Utrenniy) LA.

• Consultations to collect information on traditional way of life of the ISPN in Tazovskiy district.

As part of ESHIA (2018), Ramboll also conducted several interviews with other representatives of ISPN who perform traditional economic activities in Tazovskiy district. The interviews were performed in order to collect information on traditional way of life of Nenets. Some of the interviews were conducted with women.

• Consultations as part of disclosure of Scoping Report and ESHIA for the Complex.

In the course of these consultations, engagement with women was carried out in a Q&A format in the form of information desks (see above).

Information on traditional indigenous way of life collected from the above consultations with women was generally similar to that collected during consultations with men. The consultation process did not identify particular aspects or information that would suggest a disproportionate or peculiar potential impact of the Project specifically on women involved into traditional practices. It was also confirmed during the consultations that traditional economic activities such as wildcrafting are typically considered as 'female' mong ISPN communities. Relevant information is provided in Chapter 8.

The Company will seek to integrate a gender perspective into the consultation process of the Project. The Indigenous Peoples Development Plan (Section 10.7) will also be developed in a gender-sensitive manner.

#### 4.6 Free Prior Informed Consent

Additionally, the Company will continue the process of Free Prior Informed Consent (FPIC) regarding ISPN stakeholders as part of the stakeholder engagement activities. The FPIC process will integrate with the activities under the Indigenous People Development Plan to be prepared by the Company at further stages of the Project. Of special note are the consultations with ISPN representatives the Company conducted in 2013-2018:

- Public consultations to include opinion polls among the indigenous communities of Antipayutinskaya, Gydanskaya, Nakhodkinskaya and Tazovskaya Tundra with proper recording (more than 25 events held);
- Ethnographic survey to include collection of information on vital activities of the ISPN nomadic communities within the Salmanovskiy (Utrenniy) LA and their opinions on potential negative impact of gas production projects within the license area; and
- 3) Engagement activities in the framework of the international ESHIA for the Complex (2018). Disclosure of information on potential impacts of the Complex on customary economic activities and collection of indigenous communities' opinions in the course of the Ramboll consultant's visit to the Salmanovskiy (Utrenniy) LA and public consultations in Tazovskiy, Gyda, and Antipayuta. Location of additional reindeer herds' crossings were approved in consultation with part of the ISPN representatives migrating within the license area<sup>68</sup>.

The above activities are viewed as a part of the Project's FPIC process and comprise important measures taken by the Company that lay the foundation for future stages of the FPIC process. In the course of these activities, the Company has ensured 1) early involvement of representatives of the ISPN in the process of consultations on various Project facilities; 2) dissemination of necessary information among tundra population (including events held jointly with the representatives of the "Yamal – Potomkam!" Association); 3) meetings with and surveys of ISPN representatives with proper record-keeping; 4) documented voting of tundra indigenous people to determine the level of support for development of various Project facilities from ISPN of Tazovskiy district.

<sup>&</sup>lt;sup>68</sup> Location of the crossings' sites was defined based on the information on migration routes discovered during the ethnographic survey conducted by Purgeokom LLC in 2015, as well as on the outcomes of engagement with administration of Gyda settlement. Locations of the crossings were approved by four representatives of ISPN during their communication with Arctic LNG 2 specialist in April 2018. In the course of this communication, ISPN representatives also suggested locations for additional crossings and provided their opinions on necessary features of these crossings.





As mentioned earlier, further FPIC consultations will be conducted as part of Indigenous Peoples Development Plan preparation. While ensuring FPIC from the Project-affected ISPN, the Company will base related activities on the following principles in accordance with IFC PS7:

- 1) FPIC comprises two key elements: a process and an outcome<sup>69</sup>;
- 2) The process of FPIC will build upon the principles of informed consultations and participation (ICP), and, additionally, will ensure Good Faith Negotiation (GFN), which implies consultations with affected indigenous residents in reasonable timeframes and in a form mutually convenient and appropriate for all parties with provision of all information necessary and crucial for decision-making; FPIC consultations will be of iterative nature<sup>70</sup>;
- The FPIC process' *outcome* will be an agreement with the affected indigenous peoples or their representatives; the agreement may take the form of a Memorandum of Understanding, Letter of Intent or another format acceptable to all parties<sup>71</sup>;
- 4) It is expected that the resulting document of FPIC (Memorandum of Understanding or other) will refer to measures to mitigate or enhance the impacts on affected indigenous peoples included in the specially developed Indigenous Peoples' Development Plan (IPDP)<sup>72</sup>.

It is of note that the FPIC process as part and as result of IPDP preparation will ensure that affected indigenous communities are provided with sufficient information on both Project's negative impacts, as well as benefits that the Project may entail for the local residents.

The approach to FPIC process will be detailed in the Indigenous People Development Plan to be prepared by the Company.

<sup>&</sup>lt;sup>72</sup> IFC Guidance Note 7 "Indigenous peoples" P41





<sup>&</sup>lt;sup>69</sup> IFC Guidance Note 7 "Indigenous peoples" P25

<sup>70</sup> Ibid.

<sup>&</sup>lt;sup>71</sup> IFC Guidance Note 7 "Indigenous peoples" P38

## 5. CHARACTERISTICS OF THE PLANNED ACTIVITY

Arctic LNG 2 involves extraction of hydrocarbons of two categories - natural gas and gas condensate, their pre-treatment at the Field facilities, transmission by separate pipelines for natural gas and gas condensate to the LNG & SGC Plant, and offloading the products to gas carriers and tankers at the Terminal.

The main activities conducted immediately prior to the Project implementation and integrated into its structure are listed in consecutive order and briefly described in Table 5.1. Implementation time frames of the Project components are schematically presented in Figure 1.8, Chapter 1.

No.	Activity	Time frames and current status	Link to other activities
5.1	Exploration and production of crude hydrocarbons in subsoil area of federal significance including Salmanovskoye (Utrenneye) OGCF	2011 till the end of Project. The respective subsoil license held by LLC "Arctic LNG 2" is valid till year 2120.	All other activities are conducted within the boundaries of the license area of the Salmanovskoye (Utrenneye) OGCF as defined in respective license
5.2	Construction of the berth structures at Salmanovskoye (Utrenneye) OGCF	2016 - to date	The berth structures have been in operation since 2016 and will be integrated into the Utrenniy Terminal
5.3	Maintenance dredging in the water area of the berth structures of the Salmanovskoye (Utrenneye) OGCF	2016 – to date, every two years	The water area within the boundaries defined in the berth structures design documentation will be integrated into the Utrenniy Terminal
5.4	Early development facilities at the Salmanovskoye (Utrenneye) OGCF	2017 - to date The facilities have been put into service	All facilities (except for
5.5	Salmanovskoye (Utrenneye) OGCF Facilities Setup. Gas supply for the power supply facilities to support construction, hydraulic filling and drilling operations (start-up package I, designation in the design documentation - PIR-1)	Phased construction and commissioning for service in 2020-2026, in accordance with the approved design documentation. Operation - till completion of drilling, construction and hydraulic filling operations	temporary) will be integrated into the Salmanovskoye (Utrenneye) OGCF Facilities Setup (item 6). Temporary site facilities will be dismantled, and respective land will be reclaimed and returned to the lessors
5.6	Salmanovskoye (Utrenneye) OGCF Facilities Setup (start-up packages PIR- 25)	Construction and commissioning for service in four phases over the period 2020-2026, in accordance with the approved design documentation. Operation - till the end of Project	Several permanent facilities of the Field are designed under separate titles
5.7	Construction of well pads No.2 and No.16 at Salmanovskoye (Utrenneye) oil, gas, and condensate field, drilling and testing period	Design development and the state expert review <sup>73</sup> procedures were completed in 2018-2019. Planned completion of the construction works - 2025.	Specific works for completion of the well pads are implemented under respective titles

#### Table 5.1: Arctic LNG 2 Project phases and implementation time frames

<sup>&</sup>lt;sup>73</sup> Hereinafter the term "*state expert review*" refers to the state expert review of engineering survey reports and design documentation, as well as state ecological review of the planned activity (if applicable)





No.	Activity	Time frames and current status	Link to other activities	
5.8	Construction of 18 well pads at Salmanovskoye (Utrenneye) OGCF, drilling and testing period	The design works were completed in 2019. The design documentation has been approved by FAI Glavgosekspertiza of Russia. Implementation is planned during 2020-2026.		
5.9	Completion of well pads P304 and R295 at the Salmanovskoye (Utrenneye) OGCF	Engineering surveys have been completed. EIA and preparation of design documentation is in progress. The State Expert Review is planned in 2020.	The single wells are intended to supply fuel gas for the FIELD power supply complexes	
5.10	Utrenniy liquefied natural gas and stabilised gas condensate terminal: Early phase facilities (EPF, PK 1)	The design documentation has been prepared and approved by FAI Glavgosekspertiza of Russia. Construction – 2019-2021, operation – from 2021 till the end of Project	The existing berth structures (item 2) will be integrated into the Terminal	
5.11	Utrenniy liquefied natural gas and stabilised gas condensate terminal: Operating phase facilities (OPF, PK 2)	The design documentation has been prepared and approved by FAI Glavgosekspertiza of Russia. Construction – 2019-2024, operation – from 2024 till the end of Project	Configuration of the ice barriers is selected to provide the inner area of the Port that allows for	
5.12	GBS Plant for production, storage and offloading of liquefied natural gas and stabilized gas condensate	Design development and the state expert review procedures have been completed in 2020. Construction – 2020-2026, operation – from 2026 till the end of Project	and LNG&SGC capacities from three to six GBS units	

Further to the above list, there is one more major facility that relates to the Arctic LNG 2 Project at the infrastructure level – the Utrenniy Airport. It is not a part of the Project but is associated with it, as the Project cannot be implemented without the airport. Therefore, impacts of the airport construction and operation have been assessed as part of the Project impacts (Chapter 9). Design has been developed, and the state expert review of the survey reports and design documentation for the project was completed in 2019. The times of construction start and putting the airport into service are to be clarified. The airport will be operated by Sabetta International Airport LLC. LLC "Arctic LNG 2" acts as lessor of the land plots and utility supplier for the airport.

Originally, the site of the future airport was designed for reception, sorting, treatment and disposal of solid waste (the waste disposal site) - the respective engineering and transport solutions are reflected in ESHIA 2018. The new site location (in the area of power supply complex No.2 and PGTP No.3) and technical design for the waste disposal site are included in the design documentation for start-up package PIR-5 of the Field.

The following subsections provide an overview of each of the Project components listed in Table 5.1 above.


# 5.1 Project background. Exploration and planning for the Salmanovskoye (Utrenneye) OGCF Facilities Setup

The resource base for the Project – Salmanovskoye (Utrenneye) oil, gas, and condensate field74, was discovered in 1979 when GlavTyumenGeologia (Tyumen Main Geologic Department) drilled the first exploration well. The preliminary studies were conducted during 1980-1985.



Figure 5.1: Salmanovskoye (Utrenneye) oil, gas, and condensate field

<sup>&</sup>lt;sup>74</sup> In 2008 the field was re-named as a tribute to petroleum geologist Farman Salmanov who worked at the leading roles in the Tyumen Main Geologic Department and the USSR Ministry of Geology





Since 2011, licenses for the use of the field subsoil resources are held by subsidiaries or joint ventures with participation of NOVATEK, including LLC "Arctic LNG 2" that holds the license since 2014<sup>75</sup>. The field reserves and geological model were clarified by further exploration during 2012-2014.

The total of 34 high-quality hydrocarbon reservoirs were found in the field, of which 16 are gas reservoirs, 15 - gas and gas condensate, 2 - oil and gas condensate, and 1 is oil reservoir<sup>76</sup>. The reservoirs are associated with the Mesozoic deposits of Peksedskoye dome. They reach to the depth of 2 km, with the most common range is between 1 and 1.5 km. Chemical composition of the produced fluids is covered in Chapter 7 Section 7.4.1.

Table 5.2 lists the main productive characteristics of the Salmanovskoye (Utrenneye) OGCF being one of the largest fields for two adjoining petroleum regions - Gydan and Yamal<sup>77</sup>:

- Original dry gas reserves 1582 billion m<sup>3</sup>, including category C1 681 billion m<sup>3</sup>, category C2 901 billion m<sup>3</sup>;
- Original gas condensate reserves 76.2 million tons, of which 59.3 million tons are extractable reserves.

The field will be developed by drilling 191 wells<sup>78</sup> with near-horizontal tailing-in and horizontal sections' lengths up to 1500 m.

The license area occupies 3409 km<sup>2</sup> and includes three distinct zones of "domes": Northern, Central and Southern (Table 5.2, Figure 5.1).

	Producing zones			
Characteristics	Central dome	Southern dome	Northern dome	
Original dry gas reserves, billion m <sup>3</sup> (% of total field reserves)	680 (43)	576 (36)	327 (21)	
Number of producing wells (well pads)	89 (7)	92 (7)	32 (5)	
Maximum production of dry gas, billion m <sup>3</sup> /a	14.5	12.0	4.0	
Maximum production of stabilised gas condensate, thousand TPA	721.0	591.0	202.0	
Design year of putting into operation	2023	2024	2026	

Table 5.2: Characteristics of the Salmanovskoye (Utrenneye) OGCF, breakdown by producing zones

Sequence numbers are assigned to the gas and condensate well pads (GWP Nos.1...19). The pads location in the map (Figure 5.1) reflects their attribution to different domes within the field: GWP Nos.1...7 belong to the Central dome, GWP Nos.8...14 - to the Southern dome, GWP Nos.15...19 - to the Northern dome.

In 2018, the license area was extended in its southern part, to include the gas and condensate well pad No.20 that was not originally included in the scope of well pads design (refer to the scheme in Figure 5.1).

The different timing of planned putting the domes into operation (Figure 5.2) implies individual consideration of the development parameters for each dome.

<sup>&</sup>lt;sup>78</sup> According to the FIELD design documentation (Salmanovskoye (Utrenneye) OGCF Facilities Setup. Design documentation. Part 1. Explanatory memo. - NIPIgaspererabotka JSC, 2019, p.28), the Project will operate 191 wells (arranged at 19 pads) out of the total stock of 213 wells



5-4



<sup>&</sup>lt;sup>75</sup> License C/IX 15745 H3 dated 20.06.2014 as revised on 29.03.2018 r. / Consolidated National Register of Subsoil Areas and Licenses. – Russian Federal Geological Fund of the Federal Agency for Mineral Resources

<sup>&</sup>lt;sup>76</sup> The Project does not provide for production of oil

<sup>&</sup>lt;sup>77</sup> Originally, the Utrenneye OGCF was assigned to Gydan petroleum region (GPR), due to its geographic location on the Gydan Peninsula. According to the latest geological oil and gas zoning of the West-Siberian oil and gas province (FSUE VNIGNI, 2012), Salmanovskoye (Utrenneye) field belongs to the Yamal petroleum region, along with Shtormovoye field which is located further to the north



Figure 5.2: Salmanovskoye (Utrenneye) OGCF Facilities Setup Programme

Source: Arctic LNG 2. Project Information Memorandum. – Arctic LNG 2 LLC, February 2020





#### 5.2 Construction and operation of the berth structures

The general-purpose berth<sup>79</sup> is among the first permanent facilities within the Salmanovskiy (Utrenniy) license area. The distance to Salekhard – the capital of YNAO – is 540 km, to Sabetta seaport – about 70 km, to the nearest settlements of YNAO Tazovskiy Municipal District - 440 km (Tazovskiy settlement), 240 km (Antipayuta village) and 170 km (Gyda village).

The berth serves as a base point for the development of the territory and water area which performs the function of reception and dispatching of construction cargoes, fuel and lubricants. The design documentation does not specify which ports will be used for the goods supply for the field development. The Consultant assumed two main routes for most vessels: from Arkhangelsk via the Northern Sea Route and the Ob Estuary, and from Salekhard (Labytnangi) through the Ob Estuary.



#### Figure 5.3: Berth structures

Photo by IEPI JSC, 2019<sup>80</sup>; drawing and explication from the design documentation for the facility

The berth is designed to handle 100-140 thousand tons of cargo during each navigation season. The structures are not used during the periods when navigation is impractical (about 300 days per year).

As a hydraulic structure, the berth is divided into two sections (Figure 5.3):

<sup>&</sup>lt;sup>80</sup> Hereinafter, the illustrations are based on the photo materials produced in 2018-2019 by IEPI JSC - contractor for the local environmental monitoring in the Arctic LNG 2 Project area. The reports (refer to the list in Appendix 6) have been provided by LLC "Arctic LNG 2"





<sup>&</sup>lt;sup>79</sup> Referred to in the design documentation as "berth structures". Will be integrated into the Utrenniy Teminal as a general-purpose berth

• Access section of 142 m providing a transport link between the berth and onshore facilities (storage, etc.).

Considering the vessels turn-around time during the navigation period, it is possible that up to three vessels of the following design types can arrive at the berth for unloading at any given time:

- Design R-77: single-decked twin-screw motor tanker for transportation of light petroleum products class I-III, load draught 2.5 m, speed 19 km/h, dimensions 108.6x15.1x13 m;
- Design R-56: Dumb dry-cargo vessel (flat top barge), dimensions 86x17.3x2.85 (unladen height) m for transportation of building materials; freight-carrying capacity 2800 t, draught 2.63 m;
- Designs 16801 and 942M: Dumb barges with freight-carrying capacity of 2500 t and 1000 t, respectively; dimensions and draught are same or smaller than those indicated for R-56;
- Designs 07521 and 758B: sea-going tugs, draught up to 2.5 m; dimensions 50.2x10.4x3.5 m, maximum; cruising endurance up to 15 days at towing speed up to 19.5 km/h.

The construction materials will be unloaded by shipboard and mobile harbour cranes (two track-mounted handling cranes Mantsinen 140/120R and Mantsinen 70) and transported from the jetty by trucks (side trucks, dump trucks and haul trucks based on MAZ 537 and equivalents) via the access section to the access road and storage sites.

The general-purpose berth water of 2.24 ha is within the boundaries of Sabetta Port. The water area provides operational and manoeuvring area, as well as fairway sufficient for movement of vessels of the designed type.

Maximum number of shift workforce needed for operation of the berth structures is 21, with a maximum shift of 10 persons.

The design documentation for the early phase and operation phase facilities of the Utrenniy Terminal provides for reconstruction of the general-purpose berth and modification of its parameters (refer to Section 5.5 for details).





Northern sea route

Ship channel of Ob Estuary

YAMAL PENINSULA

Sabetta�

KARA SEA

GYDAN

PENINSULA

Utrenniy

Channel through the Ob bar

Sabetta

kilometers





Figure 5.4: Water area used in the Ob Estuary and Utrenniy Terminal facilities

Information on positions of the facilities and battery limits is adopted from the design documentation





The berth design documentation was prepared by Morstrojtechnologia LLC under commission of NOVATEK-YURKHAROVNEFTEGAS LLC; in 2014 it was discussed at public consultations in Tazovskiy Municipal District of YNAO along with the engineering survey reports, after which it was approved by the State Expert Review Board<sup>81</sup>.

The berth structures have been in operation since 2016; in the future they will be integrated into the Utrenniy Terminal (item 5.5, Figure 5.4). Their associated goods storage, power supply, shift workforce accommodation facilities, as well as access roads are covered by the design documentation for the early development facilities (section 5.4.1).

### 5.3 Maintenance dredging in the water area of Salmanovskoye (Utrenneye) OGCF

Maintenance dredging is intended to ensure adequate water depth throughout the area of the berth structures. Seabed surface in the Ob Estuary is variable due to the extensive hydrodynamic and ice processes; excavations are soon filled with sediments. Therefore, underwater technical operations must be repeated on a regular basis to maintain safe conditions for vessels traffic (maintenance dredging). The scope for the works is defined in dedicated project documentation<sup>82</sup> that provides for maintenance dredging with two years' intervals during the period 2017-2022.

In particular, the project EIA materials were discussed in October 2016 - February 2017 by the Public Council at the Department for Natural Resource Regulation, Forest Relations and Development of the Oil and Gas Complex of YNAO. Later in 2017, the dredging design package passed the State Expert Review<sup>83</sup>, and the designed activities are conducted in accordance with the agreed schedule. Following integration of the general-purpose berth into the Utrenniy Terminal, the corresponding water area will become a part of the common port area to be maintained in accordance with the respective Terminal design.

The contour lines of all dredging activites for the Project are shown in Figure 5.5.

### 5.4 Salmanovskoye (Utrenneye) OGCF Facilities Setup

#### 5.4.1 Early development facilities

The main components of the early development facilities, i.e. elements needed to start the main works for the field facilities setup, include provision of basic transport and utility infrastructure within the license area, shift accommodation facilities, power, water and wastewater services, fuel supply, storage premises, and waste management infrastructure. Given the extremely low initial level of development of the license area, most of the early development facilities were first constructed close by the berth structures and the designed power supply complex No.2, after which the activity gradually moved toward the Northern and Central domes.

The nodal points for the early development facilities are the jetty, as well as single wells for fuel gas supply to the field facilities - P304 (Central dome) and R270 (Northern dome). Each well supplies gas to the nearby sites of two portable gas turbine power plants (PGTPP No.1 at the Central dome and PGTPP No.2 at the Northern dome), to the boiler house at the temporary accommodation camp (TAC), gas flares, and other consumers.

All sites of the early development facilities are interconnected with each other and the berth structures by a system of utility corridors. The main corridors that run from the jetties to the east (toward the Central dome) and to the north-north-east (the Northern dome) comprise motor roads, communication and power transmission lines, and in some sections – process pipelines (refer to the scheme in Figure 5.6). The total land requirement of the early development facilities is estimated at 434.3298 ha (the land category is 'industrial, transportation, communications and other special purpose land'), of which 50 ha is intended for areal facilities, while the rest of 385 ha is occupied by process and utility networks.

<sup>&</sup>lt;sup>83</sup> Hereinafter the term "state expert review" refers to the state expert review of engineering survey reports and design documentation, as well as state ecological review





<sup>&</sup>lt;sup>81</sup> The common title of the design documentation and EIA is "Berth structures at Salmanovskoye (Utrenneye) oil, gas, and condensate field" (NOVATEK - YURKHAROVNEFTEGAS, 2014).

<sup>&</sup>lt;sup>82</sup> The common title of the design documentation, survey materials and EIA is "Maintenance dredging at the berth structures of the Salmanovskoye (Utrenneye) oil, gas, and condensate field" (Eco-Express-Service LLC, 2016).



Figure 5.5: Contour lines of land use, designed artificial land plots (ALP), hydraulic structures, and dredging in the Ob Estuary for the Plant and Port

## Information on the facilities' location and boundaries of the designed activities is sourced from the Design Documentation

Most part of the early development facilities have been designed by EnergoGasEngineering JSC and GK RusGasEngineering JSC for LLC "Arctic LNG 2" under the common title<sup>84</sup>. The respective environmental impact assessment report was considered and discussed in Tazovskiy in July 2017<sup>85</sup> and has been approved by the State Expert Review Board.

Construction of the early development facilities commenced in 2018. The works are divided into 13 stages to be implemented during four years, with the maximum number of 378 of construction workforce (second year). Elements included in each stage are listed in Appendix 16.

All early development facilities (except for temporary elements) will be integrated into the Salmanovskoye (Utrenneye) OGCF Facilities Setup. Temporary site facilities will be dismantled, and respective land will be reclaimed and returned to the lessors.

#### *5.4.2 Gas supply for the power supply facilities to support construction, hydraulic filling and drilling operations*

Most of the FIELD facilities will be constructed and commissioned as two conventional start-up packages, the first of which covers the gas and power supply facilities for the construction, hydraulic filling and drilling operations (PIR-1). Design for this element is developed by YUZHNIIGIPROGAS Institute LLC and passed the state expert review in 2018. Construction and commissioning of the facilities is divided into several stages during the period 2019-2020.

The temporary power supply complex No.2 will use the Company's existing portable automated power plants PGTPP-2500 to produce power for the drilling and construction activities, and for operation of dredgers during the whole period of the respective works. Gas for the power supply complex will be provided

<sup>&</sup>lt;sup>85</sup> Tazovskiy Municipal District Administration Resolution No. 727 of 01.06.2017 on conducting public hearings





<sup>&</sup>lt;sup>84</sup> Early development facilities at the Salmanovskoye (Utrenneye) oil, gas, and condensate field. Engineering survey and design documentation. -GK RusGazEngineering CJSC, 2014. In the scheme in Figure 1.1, these facilities are shown as part of the FIELD.

from well pad GWP No.16, gas condensate wells No.1601 and No.1602. Besides these two sites, the design provides for the use of four sites with temporary site facilities (TSF) and temporary access roads.

For the site of the temporary power supply complex No. 2, the following wastewater networks are provided:

- indoor and outdoor domestic sewerage networks in the buildings of the control room and checkpoint;
- networks for the contaminated rain and melt effluents from the diked sites of the methanol supply tanks, diesel fuel tanks, separators, as well as the drainage of rain and melt water from the pits of the loading / unloading areas of road tankers.

For the accumulation of domestic wastewater, an underground heat-insulated tank with electric heating with a volume of 8 m<sup>3</sup> is provided. For the accumulation of contaminated effluents, two underground heat-insulated tanks with electric heating of 25m<sup>3</sup> each are provided. Pumping of domestic wastewater and contaminated effluents is provided by motor vehicles with further removal and supply to the thermal wastewater treatment unit (plant), designed within the scope of PIR-1.

The scope of PIR-1 facilities design and construction further includes the following linear facilities:

- Gas flow-line with a methanol pipeline from GWP No.16 to power supply complex No.2;
- Motor road MR No.1: Section 1 from the Utrenniy Terminal to the TAC site;
- Motor road MR No.2 from the TAC site to the site of GWP No.16;
- Motor road MR No.7 from MR No.1 to the site of power supply complex No.2;
- Motor road MR No.3 from MR No.1 to the site of water treatment plant WTP-3;
- OPL 10 kV "Power supply complex No.2 GWP No.16";
- OPL 10 kV "Power supply complex No.2 TAC";
- OPL 10 kV "Power supply complex No.2 Field camp (FC)";
- OPL 10 kV "Power supply complex No.2 WTP-3";
- Communication networks system (FOCL).

RAMBOLL





Figure 5.6a: Location of the Salmanovskoye OGCF Facilities Setup: general layout





Upstream facilities	CGTP PGTP	<b>Pipelines</b> Gas gatheri	ng network	
Iltilities (Setup)			(in the common corridor with inhibitor pipelines and other c	methanol pipelines, communications)
POL warehouse	Methanol warehouse	Main pipelin	es	
Field comp (EC			underground	above-ground
	.)	Gas flow lin	es	a have around
		Candanasta	underground	above-ground
Emergency Res	sponse Centre (ERC)			above-ground
Administrative	area	Condensate	ninelines	
Temporary acc	ommodation camp (TAC)		underground	above-ground
Data processin	g centre		Piperacks for various purp	poses
Solid municipa industrial wast	l, construction and e disposal site	Roadside fa	(incl. water-bearing)	
Water supply and wate	er disposal facilities	(schematic)		
Vater intakes			Valve stations	Pig trap stations
Water intake a	nd water treatment	•	Purge vents	
Sewage pumpi	ng stations		Pig receiver	
Wastewater tre	eatment facilities	Power sup	ply facilities	
Effluents re-eje	ection sites		Power plant No. 2	
Plant and Port facilities	5		EDPS site	
GBS LNG & SGC Plant	-		Transporter substation o	f water intake facilities
Ready-to-oper	ate equipment	Power lines		
- Onshore facilit	ies	$\leftrightarrow \leftrightarrow$	35 kW ↔ ↔ € 10 kV	N
Terminal "Utrenniy"			(airport approach area)	
Capital constru	iction facilities			
Drainage tray				
Transport facilities		Tempora	ary construction facil	ities
Motor roads Motor roads of a	n uncommon use (III and IV category)		Plant TSF	
Temporary moto	or roads (construction stage)		Port TSE	
			Setup TSF	
Winter roads			Temporary POL warehous	٥
	s road to GWP No. 20		Temporary water intake	C
Helipads		Tempora	ry facilities for tests	
(Helipad 1, Heli	pad 2)		Equipment sites	
is set nearby the	y helipad for the construction stage e berth facilities)		Communication corridors	
Airport (not a part of the l	Project)	Tempora	ry motor roads	
Land allocation		Tempora	ry fuel pipeline (Port)	
		Building	– materials quarries	
		20,020	hydraulic fill	
		Hair Parel		
		-Tal. I- Pa	ary-excavated	







Figure 5.6c: Location of the Salmanovskoye OGCF Facilities Setup: Northern dome







Figure 5.6d: Location of the Salmanovskoye OGCF Facilities Setup: facilities located close by the PLANT and PORT







Figure 5.6e: Location of the Salmanovskoye OGCF Facilities Setup: Central dome Source: design documentation by NIPIgaspererabotka JSC, 2019









Figure 5.6f: Location of the Salmanovskoye OGCF Facilities Setup: Southern dome





#### 5.4.3 Main FIELD facilities

Most part of the construction design for the FIELD facilities is developed by NIPIgaspererabotka JSC (the design has passed the state expert review). The total land area required for this group of facilities is estimated at 1128.3 ha (without temporary sites and utility corridors). Brief characteristic of different functional groups of the FIELD is provided below.

#### 5.4.3.1 Gas and condensate well pads

The technical design for the field development provides for construction of 191 wells arranged in 19 pads within the license area<sup>86</sup> (Figure 5.6). The Project design documentation<sup>87</sup> provides for allocation of a land plot of 10 to 23 ha for each of the 19 well pads, depending on the number of wells. Each site will be prepared by providing waterproofing, thermal insulation, filling the ground bed for the GWP facilities, construction of access roads and water supply lines<sup>88</sup>, and surface drainage systems<sup>89</sup>.



Figure 5.7: Preparation of drilling sites for producing wells in the Salmanovskiy (Utrenniy) LA. Well pad GWP No.2 (left) and site of single well No.297 (right)

#### Photo by IEPI JSC, 2019

<u>Well drilling operations.</u> The wells will be drilled using rigs of different models and brands (Table 5.3, Figure 5.8) designed for pad (cluster) drilling of hydrocarbons producing wells to the depth down to 5-7 km. All rig will be supplied to the prepared well sites as Arctic version package modular units. All used equipment will be fitted with a variable speed alternating current drive motor, with a digital control system.

Main components of the rig:

- Derrick drawwork unit designed to meet the requirements of the Americal Petroleum Institute (API, Spec 4F);
- Circulation system to allow for pitless drilling, with tanks for water (90 m<sup>3</sup>), drilling mud (270 m<sup>3</sup>), trip and purification tanks, hydraulic mixer tank; supplied purification equipment by either Derrick or Mi Swaco comprising a set of shaker screens, conveyor screen, mud cleaner, centrifuge, degasser, and cuttings removing system;
- Pumping block comprising 5 factory-fabricated package modules supercharging and drilling pumps, shut-off and distribution device, and maintenance platform;
- Heating system with two diesel-powered heat generators ANS-700 for air heating, and two modular steam generators PGM-500 for steam heating (additional electric heating coils and portable heat generators will be used during commissioning);

<sup>88</sup> Water will be sourced from natural water bodies. In particular, water intake for GWP No.16 will be located at an unnamed lake 700 m off the well pad boundary; for GWP No.2, water will be delivered by road tankers from the water intake facilities to be constructed near the site of well No.297.

<sup>89</sup> Wastewater will be recycled using local treatment plant Tver-25





<sup>&</sup>lt;sup>86</sup> Additional GWP No.20 may be developed within the Southern dome in the future. To allow for this, the license area was extended in its southern part in 2018. The total number of wells within GWP Nos. 1...20 is 213.

<sup>&</sup>lt;sup>87</sup> Construction of well pads No.2 and No.16 at Salmanovskoye (Utrenneye) oil, gas, and condensate field, drilling and testing period. Design documentation. Code 346-1-319/18/Π-346. – SERVISPROEKTNEFTEGAZ LLC, 2018.

Construction of 18 well pads at Salmanovskoye (Utrenneye) oil, gas, and condensate field, drilling and testing period. Environmental Impact Assessment (EIA\_. Code 2018-560-HTLI-OBOC – NOVATEK SCIENTIFIC AND TECHNICAL CENTER LLC, 2019.

- Compressor block for pneumatic control of drilling (fitted with two screw compressors Atlas Copco GA45, capacity 6.5 m<sup>3</sup>/min each, set of receivers, and adsorption air drier);
- Electrics box comprising transformer modules, switching gear and other equipment;
- Combined extract and input ventilation system.

Name (model)	Maximum drilling depth, m	Maximum load capacity, ton	Hoist capacity, kW	Manufacturer and referenced source	Current use in the Salmanovskiy (Utrenniy) LA
BU 5000/320 EK- BMCh	5000	320	1500	Uralmash NGO Holding LLC	Single well No.297PO
BU 6000-400 EK- BMCh "Arktika"	6000	400	1500	http://www.uralmash- ngo.com/	GWP No.1 and No.3
ZJ-70 DBS "Avrora"	7000	450	1975	ERIELL Group(https://www.eriell. com/activity/equipment/)	GWP No.2

#### Table 5.3: Cluster drilling rig



#### Figure 5.8: Drilling rig "Uralmash 6000/400 EK-BMCh (left) and ERIELL ZJ-70 DBS "Avrora"

#### References to sources are provided in Table 5.3

The proposed rigs offer the advantages of a relatively high capacity, lower cost of installation and dismantling (due to the modular design), lower risk of leaks of drilling mud from non-sealed apparatus, more comfortable work places for operators.

Wells in the pads will be arranged in rows, i.e. groups of wells developed in parallel, with possible time intervals of several years between the rows (in particular, tentative time interval between rows at GWP No.16 is 6 years). Wells in each row are drilled in one or two stages.

According to the Project Information Memorandum, the total of six drilling rigs will be used in the field: the first one is in operation since 2018, two rigs will be launched in 2020, two in 2021, and the last one in 2022.

Connection systems of each well pad include the following elements:

- Wellhead connections;
- A horizontal flare system; and
- Connecting assembly for portable test separator.

The wellhead connections allow for purging the wells using the tubing string, killing of well and flow stimulation, safe flaring of gas in flare pit in case of purging after workover or lineup.





Reservoir gas flows through wellhead equipment to the valve assembly on the product line and further to the reservoir gas manifold at the well pad connected to the gas gathering network. To prevent hydrate formation, respective inhibiting agent will be injected into the gas gathering network pipelines.

Horizontal flares are provided in the connection piping of each well pad, so that gas from purging during wells lineup operations will be safely burnt. Fuel gas for the flares is supplied from the well pad manifold via a pressure reducing station.

<u>Management of drilling wastes and drilling wastewater</u>. The well pads design is determined by the adopted method of managing drilling wastes. With the conventional sump drilling technology, wastes are placed within the well pad site and left there at the end of works. In this case, sumps perform the function of waste disposal vessels that must safely contain and isolate the waste from contact with the environment.

The Company dismisses this technology due to its inherent high level of environmental impact. Alternative (sumpless) methods of managing drilling wastes provide for decontamination, treatment and disposal outside the license area, or a combination of two or three of the mentioned options (refer to Chapter 6 for details).

Selection of specific method of treatment and disposal depends on properties of drilling mud being used. Either oil-based muds (OBM) or water-based muds (WBM) can be used for wells drilling in the Salmanovskiy (Utrenniy) LA. In both cases, the drilling rig will provide a closed circuit for circulation of mud with a fourstep treatment block.

Cuttings extracted from well are supplied into vertical dehydrator to separate liquid phase from cuttings by centrifuging. The centrifuge is applied to provide automatic control of drilling wastes feed and separation efficiency.

A part of separated liquid will be used in preparation of construction mixes for disposal of drilling wastes.

The remaining liquid will be disposed of in the horizontal flare unit (HFU, Figure 5.9). Its concept is based on the following scheme: liquid to be disposed is sequentially passed through shaker screens, silt box and centrifuge and fed into heating coil pipe, from where it is injected through atomizing nozzle into the internal space of shell tube with burning gas flow, and evaporated water is released to atmosphere.

#### Figure 5.9: HFU-5 unit for disposal of treated wastewater

#### Source: official website of the equipment manufacturer, GK NEFTEMASHKOMPLEKT, http://nmkt.ru/

If WBM is used, drilling solid wastes are disposed on-site. First, 'maturation' of the wastes is arranged using containers or accumulation vessels that are installed in a dedicated area within the well pad. The material is regularly mixed by excavator to stimulate the process. Special chemicals are added in the same vessels to transform the waste into construction material category. The latter is collected in dedicated ponds within the well pad (Figure 5.10) and is subsequently used for road pavement.









Figure 5.10: Well pad development scheme (example of GWP No.9) including storage area (red contour line) for construction material produced from drilling wastes

Source: Construction of 18 well pads at the Salmanovskoye (Utrenneye) OGCF. Drilling and testing period. 2018-560-HTLI-KII9-FII. – NOVATEK STC LLC, 2020





	Item
	Well head
	ВЛБ БУ-6500/450 ЭЧРК-БМ-1
	Treatment section
	Solution section
	Pump section
	Power section
	Pipe rack
	Main controls
	Damping and throttling section
	Infield pipelines
	Equipment section
	GFU depot (2)
	Construction materials storage site
	Chemicals site (2)
	Geotechnical surveys station
	Turbular site (2)
	Special machinery
	Refueling vehicles
	Fire fighting vehicles
	Fire fighting vehicles
	Scrap metals site
	Wrapping materials site
	Container for industrial rubber
	Fire fighting section
	Fire water tanks, $v = 75 \text{ m}3 (4)$
	Electric shop
	Communications
	Leisure trailer
	Dispatching
	Office
]	Containers
	Smoking room
	Wastewater tanks (3)
	Restroom (2)
	Warehouse (2)
	Showers (2)
	Laundry
	Canteen (4)
	Water tank, $v = 5 m3 (2)$
_	Refrigerator
_	Residential cabins (27)
_	Dressing rooms (2)
_	Drying rooms (2)
_	First aid room
_	Fuel for boiler room
_	Boiler room
_	Water tanks, v = 100 m3 (4)
_	Additional tanks
-	Diesel tanks, v = 50 m3 (7)
_	Metal works section
_	Oil tank, v = 20 m3
_	Materials and equipment
_	Drilling waste neutralization site
_	Drilling waste disposal site
_	Helipad
_	Diesel-generators
_	Transformer substation
	Drain tank, $v = 3 \text{ m}3$

If OBM is used, cuttings are destroyed (burnt) on-site using a mobile flaring unit. The process generates solid waste - mineral residue that, due to its properties, can be utilized in construction. The design provides for use of UPNSh unit at well pads GWP Nos. 1, 3-15 and 17-19 (Figure 5.11). In this case, the following sequence will be applied for managing drilling wastes:

- Cuttings are placed into 10 m3 metal container, mixed with sand and mineral residue after flaring, to reduce content of hydrocarbons in the material down to 20 %;
- The produced mixture is loaded by excavator into reception hopper of the unit;
- From the hopper, the material is transported by belt conveyor into the drum for thermal treatment;
- In the rotating drum, the burner flame heats the mixture in presence of atmospheric oxygen up to 900-1000 deg. C; as a result, hydrocarbons in the mixture are oxidized, and the released heat is utilized for maintaining further treatment of drilling wastes.





Figure 5.11: UPNSh unit (left) and Fortan unit for treatment of drilling wastes containing hydrocarbons

Sources: official websites of Servis-Ekologia LLC,https://service-ecology.ru/ and TT-Group, http://ttgroupworld.com/ru/

Flue gases from the unit are released via a 10 m stack after several treatment steps: cyclone for removal of coarse particles, removal of smaller particles, and after-burning of gas and fumes from incomplete combustion of hydrocarbons on an additional burner; shock-inertial scrubber with water.

The end product of meets the criteria of hazard class IV or V, therefore, it can be used as a component for road paving.

At well pads No.2 and No.16, drilling wastes containing hydrocarbons will be treated using pyrolysis technology in mobile modules Fortan and Fortan-M. This is a proven process that has been used in 20 countries during 18 years. These units feature multi-fuel design of furnace, mobility, and low consumption of electricity and fuel.

The selected approach to management of drilling waste and wastewater will minimise industrial pollution of the geological environment and facilitate complete reclamation of the well sites at the end of the wells service life.

#### 5.4.3.2 Gas gathering network

Formation fluid will be transported from the GWP to the primary gas treatment plant (PGTP-3, Northern dome) and complex gas treatment plants (CGTP-1 and CGTP-2, Central and Southern domes) by a radial-pattern manifold system of the gas gathering network (GGN). Underground installation of the flow-lines is impractical due to the omnipresent permafrost soil, complex relief prone to gullying, and the high temperature of the transported media. This leaves the only possible option - installation of GGN on elevated pipe racks.

Since working pressures during the first years of the field development will be relatively low, and gas flowlines for all considered configuration options will be quite long, the pressure boundary is located at the outlet of gas production well pad. Therefore, the wellhead connections and equipment of the well pads are designed for maximum static pressure of 21 MPa, and the flow-lines between the pads and valve stations are designed for the working pressure of 11.8 MPa. Overpressure protection of the gas gathering network (GGN) will be provided by safety valves at each well pad.







The field GGN is characterised by long gas flow-lines between the well pads and receiving facilities, some of which are longer than 20 km. The total design length of gas flow-lines DN 250 – 500 mm within the field GGN is estimated at 168 km.

Based on the result of comparison of GGN with design pressure of 12.98 MPa (working pressure 11.8 MPa) and 21 MPa, working pressure within 11.8 MPa is adopted for transportation of formation fluid from all well pads to CGTP/PGTP. Achievement of the required gas pressure at the inlet of CGTP and PGTP with this arrangement is verified by hydraulic analysis.

Pig trap stations (PTS) are provided on all pipelines longer than 0.5 km for diagnostic, cleanup and regular bleeding of liquid. In accordance with p.9.2.1 of GOST R 55990-2014 "Field pipelines", flow-lines longer than 30 km and methanol pipelines longer than 10 km are fitted with block valve stations. Block valve stations are also provided at branch pipe connections. Safety valves are installed immediately upstream the CGTP and PGTP sites.

#### 5.4.3.3 Gas Treatment Plants

The complex gas treatment plants (CGTP1 and CGTP2) treat formation fluid from the well pads to achieve the required quality of natural gas feed for the LNG plant, and separate gas condensate and water-mineral solution (WMS). From the CGTP, pre-treated natural gas and unstabilised gas condensate flow by separate pipelines to the GBS LNG & SGC Plant. WMS is fed into the methanol recovery unit (MRU) designed as part of CGTP and PGTP, for recycling of methanol. Block diagram of the designed CGTPs is illustrated in Figure 5.12. Figure 5.13 shows a general view of such plant and fragment of the layout plan of the future CGTP1 at the Salmanovskoye (Utrenneye) OGCF.



#### Figure 5.12: Block diagram of designed CGTP within the Salmanovskoye (Utrenneye) OGCF Facilities Setup

#### Source: design documentation (NIPIgaspererabotka JSC, 2019)

Based on the assessment and comparison of the natural gas and gas condensate pre-treatment technology, the preferred process option is based on low-temperature separation (LTS) using a turbo-expanding assembly (TEA), where gas from the field Central dome is treated in CGTP1, from the Southern dome - CGTP2, and from the Northern dome - in PGTP3. This configuration of the sites, pre-treated gas and gas condensate supply to the GBS LNG & SGC Plant is guaranteed even in case of accident at one of the gas pre-treatment sites.





	Buildings and facilities		
No.	Item	No.	Item
1	Pig receiver	21.4	Emergency diesel generator No. 4
2	Switching valves	21.5	Diesel tanks (V = 100 m3)
3	Slug catcher No. 1	22	Integrated control and safety system and
4	Slug catcher No. 2	07	service section
5	Onsite piperacks	25	Scrap metals storage
5.1	Piperack No. 1	24	Fire station
5.2	Piperack No. 2	25	
5.3	Piperack No. 3	26	Warehouse with parking
5.4	Piperack No. 4	27.1	Boiler house
5.5	Piperack No. 5	27.2	Diesel tanks No. 1, 2 (V = 100 m3)
6	Gas separation unit	- 28	Industrial and fire water pumping station
6.1	Gas separators		
6.2	Industrial and storm wastewater drum No. 1 with the nump $(V = 50 \text{ m}^2)$	29	Wastewater treatment unit
7	Methanol numping station	- 30	Industrial and domestic waste tanks
8	Methanol tanks		
		- 31	Industrial and fire water tanks No. 1, 2
8.1	Methanol tanks No. 1-4 (V = 100 m3)		
8.2	Drain sump (V = 8 m3)	31.1	Industrial and fire water tank No. 1 (V = 1000 m3)
8.3	Pipe and cable rack		
8.4	Industrial and storm wastewater drum No. 2 with the pump (V = $16 \text{ m3}$ )	31.2	Industrial and fire water tank No. 2 (V = 1000 m3)
9	Methanol regeneration unit	32	Raw water tanks No. 1, 2
9.1	Industrial building	- 321	Paw water tank No. 1 ( $V = 100$ m <sup>2</sup> )
9.2	Outer equipment	32.1	
10	Low temperature gas separation unit	32.3	Raw water tank No. 2 (V = 100 m3)
10.1	Industrial building	33	Domestic and fresh water tanks
10.2	Outer equipment	331	Domestic and fresh water tank No. 1 (V = 25 m3)
10.3	Pipe and cable rack		
10.4	with the pump (V = 50 m3) 35 separators unit	33.2	Domestic and fresh water tank No. 2 (V = 25 m3)
10.5	Condensate separation unit with the compressor	- 54	II/d
11	room for separated gas	35	(V = 16  m3)
11.1	Industrial building	36	Floodlight towers
11.2	Outer equipment	36.1	Floodlight tower No. 1
11.3	Industrial and storm wastewater drum No. 4 with the number $(1 - 16 m^2)$	36.2	Floodlight tower No. 2
12	with the pump ( $V = 16 \text{ ms}$ )	- 36.3	Floodlight tower No. 3
17	Air compression unit	36.4	Floodlight tower No. 4
		36.5	Floodlight tower No. 5
14	Nitrogen membrane unit with the receivers	36.6	Floodlight tower No. 6
ъ	Horizontal burner device	36.7	Floodlight tower No. 7
16	Flare system	36.8	Floodlight tower No. 8
16.1	HP and LP flare separators	36.9	Floodlight tower No. 9 Sewage treatment facilities. Domestic wastewater
16.2	HP Flare	- 5/	treatment plant
16.3	LP Flare	38	Sewage treatment facilities. Industrial and storm wastewater treatment plant
17	n/a	39	n/a
18	Industrial and storm wastewater drum No. 5, 6, 7 with the pump (V = 50 m3)	40	Sewage treatment facilities. Neutralizers for industrial
19	Substation 35/10 kW		
19.1	Fence	40.1	Neutralizer for industrial and storm wastewater No. 1 (V = 1000 m3)
20	Transformer substation		Noutrolizor for industrial and at an
21.1	Emergency diesel generator No. 1	40.2	No. 2 (V = 1000 m3)
21.2	Emergency diesel generator No. 2		Sewage treatment facilities. Neutralizers for treated
21.3	Emergency diesel generator No. 3	41	wastewater No. 1, No. 2



Figure 5.13: General layout of CGTP1 at the Salmanovskoye (Utrenneye) OGCF

Source: design documentation (NIPIgaspererabotka JSC, 2019) and general view of an operating CGTP (Termokarstovoye field, photo by NOVATEK, http://www.novatek.ru/ru/business/producing/Termokarstovoye/)







The LTS with TEA technology will be implemented in each of the complex gas treatment plants CGTP1 and CGTP2 comprising the following process units:

- Valve station;
- Pig receiver;
- Separation unit;
- Low-temperature separation unit;
- Condensate degassing unit;
- Booster compressor station (for adequate cold supply);
- Separated gas compressor;
- Methanol recovery unit;
- Methanol storage tanks with a pumping station;
- Flare system;
- Fuel gas treatment unit;
- Instrument air compressor station;
- Nitrogen facilities.

The LTS with TEA technology is capable of producing gas and gas condensate at the CGTP outlet below 0°C in all seasons. With the low temperature of gas and gas condensate, pipelines for their transportation can be installed underground, with no risk of soil thawing.

Gas from the field Northern zone will be treated at the PGTP3 site. The process analysis has shown that, considering the relatively small quantity of gas from the Northern zone, sufficient gas pre-treatment at the PGTP site can be achieved by separation of formation fluid only. The feed gas quality requirements of the LNG & SGC Plant will be satisfied by mixing the stream from PGTP3 with the main streams from CGTP1 and CGTP2. The list of process units at PGTP3 site differs from CGTP sites as it does not include the low-temperature gas separation unit.

#### 5.4.3.4 Infield pipelines

The gas pre-treatment facilities will be connected to the GBS LNG & SGC Plant by a system of infield pipelines<sup>30</sup>: gas pipeline feeding gas to liquefaction, gas condensate pipeline supplying gas condensate to stabilisation, and methanol pipeline transporting methanol from the storage sites to the gas pre-treatment plants. Pipelines for transportation of condensate, methanol and fuel gas will be installed in a common trench, with a technologically safe clearance. The transported media temperature will be maintained below zero at all times. The linear facilities' corridors are also designed to accommodate a system of areal pipeline facilities - valve stations, corrosion-prevention elements, etc. The total length of infield pipelines DN100-1000mm is about 202 km.

#### 5.4.3.5 Supply of resources

<u>Logistics system areal facilities.</u> A number of auxiliary areal facilities of the FIELD gravitate to the berth structures and are intended for materials and equipment management, accommodation and services for rotation shift personnel, vehicles, construction and other special machinery (Figure 5.6, Appendix 17).

<u>Power supply</u> for the FIELD facilities will be provided from the existing power supply complex No.2, and the new gas turbine compressor power plant (GTCPP) to be constructed at the site of PGTP3. In the future, temporary power supply complex No.3 will be constructed at the Southern dome to produce power for the drilling and construction activities, and for operation of dredgers using the Company's existing portable automated power plants PGTPP-2500 and fuel gas from single well R295.

Buildings and structures at the GTCPP site will include power modules, substation 10/35kV comprising switchgear 10kV, step-up transformers 10/35kV and switchgear 35kV, as well as site Package Transformer Substations (PTS, 2 units).

Emergency power supply will be provided by liquid-fuel emergency diesel power stations (EDPS), and uninterrupted power supply system with accumulator batteries. The emergency power supply scheme is decentralized, with locally installed package container automated EDPSs with output voltage 0.4 kV. The EDPSs are connected to 0.4kV buses at the package transformer substations (PTS). Loss of voltage on

<sup>&</sup>lt;sup>90</sup>Since Russian regulations imply classification of pipelines into infield and trunk lines, pipelines connecting the natural gas pre-treatment facilities with the Plant and other onshore process facilities are referred to in the design documentation as infield and trunk pipelines.





0.4kV buses in PTS will trigger starting of the EDPSs to restore power supply to consumers. The design provides for installation of 41 EDPSs with capacities ranging from 100kW to 2000kW in the field territory.

<u>Water supply</u>. The design provides for construction of several surface water intake facilities to supply technical and potable water for the FIELD consumers. Most part of the water will be abstracted from lakes that do not freeze to the bottom in winter. In some cases, abstraction of water for technical water supply will be arranged in soil-based construction materials quarries.

The water intake facilities comprise: a first lift pumping station, intake head elements and gravity-flow pipelines, pressure pipelines, and modular-packaged power plant 10/0.4kV.

To preserve the natural quality of surface water and prevent potential contamination of water body, in accordance with SanPiN 2.1.4.1110-02 "Protective sanitary zones of drinking water supply sources and pipelines", the designed facilities must be surrounded with protective sanitary zones (PSZ) comprising three belts.

Design water intake capacity at Khaltsyney-Yakha meander lake and Quarry No.25n for the onshore facilities is 85 m<sup>3</sup>/h during normal operation; capacity of the water intake at Quarry No.31n for the site of CGTP1 - 40 m<sup>3</sup>/h; at Quarry No.2g for CGTP2 - 40 m<sup>3</sup>/h.

The intake facilities are designed to match category II for water supply availability. Water abstraction with the design flow rate is provided using three head elements, of which two are backup. The head elements are fitted with cartridge filters and fish protecting devices. Suction lines that connect the head elements and the pumping station are made of flexible reinforced pipes.

From the intake facilities water is pumped through two pipelines to the raw water tanks at the WTP sites of the early development and gas treatment facilities.

All facilities in the field territory will be served by two systems of water supply:

- Potable water; and
- Process-and-fire water.

The following treatment facilities will be provided for production of potable water:

- Water purification and treatment stations (with pump groups to supply water for household and drinking needs);
- Potable water storage tanks.

Potable water distribution system is intended to supply potable water to fuel depot, Utrenniy Terminal, TAC, ERC, FC, PGTP3, GBS LNG & SGC Plant, process-and-fire water PS and wastewater treatment plant No.3 (WWTP3), for respective site needs, and also for the internal firefighting in buildings at the sites of the Utrenniy Terminal.

The WTP facilities at CGTP1 and CGTP2 will include the following elements for potable water supply:

- Water treatment plant WTP-100 (with pump group to supply water for household and drinking needs); and
- Potable water storage tanks.

#### 5.4.3.6 Wastewater and waste management

<u>Wastewater system.</u> Wastewater treatment and disposal. The FIELD design provides for several different systems for collection and disposal of:

- Domestic wastewater;
- Industrial wastewater and runoff;
- Storm water (rain water and snow-melt water);
- Process wastewater; and
- Waste methanol-water.

Wastewater treatment stations will be constructed at all sites with significant wastewater streams (otherwise, storage tanks are provided for collection and transportation of wastewater to WWTPs at other sites). Wastewater treatment plant at CGTP1 consists of the following elements:

- Biological wastewater treatment plant WWTP-100;
- Dewatered sludge temporary storage site;
- Industrial wastewater and runoff treatment unit;





- Industrial wastewater and runoff equalization tanks; and
- Treated wastewater equalization tanks.
- Wastewater treatment plant at CGTP2 consists of the following elements:
- Domestic wastewater treatment unit;
- Dewatered sludge temporary storage site;
- Industrial wastewater and runoff treatment unit;
- Industrial wastewater and runoff equalization tanks; and
- Treated wastewater equalization tanks.

The design provides for injection of treated wastewater into deep formation near the sites of CGTP1, CGTP2 and PGTP3. For this purpose, 22 deep appraisal (absorbing) wells will be drilled, some of which will be operating and other will stay in reserve (used for the absorbing stratum monitoring).

A part of treated wastewater will be disposed in surface water bodies - lakes (during hydraulic production of sand), inland water courses and the Ob Estuary (controlled discharge). Respective consents and approvals by competent authorities of the RF are already in place.

<u>Solid municipal, construction and industrial waste disposal site</u> is intended for centralized collection, thermal treatment (incineration) and disposal of industrial and domestic wastes of hazard classes III-V generated during construction and operation of the Salmanovskoye OGCF Facilities Setup, Utrenniy Terminal, the Plant, and also immediately by the operations of the waste disposal site.

The following operations will be conducted at the waste disposal site:

- Reception (including input radiation testing and weighing), disposal, isolation and burial of construction and industrial wastes of hazard classes IV and V;
- Pre-treatment (crushing) of bulky wastes and compaction of packaging;
- Temporary storage (accumulation) till generation of the shippable quantity of wastes prohibited for acceptance at the waste disposal site, and valuable recyclables;
- Thermal neutralization and in the thermal treatment system (TTS) of industrial wastes of hazard class III-IV (including contaminated with petroleum products), municipal solid wastes of hazard class IV-V, and liquid wastes of hazard class III-IV.

The waste treatment methods are selected to minimise the volume of burial and transfer to recycling (reuse) the wastes prohibited for acceptance at the disposal site. Thermal treatment will be applied to minimise the volume of the wastes buried in the landfill.

Starting from 2021, the waste disposal site design will have a capacity to handle 161,400 tons of wastes, including 63,200 tons to burial, 96,000 tons - thermal treatment, and 2170 tons - accumulation (temporary storage).

Besides the waste storage areas, the waste disposal site will have two buildings (office and WWPS) and several process facilities, namely:

- Isolating soil site;
- Bulky waste site;
- Area for collection of MSW produced during operations at the waste disposal site;
- Site for temporary accumulation of compacted and crushed wastes in containers;
- Parking space for specialized vehicles;
- Covered site for wastes crushing and compaction;
- Weighing bridge with a radiation control station;
- Fire water tanks; and
- Waste incineration system.

The waste disposal site with a service life of 25 years is divided into four start-up packages:

- 2020-2031 provision of waste reception and sorting facilities, office, vehicle parking, wastewater collection and storage system, fire safety system, four cells for disposal of wastes of hazard classes IV and V with combined capacity about 36 thousand m3, wastes crushing and compaction site, isolating soil sites, temporary storage sites for the wastes intended for transfer to third parties, antenna mast structures and light poles, monitoring station for supra-permafrost waters of the seasonally thawed layer;
- 2020-2044 construction and operation of solid and liquid waste thermal treatment facilities;







- 2032-2043 extension of the disposal facilities for wastes of hazard classes IV and V (three new cells with combined capacity 23 thousand m3) and provision of the second monitoring station for supra-permafrost waters of the seasonally thawed layer;
- 2043-2044 partial reclamation and landscaping in the area filled with waste; extension of the disposal facilities for wastes of hazard classes IV and V (one new cell with a capacity of 8 thousand m<sup>3</sup>).

The functions of waste management for the whole Project will be outsourced from a licensed contractor -TyumenVtorSyr'yo LLC (TVS<sup>91</sup>. It is expected that, for the waste streams within the service area of TVS that are not subject to thermal treatment (mainly hazard classes I and II, and a part of hazard class III wastes), TVS will subcontract remote waste management facilities and arrange for transportation of the wastes to the remote disposal sites.

#### 5.4.3.7 Emergency Rescue Centre

Emergency Rescue Centre (ERC) is intended for prevention of and response to emergency situations at the FIELD facilities, and to ensure that personnel and property of companies involved in the Project construction and operation are protected against natural and man-caused disasters. The ERC consists of two facilities - Fire Station and Gas Rescue Station. The former is fitted with foam extinguishing road tankers and vehicles (6 units), communication and lighting vehicles, as well as equipment and materials for oil spill response.

The Fire Station premises include bays for fire-fighting machinery, service rooms (offices, training room, rest room for duty personnel, communication station, facilities for maintenance of fire hoses, washing and drying of special clothing, etc.), auxiliary facilities (shower, toilet, storage premises for accessories, fire-fighting equipment and foaming agent, dining room, etc.), and utility rooms (ventilation, sewerage, communication equipment rooms).

For containment and liquidation of accidents, including decontamination of rooms and/or outdoor areas affected by gas emissions, and for control of air quality and levels of harmful substances in air during gas rescue operations and after containment of emergency, the Gas Rescue Station will provide premises for gas rescue service (paramilitary mine rescue squad, PMRS) duly attested and equipped with all necessary machines, equipment, outfit and tools.

#### 5.4.3.8 Temporary Accommodation Camp

The Salmanovskoye (Utrenneye) OGCF Facilities Setup will be operated by rotation shift personnel accommodated in dormitories. In accordance with the design specification, the temporary accommodation camp (TAC) should also serve the accommodation needs of adjoining facilities - GBS LNG & SGC Plant and Utrenniy Terminal. The TAC facilities are designed to accommodate 1500 workers (with a 5% reserve). This capacity will be provided by construction 10 dormitories each for 150 beds.

The TAC location is selected to minimise the distance to the permanent work sites during operation, however accommodation facilities are always kept outside sanitary protection zones of the industrial facilities. The Temporary Accommodation Camp comprises the following main buildings:

- Boiler plant;
- Reserve data processing / telecommunication center;
- PTS;
- EDPS;
- WWPS;
- Community centre;
- Dormitories Nos. 1...10;
- Warehouses for food and non-food products;
- Health and recreation module;
- Canteen;
- Foot bridges; and
- Laundry.

Feldsher's aid post in the building of the community centre is intended to provide medical services to personnel (Figure 5.14).

<sup>&</sup>lt;sup>91</sup> Operator for management of liquid wastes will be selected through a separate tender process







Temporary accommodation facilities will be provided at the TSF sites for the contractors' personnel during the period of construction of the Field, Plant and Port facilities.



Figure 5.14: Location scheme of accommodation facilities for rotation shift personnel involved in construction of the LNG Plant in the territory of the Salmanovskiy (Utrenniy) LA

Source: Accommodation concept for the LNG Plant construction workforce at the Utrenneye OGCF. Electronic presentation document - LLC "Arctic LNG 2", 2020)

5.4.3.9 Helicopter pads

Helicopter landing site (helipad) is a land area or specially prepared site with improved surface, intended for regular or occasional take-offs and landings of helicopters. Helipads within the field territory are designed for operation of helicopters Mi-8 and Mi-26.

A helipad of 50.4x50.4m for take-off and landing of helicopters Mi-8 will be provided in the area of each site of CGTP1, CGTP2 and PGTP. Each helipad will be connected to the general road network by an access road with a turning circle of 15x15m at the end. Another helicopter landing site - the Utrenneye helipad - will be constructed close by the berth structures and field camp.

Location of the helipads in relation to other facilities in the field territory is selected considering configuration of the approach ways and obstacle clearance requirements for no-run take-off and landing, without using the cushion creep effect for takeoff. The approach ways for helicopters Mi-8 and Mi-26 meet the obstacle clearance requirements of 1:2 and 1:4 (distance of 300 m and 600 m) in the direction of take-off and landing, respectively, and 1:1 within the side strips (distance up to 150 m). Overhead HV power lines within the approach ways are located at a minimum distance of 1 km from the boundary of airstrip. Distance from side border of air strip to OPL is at least 0.3 km.

#### 5.4.3.10 Motor roads

The designed motor roads are internal industrial roads, or more specifically - inter-site roads between isolated industrial sites, that provide a road network within the field territory for transportation of technical goods, passengers, as well as general household cargoes.

In accordance with SP 37.13330.2012, the following technical categories (and respective standard parameters) have been assigned to the designed internal roads within the field territory (Table 5.4).





	Technical category			
Parameter	III-B	IV-B		
Number of traffic lanes	2	2		
Design traffic speed, km/h	30-50	30		
Roadbed width, m	9.50-10.50	6.5-8.50		
Carriageway width, m	6.5-9.5	4.5		
Shoulder width, m	1.5-2.00	1.00-2.00		
Maximum longitudinal gradient, ‰	30			
Permissible longitudinal gradient in particularly complex situations, ‰	80	100		
Road surface clear sight distance, m	100			
Cross profile	Duo-pitch			
Road topping design	Capital, prestressed RC panels on geotextile, supported by cement- reinforced sand on geoweb	Interim type, choke-stone layer on geoweb		

#### Table 5.4: Technical parameters of designed roads within the field territory

The total length of all roads in the field territory is 153.5 km, of which 40 km will be put into operation as part of the early development facilities, and about 15 km - with PIR-1.

Since most roads are constructed on filled embankments, special structures are provided at the crossing points with reindeer migration routes. General view of such structure is shown in Figure 5.15. The crossing points locations and their number (Figure 5.6) are defined in consultation with reindeer herders. An additional embankment is filled to the length of 100 m on both sides of the main road embankment, with very gentle slopes (1:10), and with surface reinforced with geotextile and sawn grass. Vehicles traffic at the deer crossings are further regulated with warning signs for drivers approaching the areas where the animals may appear. More details on these and other similar facilities that ensure safe passage of reindeer herds and sledges across the Project linear facilities are provided in Chapter 10 Section 10.7.3 herein.







#### Figure 5.15: Arrangement scheme of crossing points at the intersections of herds migration routes with roads

Pictures made in 2019 in the LA territory and provided by the Company; drawing of the crossing point structure is adopted from the design documentation<sup>92</sup>

#### 5.4.3.11 Other linear facilities

Besides the gas flow-lines, inter-site gas lines, and motor roads, the field infrastructure will include the following elements:

- Inter-site condensate pipelines DN1000 (total length 26.8 km) and DN200 (37 km);
- Inter-site methanol pipelines DN150 (97.7 km) and DN100 (0.7 km);
- Methanol pipelines within the corridors of the gas gathering network corridors, DN50 (168 km);
- Overhead power transmission line OPL-35 kV (113 km);
- OPL-10 kV (107 km);
- Four fiber-optic communication lines (main and backup communication line, one line of the drilling control information system, and one line for high-tech security system) with the total length of 913 km.

The designed location of the above elements is within the common technical corridors, with adequate clearances for safe construction and operation.

#### 5.4.4 Well pads and single well sites Management of drilling wastes

Certain operations related to the development of drilling sites are designed separately from the aforementioned facilities and activities. More specifically, design for site preparation for gas and condensate wells GWP -1...19 (including grading, waterproofing, thermal insulation, bunding and arrangement of waste ponds), for treatment and disposal of drilling wastes, and technical reclamation of the well pad area at the end of service life has been prepared by SERVISPROEKTNEFTEGAZ LLC using the survey reports of Uralgeoproket LLC and PurGeoCom LLC (GWP Nos.2-16) and NOVATEK SCIENTIFIC AND TECHNICAL CENTER LLC (GWP Nos.1, 3-15, 17-19). The respective engineering survey reports and design documents have passed the State Expert Review. Both water-based and oil-based muds will be used for drilling, therefore, the design provides for separate management of the different drilling waste streams.

Besides the well pads with hydrocarbon production wells intended to provide feedstock to the Arctic LNG 2 Project, several single wells will be drilled for production of fuel gas for internal consumers within the

<sup>&</sup>lt;sup>92</sup> Salmanovskoye (Utrenneye) oil, gas, and condensate field facilities setup. Section 8 "List of Environmental Protection Measures". Part 1 - General. 120.ЮР.2017-2020-02-00C1





Project. Phases 2 and 10 of the early development facilities (as defined above) provide for drilling of single wells No.R270 (Northern dome) and No.P304 (Central dome) to supply fuel gas to the sites of respective gas turbine power plants PGTPP-2500. A separate design package is currently being developed for the individual well sites P304 and R295 (the latter one belong to the field Southern dome). The main design company is NOVATEK SCIENTIFIC AND TECHNICAL CENTER LLC, and company in charge of preparation of the design documentation is Scientific-Research Design Institute EleSy LLC. The following associated linear facilities are included in the scope of the well site design: Gas flow-line from well site No.201 (GWP No.2).

#### 5.4.5 Production of soil-based construction materials

Major part of the sand and sand-and-gravel materials needed for the construction will be produced in hydraulic sand production quarries (the whole required quantity of crushed stone will be supplied from remote sites). As a rule, contours of the quarry sites follow the contour lines of the lakes on the shores of which hydraulic fills are arranged. Sand will be transported to the fill sites by seasonal (winter) roads. Design documentation for the early development facilities provides for operation of three hydraulic sand production quarries with the total sand reserves of approximately 16 million m<sup>3</sup> - Nos. 5, 2 and 10.

Hydraulic sand production quarry No.5 is located at Tangusumto lake, 27 km east of the Ob Estuary, near GWP No.7 (Central dome). Average haulage distance from hydraulic sand production quarry No.5 to the construction sites is 10.7 km for the sites in the area of PGTPP No.1 and other facilities within the Central dome, 32 km for the facilities in the area of TAC, and 43 km to the sites in the area of PGTPP No.2 (Northern dome).

Hydraulic sand production quarry No.2 is located at unnamed lake south of GWP No.11 (Southern dome). Haulage distance for transportation of soil material from this site is 28 km to the sites in the area of PGTPP No.1; 56 km to TAC area; 60 km to the sites in the area of PGTPP No.2.

Hydraulic sand production quarry No.10 will be arranged at unnamed lake at a distance of 350 m from the Ob Estuary waterline, 11 km NNW of the berth structures. In this case, sand haulage distance is about 40 km to the sites in the area of PGTPP No.1; 11 km to TAC area; 25 km to the sites in the area of PGTPP No.2.

The total of 14 hydraulic sand production quarries with sand reserves in excess of 20 million m<sup>3</sup> will be used for the construction of all major elements of the FIELD. The largest quarries (Nos. 9, 4 and 2n - refer to the schemes in Figure 5.6 and picture in Figure 5.16) are located close by the PLANT and PORT sites. By present, seven hydraulic sand production quarries are operational, and others have reached the stage of land acquisition, application for water use permits, development and approval of technical designs for minerals extraction. Besides the hydraulic sand production quarries, the FIELD design also provides for operation of 16 dry-excavation quarries for which 200 ha of land is allocated (including access roads).



The respective subsoil licenses and land lease agreements for the quarrying activities are held by LLC "Arctic LNG 2". Besides the technical design for minerals extraction, the design package for each quarry also includes a reclamation design. The permits for assignment of the lakes for sand jetting operations are subject to the approval of water body monitoring programme by the supervising authorities.

Figure 5.16: Hydraulic sand production in lakes Quarry No.9, photo by IEPI JSC, 2018







#### 5.5 Utrenniy Terminal

The Utrenniy liquefied natural gas and stabilised gas condensate terminal (the PORT) is intended to provide the marine logistics support in terms of gas carriers and tankers for offloading of LNG and SGC, reception and temporary storage of cargoes for operations and construction. The offshore facilities of the Terminal will be constructed in the Ob Estuary area between the outlets of Khaltsyney-Yakha<sup>93</sup> and Nyaday-Pynche Rivers. The berth structures have been operated in this area since 2015 (refer to sub-section 5.2).

The designed facilities will be developed in two sites: the administrative area close by the existing generalpurpose berth which is subject to reconstruction; and the quay area to be developed within the designed site of the LNG & SGC Plant on three gravity-based structures.

The hydraulic structures of the PORT include the northern and southern ice barriers that shape the inner area of the port (520 ha, or 4000 m by 1500 m), and two adjoining artificial land plots (ALP-1 and ALP-2) with the total area of 24.1 ha. Design position of the latter is on the rear side of the quay, so that they will be protected against external impacts by hydraulic structures on three sides, and on the fourth side they will adjoin the existing coastline. Both ALPs will be constructed by seize of water area by means of filling with sand from quarries. The volume of dredging works in the PORT water area is estimated at 12.0-12.5 million m<sup>3</sup>.

The berthing facilities configuration is aligned with the parameters and adopted mutual positions of the three gravity-based structures of the future GBS LNG & SGC Plant. The available internal water area surrounded by the ice barriers allows for extension of the Terminal for up to six GBSs. After completion of the PLANT construction, the quay designed as part of the early development facilities will be used for installation of GBS, leading in and maintenance of the PLANT process facilities. Design for the Terminal facilities was developed for LLC "Arctic LNG2" by LENMORNIIPROEKT JSC jointly with GT Morstroy CJSC in 2017-2019. Both survey reports and design documentation for the Terminal have successfully passed the state expert review. The Terminal will be constructed and commissioned in two stages (start-up packages): start-up package I - early phase facilities (EPF); and start-up package II - operating phase facilities (OPF).

Early phase facilities of the Terminal are intended for the following functions: year-round reception of vessels; reception and handling of building materials, oversized modules, machinery, equipment, petroleum products for the period of construction and operation of the Salmanovskoye (Utrenneye) OGCF Facilities Setup, GBS LNG & SGC Plant, and the Terminal.

Design for the early port facilities provides for arrangement of general-purpose berth by reconstructing the existing berth structures; provision of water area and navigation aids; dredged soil dumping in the Ob Estuary of the Kara Sea; construction of artificial land plot ALP-1 of 13.6 ha (in the Ob Estuary); construction of quay (sections 1-3) and shore reinforcement in the resulting territory; construction of facilities in the administrative area and navigation aids.

The following permanent facilities will be constructed as part of EPF (some of them will be owned by investors while others will be federal property):

- Construction:
  - sea port water area and access channel; general-purpose berth; utility systems (power supply, surface runoff drainage system, fire water system, liquid bulk cargo reception system, etc.); tide gauge; traffic safety facilities; office building; navigation aids; quay: Section 1 including shore reinforcement, section 2, section 3 including shore reinforcement; ALP-1;
  - onshore infrastructure (outdoor storage areas; infrastructure to match the cargo turnover requirements; boom pad);
- Reconstruction:
  - Sea port and access channel; jetty, general-purpose berth (to be created by reconstructing the jetty); berth No.1, berth No.2, berth No.3, access section of 142 m.

OPF functions: year-round reception of vessels; LNG and SGC offloading to marine vessels; GBS maintenance from the Terminal territory; harbour vessels base during the operation of the GBS LNG & SGC Plant and the Terminal; reception of liquid bulk cargo (methanol during summer navigation, diesel fuel in all seasons); reception of cargoes for operation of the Terminal and adjoining facilities.

<sup>&</sup>lt;sup>93</sup>Hereinafter, water bodies are referred to using their designation in the State Water Register, which may differ from commonly used naming and hydronyms in geographical maps





The operating phase facilities will include construction of the quay (sections 4-6) and shore reinforcement in the resulting territory; construction of ALP-2 of 10.5 ha in the water area of the Ob Estuary; construction of facilities in the administrative area; reconstruction of quay (sections 1-3) for the new function; provision of water area and navigation aids; dredged soil dumping; construction of the northern and southern ice barriers.

The OPF facilities include:

- Reconstruction: sea port water area; general-purpose berth (berth for the port fleet and emergency response facilities with an extension for reception of rolling cargo); quay (sections 1-3);
- Construction:
  - Ice barriers;
  - Berth for the port fleet and emergency response facilities with an extension for reception of rolling cargo integrated with the general-purpose berth;
  - Methanol reception system;
  - Bunkering infrastructure for the port fleet at the berth;
  - Components of the ice management system (IMS);
  - Onshore infrastructure (navigation safety system (NSS), including ARTP-4 with the following facilities: diesel power plant; equipment module; fuel reception station for DPP; navigation aids); outdoor sites and storage facilities: navigation aids outdoor storage and maintenance site; spill response equipment store; outdoor storage for containers and special machinery; temporary storage sites for special machinery and containers with equipment (including sites on the berth rear side); traffic safety facilities (including navigation traffic safety facilities) and counter-terrorist protection, with allowance for the construction and operation of GBS 1...3;
  - Premises for the state institutions (federal property): RF state border checkpoint and traffic safety facilities; facilities of the federal services including indoor parking; offices and domestic facilities; transport and utility infrastructure.

Cristophe de Margerie vessel - the lead ship of Yamalmax class (ice class Arc-7, draught up to 11.78 m) which is already used by the Yamal LNG Project is adopted as prototype for the design of Utrenniy Terminal. So designed water area will feature seabed levels down to minus 15.0 m and will consist of three main elements - berth operation zones, turning/maneuvering area, and access channel for safe working of vessels of the designed type.

Construction of the Utrenniy Terminal is planned for the end of year 2022. Average number of construction workforce for the construction of the EPF and OPF is tentatively assessed at 746 and 2193, respectively. The maximum turnover of construction cargoes is expected in 2021 - up to 1.5 million tons. Cargo turnover target of the Terminal during the operation phase (starting from 2026) is 19.8 MTPA of LNG (39.6 MTPA for extension in a long term) and 1.8 MTPA of SGC (3.6 MTPA in a long term).

Institutionally, the Terminal is included in section No.2 of the Sabetta Port (RF Government Decree of 31.08.2019 No.1948-r on the modification of the sea port boundaries) and will be supervised by FSUE Hydrographic Enterprise (under the Rosatom State Corporation).

#### 5.6 GBS LNG & SGC Plant

The Plant will have three LNG trains with declared annual capacity about 6 MTPA of LNG (for one train), which will be integrated with the artificial land plot to be constructed in the Ob Estuary, and the onshore infrastructure (Figure 5.17).

The total SGC capacity of the Plant during the peak operations period can be as high as 1.6-1.8 MTPA<sup>34</sup>. The adjacent coastal area will be used for construction and operation of auxiliary facilities and infrastructure (hereinafter – *the Plant Onshore Facilities*), and the Utrenniy liquefied natural gas and stabilised gas condensate terminal (Figure 5.4). High-level layout of the future Plant and Port facilities is included in Figure 5.17.

<sup>&</sup>lt;sup>94</sup> Maximum SGC capacity of the Plant mentioned in the Project Information Memorandum is 1.6 MTPA. According to the design documentation, the Plant will be capable to produce up to 98.6 tons of SGC per hour and offload up to 8000 m3 of SGC per hour. Maximum design SGC capacity of the Terminal to be achieved in 2026 is 1.8 MTPA.









#### Source: LLC "Arctic LNG 2"

The Plant features a special design where the process trains are built on gravity-based structures (GBS) designed to withstand heavy ice, seismic and wave impacts. GBSs are conventionally used in areas with challenging environmental and technical conditions for construction (e.g. development of offshore fields in Sakhalin Region) at a maximum depth of 150 m. Each GBS is designed as a platform which is kept in its position on the sea bed by its own weight and the contact of its bottom with the sea bed soil. Sea bed surface relief and deposits are subject to grading and stabilisation prior to installation of GBS.

In view of the benefits of the GBS technology with regard to environmental impact mitigation (refer to Chapter 6 for more details), the Company made a decision to engage remote specialized yards for manufacturing of the process trains including GBS and modular structures to be transported (towed) to the designed location area of the Plant. According to the Company, the latter will not require any specific technical preparation of the transportation route (although ice conditions and tide patterns should be taken into account), and on the approaches to the places of installation of GBS with topside structures (i.e. turn-key factory-fabricated technical equipment) geometry of the Port water area being developed will allow for their alignment in design position.

Each of the three process trains will include the following:

- Gravity-based structure with integrated tanks for storage of LNG and SGC, as well as other technical and process fluids and gases (Table 5.5);
- Topside (TS) modules comprising several decks to accommodate process facilities for production and offloading of commercial LNG and SGC products, as well as main and emergency power generation systems.







#### Figure 5.18: Plant Plot Plan

Source: LLC "Arctic LNG 2"





Ready-to-operate equipment

Base of the Process Train

Designed buildings and facilities

Fence (designed as a part of the project 2030-017-ЮР/2018(4741)-13-ПЗУІ.1.СУБ-2.1.1)

Area of the project 2030-017-ЮР/2018(4741)-13-ПЗУ1.1.СУБ-2.1.1

- Safety gap Designed fence
- Designed piperack
- Drainage tray Fire hydrant Fire water monitor Lighting column Leveling poing with a number Parking block Boundary of the designed object
- Area with heat density 4,20 kW/m<sup>2</sup> Area with heat density 1,58 kW/m<sup>2</sup>

Substances	Mass, ton, in specific components of the Plant					
(in the order of descending	Process train				Inter-site	
mass of circulation)	1	2	3	Onshore facilities	pipelines	
Flammable liquids used in the technological process						
SGC	67334.174	67334.174	54.02	0	606.215	
Synthetic heat transfer media DowTHerm Q (mixture of n-methyl ditan and alkylated arenes)	2716.591	2716.591	2716.591	0	0	
Diesel fuel	1272	1272	1272	0	65.761	
Methyl diethanolamine (MDEA)	653.95	653.95	653.95	0	0	
Unstabilised gas condensate	17.588	17.588	17.588	0	63.252	
Methanol	8.493	8.493	8.493	0	6.935	
		Flammable a	nd other gase	25		
LNG	104310.335	104310.335	104182.071	0	484.271	
Mixed refrigerants	840.982	840.982	840.982	0	0	
Ethane	652.439	652.439	6.439	0	2.23	
Butane	190.084	190.084	5.084	0	2.45	
Propane	188.077	188.077	8.077	0	2.389	
Feed gas (mostly methane)	150.645	150.645	150.645	9.99 (in the flare system)	115.34	
Natural gas liquids (NGL)	72.012	72.012	72.012	346.57	0	
Propane and butane mixture	6.811	6.811	6.811	0	0	
Fuel gas (mostly methane)	3.294	3.294	3.294	0.067 (in the fuel gas system) 18.827 (in the flare system)	6.783	

#### Table 5.5: Information on hazardous substances circulating in the Plant process trains<sup>95</sup>

The full list of the PLANT facilities includes the following:

- Turn-key factory-fabricated technical equipment:
  - Process train 1 comprising topside (TS) and gravity-based structure (GBS) with LNG and SGC offloading systems and storage tanks for process fluids, LNG and SGC accommodated in the GBS hull;
  - Process train 2 comprising topside (TS) and gravity-based structure (GBS) with LNG and SGC offloading systems and storage tanks for process fluids, LNG and SGC accommodated in the GBS hull;
  - Process train 3 comprising topside (TS) and gravity-based structure (GBS) with storage tanks for process fluids and LNG accommodated in the GBS hull;
- Base structures in the Ob Estuary of the Kara Sea for installation of turn-key factory-fabricated technical equipment 'Process Train 1', 'Process Train 2', 'Process Train 3';
- Main onshore facilities (to be commissioned simultaneously with the Plant Process Train 1):
  - Common flare system;
  - $\circ$   $\;$  Operations control complex (OCC);
  - Pipe racks;
- Auxiliary onshore facilities:

<sup>&</sup>lt;sup>95</sup> Based on the Industrial Safety Declaration of the hazardous production facility - Plant for production, storage and offloading of liquefied natural gas and stabilised gas condensate on gravity-based structures. - NIPIgaspererabotka JSC, 2019





- $\circ$   $\;$  Catch-water drain for protection against impact of external water bodies;
- Utility systems:
- Telecom tower No.1;
- Auxiliary boiler plant;
- Industrial wastewater and runoff water pumping stations Nos. 1, 2, 3;
- Fire water storage tanks;
- Fire water pumping station;
- Process water pre-treatment facilities;
- Glycol water collection and drainage site.
- Ice management system (IMS) No.1:
- IMS No.1 boiler plant;
- IMS No.1 air compressor station;
- IMS No.1 rack;
- Substation ESS-001;
- Site roads;
- Grading and landscaping elements;
- Site fence.

Further technical details of the PLANT are provided in Appendix 18.

The approach for the Plant construction can be described as follows:

- GBS manufacturing at specialized remote site;
- Building of the topside (TS) process modules at remote module-building yards;
- Transportation of fabricated process modules to the GBS manufacturing site followed by installation of TS structures from the modules and their integration with GBS, partial commissioning;
- Towage of the turn-key factory-fabricated process train (GBS+TS) to the designed location of the PLANT;
- Preparation of base in the Ob Estuary for installation of the process trains;
- Construction of onshore infrastructure;
- Installation of the process trains on the prepared base structures in the Ob Estuary, and subsequent integration with onshore infrastructure;
- PLANT commissioning and putting into operation.

The PLANT construction period is Q1 2020 – Q3 2026. The first process train of the PLANT will become operational in 2023, and further capacities will start operating in 2024 and 2025. Comprehensive pre-FEED engineering surveys have been completed by present; design has been developed, and the state expert review of the engineering survey reports and design documentation has been successfully completed (approved by the State Ecological Review Board of Rosprirodnadzor and the Main State Expert Review Board of FAI Glavgosekspertiza of Russia).

#### 5.7 Associated Facilities and Activities

In accordance with IFC Performance Standard 1 (PS1), Associated Facilities of a Project are those activities and facilities that are not financed within the scope of the Project and would not be conducted, built or expanded if the Project was not carried out, and without which the Project would not be viable. It is important to note that impacts of associated facilities and activities should be examined to the same degree as impacts of the Project.

The Consultant has checked if the above criteria are met by the fields in Gydan and Yamal petroleum regions, elements of the equipment and materials supply chain for the Project, remote facilities for disposal of the Project construction and operation wastes, communications and transport hubs, marine operations (Table 5.6).

Facilities and activities that fully meet the association criteria are the components of the Port facilities being in federal ownership, as well as activities that will be conducted without loan funding (namely development and maintenance of the Port water area and approach channel; protection of the inner water area of the Port against floating ice; ensuring transport safety of the Port and marine operations; ensuring functioning of the federal services in the Port (item A1 in Table 5.6).

Facilities and activities of the Utrenniy Airport (p.5.8) at the site selected specifically to provide transport access to the Project facilities also meet the association criteria.




Among the marine operations related to the Project implementation, the underwater technical operations and navigation in the external water area of the PORT and in the access channel, and the remote dredged soil dumping sites are immediate parts of the Project, or are associated with it (Figure 5.5).

Dimensioning requirements for the sea channel at the outlet of the Ob Estuary are dictated by the dimensions of vessels used by the Yamal LNG Project, and the cargo future traffic intensity generated by simultaneous implementation several projects (item A6 in Table 5.6); therefore, operation of this facility does not meet the association criteria of IFC, and its impacts are considered in the context of cumulative effects (Chapter 13).

The remote facilities for construction of the gravity-based structures and topside structures may not be considered as associated facilities either, as cancellation of the Project would not cause termination of their operations, and, besides participation in the Plant Project, they also run other activities (item A3 in Table 5.6). In particular, gravity-based structures and other floating units that will be manufactured and repaired at the Offshore Superfacility Construction Center (OSCY) of NOVATEK-Murmansk LLC can be used in a variety of environmental conditions. It is expected that OSCY (which until February 2018 was named "the Kola Shipyard") will specialize in manufacturing virtually all kinds of offshore superfacilities and become an integral part of the actively developing Murmansk transport hub.

Since the Project capacities for waste neutralisation, recycling or disposal are mostly intended for management of low-hazard wastes, the wastes of higher hazard classes will be transferred for disposal at dedicated remote sites run by licensed contractors. These operations are independent of the PLANT construction and operation plans, therefore, they are not considered as associated facilities (item A4 in Table 5.6).





#### **Table 5.6: Associated activities**

Inde x	Facilities and operations		Relation to the Project	Current status of implementation	Compliance with IFC criteria for associated facilities	Justification of compliance/non-compliance wit
		FacilitiesandoperationsoftheCompany(LLC"Arctic LNG 2")	Marine logistics, cargo storage, LNG and SGC offloading support	Construction	Non-compliance	Components and activities of the PORT financed by the Arctic LNG
A1	Construction and operation of the Utrenniy Terminal (the Port)	Facilities in the federal ownership and activities not financed by the Project	Initial provision and maintenance (repair) of the Port water area and access channel. Protection of the inner water area of the Port against floating ice. Ensuring transport safety of the Port and marine operations. Ensuring functioning of the federal services in the Port.	Construction	Compliance	Associated facilities are identified as follows: - ice barriers; - navigation aids; - tide gauge; - transport safety system facilities (ITSO TB); - automated wireless observer unit (AWOU); - automatic identification system (AIS) station; - closed parking for the federal services; - RF state border checkpoint; - administrative property facilities in the administrative area. Besides construction and operation of the above facilities, other as (repair) of the Port water area and access channel
A2	Construction and ope Airport	ration of the Utrenniy	Ensuring transport access to the Project facilities		Compliance	The airport will be operated by Sabetta International Airport LLC e utility supplier and land lessor. The facility is not financed within the the Project. It will be commissioned in 2022-2023 (test flights are for several projects. The airport will account for 7-10% of the tota transportation its share will be nearly 100%, as helicopter transpon by planes, due to their lower dependence on weather conditions an
A3	Operations at specialized remote construction sites		GBS construction Manufacturing of topside modules for the PLANT	Design development and expert review completed. Construction	Non-compliance	Components of the Plant will be manufactured by several companie for the Plant, mentioned in publications in the sector and regio Engineering Co. Ltd (QMW) with production facilities in Huangdao Ltd. that has its own shipyard in Zhoushan (Zhejiang Province of C manufactured at the Offshore Superfacility Construction Center Region). GBS construction will be one of the several business line the Yard may be used for the Project and also for other projects Plant). Due to the fact that the Arctic LNG 2 Project will be the firs the production sites of OSCY for the period of GBS constructio Organizationally, a subdivision has been formed in the structure of of the OSCY; The Company's responsibility also extends to the subcontractors of Arctic LNG 2 LLC). Environmental and social mo OSCY remain under the responsibility of NOVATEK-Murmansk LLC. other remote specialized sites as associated facilities: on the one other facilities, in particular the GBS construction technology is we and on the other hand, on completion of the Plant manufacturing of operate fulfilling orders from third parties. According to the plans serial production of LNG trains on GBS for other projects of the G construction of other large-tonnage offshore structures, floating fa
A4	Remote waste neutralization, treatment and disposal sites		Waste management at the Plant construction and operation phases	Operation	Non-compliance	Wastes of hazard classes V, IV and (partially) III generated by the of Salmanovskoye (Utrenneye) OGCF managed by the field Opera Port area). The wastes of hazard classes I, II and (partially) III operated by third parties. None of the above sites was built or attributable to the project, therefore, they fail to meet one of the above sites are one of the above sites was built or attributable to the project.
Α5	Operation of communication lines between the Project area and specialized construction sites and other sources of materials and equipment supplies, remote concentration points of personnel of construction, operating and other companies involved in the Project, remote waste disposal sites		Materials and equipment delivery from the remote specialized construction sites. Transportation of personnel. Transportation of wastes to remote utilization and disposal sites	Preparation of transportation scheme for the Arctic LNG 2 Project with due regard to location of potential suppliers, involved transport hubs, waste disposal sites	Compliance - for the communication lines and transport facilities operation of which would be impossible or unnecessary without the Project (particularly, navigation in the access channel of the Utrenniy Port)	The main part of this type of activity is considered by the Consulta specific review has been carried out to identify those transport proposed construction and operation of the PLANT, PORT and FIELI of the Project (e.g. ships with certain technical parameters). In par which connect the license area with the public road network <sup>97</sup> , and the Ob Estuary. The marine operations conducted for the Project h cargo turnover and intensity of shipping traffic on the concerned re

<sup>96</sup>JV of McDermott and CSIC received a contract for three main modules for the Arctic LNG 2 // Information-analytical online media PRO-ARCTIC. https://pro-arctic.ru/18/09/2019/news/37800.

Wison Offshore & Marine starts working for the Arctic LNG 2 Project // Web site LNGnews.Ru. https://lngnews.ru/2019/12/187/

97 The Tazovskiy District Municipality Master Plan refers to a long-term plan to construct a railway line in Gydan Peninsula in the direction of the Salmanovskiy (Utrenniy) LA, with a terminal point in the LA territory





#### n the IFC criteria for associated facilities

2 Project are parts of the Project

ssociated activities include initial provision and maintenance

established by Yamal LNG OJSC. LLC "Arctic LNG 2" acts as e scope of the Project and would not be implemented without planned in March-April 2021), to provide transport services al cargo turnover of Arctic LNG 2 Project; for the passenger rtation of rotation shift personnel will be gradually displaced nd higher safety of flights.

es at remote sites. Among manufacturers of topside modules onal media96 are Qingdao McDermott Wuchuan Offshore (Shandong Province of China) and Wison Offshore & Marine hina). It is planned that the gravity-based structures will be (OSCY) of NOVATEK-Murmansk LLC (Russia, Murmansk s of the Yard, and gravity-based structures constructed by (including in case of the "zero alternative", i.e. without the st major customer for OSCY, the Company decided to lease on and installation of the topside elements (until 2025). the Company, whose specialists participate in the activities contractors involved in the work of the Center (they are nitoring and management issues related to the activities of The Consultant does not consider the above companies and hand, components of the Plant could be produced also at ell developed and could be implemented at other shipyards, r if the Project is not implemented, these facilities can viably of the NOVATEK Group, OSCY will ensure the possibility of roup. OSCY possesses the technological capabilities for the cilities, etc.

e Project will be disposed at dedicated sites in the territory ator (a part of the Project, along with dredged soil from the will be transported by sea and disposed of at remote sites r extended specifically for the range or volume of wastes association criteria established by IFC.

ant as *primary supply chains*. As part of the ESHIA studies, routes (corridors) which are intended specifically for the D, and the vehicles which are solely used to serve the needs rticular, the association criteria are met by the access roads I the sea route between the PORT and the navigation line of nave been examined for the cumulative impacts of increased outes

Inde x	Facilities and operations	Facilities and operations Relation to the Project		Compliance with IFC criteria for associated facilities	Justification of compliance/non-compliance wit
A6	Extension of sea channel in the Ob Estuary (at the intersection of the navigation route and Ob Bar)	Ensuring safe navigation at the stage of the Plant and Port operation	Design development	Non-compliance98	Operation of the sea channel is needed for the marine operations Project implementation. The channel has been independently opera the channel is determined by the general increase of traffic flows, three terminals - Sabetta, Utrenniy and Arctic Gate <sup>99</sup> . The channel of the Yamal LNG Project. Implementation of the Arctic LNG 2 Project difference is potential increase of draught by 0.1 m for one vessel of to the ports of Sabetta and Arctic Gate by approximately 90% <sup>100</sup> . the Ob Estuary cannot be considered as associated facility of the <i>A</i> the association criteria established by IFC: firstly, the Project wo secondly, the channel's extension is planned anyway, in the context to the Project construction. If a need for changing the sea channe identified in the course of the Project implementation, additional stu of associated activity.
A7	Development of infrastructure of other fields in the Gydan and Yamal Petroleum Region to provide additional resource base for the Plant	Anticipated future element of the Project resource base	Exploration, appraisal	Non-compliance	The Company expressly confirms that the Salmanovskoye (Utrenn of the Project. That is why they are considered as third-party act 13) and addressed in the context of cumulative effects. The intro license area and the design for the development of the Salmanovsk
A8	LNG trans-shipment facilities (TSF) in Murmansk and Kamchatka regions	From the Project's Utrenniy Terminal (Port), LNG will be shipped by Arc7 (YamalMax) LNG carriers to the transshipment complexes at both ends of the Northern Sea Route (NSR) to be subsequently transshipped via floating storage units to conventional vessels for further transportation to regasification facilities	Surveys and project designing have been mostly completed (for the Kamchatka TSF the GlavGosExpertisa has already issued a positive opinion)	Not applicable	Both transshipment facilities will obviously serve for several LNG per cent and decreasing in course of time (as other LNG projects a 2023, their services will be consumed by third-party LNG project a to be responsible for both environmental and social management. As Project Information Memorandum states, ' <i>irrespective of any d and Murmansk regions into operation, the Project will keep operatin to transhipping at the transshipment facilities, a ship-to-ship tracurrently undertaken by Yamal LNG Project'.</i> This clearly indica independent of the ALNG2 Project, are not critical for the Project's the LNG shipment strategy that will likely be adapted to highly navigational conditions. Official Novatek's press-releases and media publications also confirm and then be shared between severa (http://www.novatek.ru/en/press/releases/index.php?id_4=3447, https://tass.com/economy/1069304, and many others). Along wi facilities will additionally serve as new key points of the Russian A in The Integrated Plan for Development of the Main Infrastructure dated Sept. 30 <sup>th</sup> , 2018), and, as it also occurs in the case of Utrer functions for the terminals will be provided by Russian state-owne (http://government.ru/docs/36084/).

<sup>&</sup>lt;sup>101</sup> As part of examining potential cumulative effects of the planned activities (Chapter 13), the Consultant updated the previously collected information on the channel and its impact on water environment of the Ob Estuary





#### the IFC criteria for associated facilities

of third parties, and will be maintained irrespective of the ated by third parties for a long period. The need to enhance s, and also considering the projected cargo turnover of the dimensioning is defined by the design vessel parameters of t will not cause any change in the range of vessels (the only category), however it will cause an increase of ship journeys On the Consultant's opinion, the sea channel at the exit of Arctic LNG 2 Project at this stage, as it fails to meet two of buld be viable even without extension of the channel, and t of third parties' shipping operations<sup>101</sup>, and does not relate and parameters specifically for the Arctic LNG 2 Project is udy will be conducted assess the respective impact as impact

neye) OGCF has sufficient resources for the whole life cycle tivities (refer to the respective scheme in Chapteras 1 and oduction of any changes in the current parameters of the koye (Utrenneye) field are not planned by the Company.

projects, with ALNG 2 share being initially less than 50-70 are launched). Since commissioning the TFSs is planned for at the start. Each TSF will be managed by its own operator

delay in bringing the transshipment facilities at Kamchatka or at the planned LNG production capacity. As an alternative ansshipment can be arranged in a manner similar to that cates that both TS-facilities, each having its own timing s survival, and several alternatives are still considering for y changeable marketing and, to some extent, the NSR's

m both TSFs will start with handling the Yamal LNG's carriers al LNG projects of the region https://arctic.ru/news/20190415/845975.html, with Sabetta, Utrenniy and other ports and airports, these Arctic development strategy: both TSFs have been included re (approved by Russian Government's Decree No. 2101-p nniy, a large portion of construction works and operational ed companies under the governmental planning and control

n tankers assisted by icebreakers is practiced in the Ob Estuary since 2015 : Sabetta Port. Justification of sea channel dimensions in the north of the Ob

<sup>&</sup>lt;sup>98</sup> If the sea channel is to be extended specifically for the needs of the Arctic LNG 2 Project, such activities should be considered as associated activities

<sup>&</sup>lt;sup>99</sup> The Arctic Gates Terminal is a part of a project of Gazpromneft-Yamal for production, offloading and transportation of oil from the Novoportovskoye field (Official Project website - http://gazpromn.tilda.ws/novyport). Year-round transportation of oil in tankers assisted by icebreakers is practiced in the Ob Estuary since 2015

<sup>&</sup>lt;sup>100</sup> Investment application (declaration of intent) for the Complex for production, storage and offloading of liquefied natural gas and stabilised gas condensate at the Salmanovskoye (Utrenneye) oil, gas, and condensate field. Remote terminal Utrenniy at Sabetta Port. Justification of sea channel dimensions in the north of the Ob Estuary. Document code 89.03.14.5.184-MK. - StPb: GT MORSTROY CJSC, 2016.

# 5.8 Project Shipping Activities

Information on the types of vessels and routes used for delivering cargoes to the berth structures during the PORT construction phase is provided in Section 5.1.

Year-round shipping activities are planned during the PLANT and PORT operation, for transportation of LNG and SGC to consumers in Asia-Pacific region and Europe. The respective routes are divided into two main segments:

- Transportation of LNG and SGC by carriers of ice class Arc-7 with and without icebreaker assistance (depending on season and ice conditions) from the Utrenniy Terminal to two marine transshipment complexes in Murmansk Region and Kamchatka Territory (refer to section 1.2.4 in Chapter 1 and scheme in Figure 1.9); and
- Transportation of LNG and SGC from the marine transshipment complexes in Murmansk Region and Kamchatka Territory to end users in Europe and Asia-Pacific region.

Transportation of hydrocarbons produced by other projects of NOVATEK in the region will follow the same routes. Procurement or building of the above vessels are not parts of the Project.

Cristophe de Margerie vessel – the lead ship of Yamalmax class – is adopted as prototype for the design of Utrenniy Terminal and for the Project marine operations (ice class Arc-7, draught up to 11.78 m, dimensions 299x50x27 m; capacity 172.6 thousand m<sup>3</sup>, speed in open water up to 35 km/h, designation in the design documentation - NG-170). Built in 2016 at the shipyard of Daewoo Shipbuilding & Marine Engineering Company and operated by Sovcomflot for transportation of end products of the Yamal LNG Project. It is planned that at least 15 gas carriers of this series will be built: they will be completed, launched and put into service by different carrier companies, including Teekay (Eduard Toll tanker) and joint venture of Sinotrans & CSC Holdings, China LNG Shipping and Dynagas (Boris Vilkitsky and Fedor Litke tankers).

Besides gas carriers of the type of Cristophe de Margerie, smaller SGC carriers will be used (dimensions 229x33x27 m, draught 11.7 m, designation in the design documentation - NO-41).

Tentative quantitative parameters of shipping traffic for the Arctic LNG 2 Project are provided in the Information Memorandum<sup>102</sup>:

- In addition to the vessels transporting products of the Yamal LNG, 17 new gas carriers will be used (orders for few of them have already been placed with Zvezda Shipyard), therefore, by year 2026, the two projects will be using the total of 32 gas carriers;
- Europe and Asia-Pacific region will respectively account for 20% and 80% of LNG traffic of the Arctic LNG 2 Project;
- The whole SGC output of the Project will be supplied to consumers in Europe;
- It is planned that several different projects of NOVATEK will share a common icebreaker and tanker fleet for shipping their hydrocarbon products;
- The total number of vessel calls at the Utrenniy Terminal at the cargo turnover of 24.4 MTPA of LNG and 1.48 MTPA of SGC<sup>103</sup> is tentatively estimated at 365, including 326 vessels of type NG-170 and 39 vessels of type NO-41; at the set turnover for the Project of 19.8 MTPA of LNG and 1.8 MTPA of SGC, the proportionally reduced number of vessel calls is 312<sup>104</sup>;
- Tanker fleet navigation in severe ice conditions in the Kara Sea including Ob Estuary will be assisted by three icebreakers operating on LNG, two existing nuclear icebreakers (Yamal and 50 Let Pobedy), and three new nuclear icebreakers (design LK-60);
- Travel time between the Utrenniy Terminal and the transshipment complexes in Murmansk Region and Kamchatka Territory is 2.5-4.5 days and 8-14 days;
- Transshipment complexes in Murmansk Region and Kamchatka Territory will be fitted with floating LNG storage units each having capacity of 720 thousand m<sup>3</sup>, and each will support the design hydrocarbon turnover of 20 MTPA.

With the declared traffic of marketable hydrocarbon products, the Arctic LNG 2 Project will increase the number of vessel journeys in the sea channel across the Ob Bar by 53, which is equivalent to about 50%

<sup>&</sup>lt;sup>104</sup> Configuration with three GBSs, i.e. without extension to six GBSs





<sup>&</sup>lt;sup>102</sup> Arctic LNG 2. Project Information Memorandum. – ARCTIC LNG 2 LLC, February 2020

<sup>&</sup>lt;sup>103</sup> Remote terminal Utrenniy at Sabetta Port. Justification of sea channel dimensions in the north of the Ob Estuary. / Investment application (declaration of intent): Complex for production, storage and offloading of liquefied natural gas and stabilised gas condensate at the Salmanovskoye (Utrenneye) oil, gas, and condensate field. . GT MORSTROY CJSC, 2016

of the total number of vessel journeys for the existing Projects: Yamal LNG (total 43 journeys for Arc-7 vessels of types NG-170 and NO-44), Obsky LNG (11 journeys), and Arctic Gate (25 journeys)<sup>105</sup>.



#### Figure 5.19: Location of the nearest fiver ports

#### Background source: Ob-Irtysh Shipping Company operation map. Website of OISC JSC at https://oirp.ru/

Besides transportation of the main products, the Utrenniy Terminal will also handle a wide range of general purpose cargoes - loose, roll-on, liquid bulk, and mixed (i.e. supplied and unloaded in containers). Information on respective vessels and vessel calls is provided in Table 5.7. All involved watercraft have been long used for local shipping and long-range cabotage in the Kara Sea (including Ob Estuary), Barens Sea, and White Sea. The nearest major ports from shich general cargoes will be dispatched for the Project are Arkhangelsk Sea Port OJSC and Murmansk Commercial Sea Port PJSC.

Year-round transportation cargoes by sea on ice class vessels escourted by icebreakers (as necessary) is possible after commissioning of the Utrenniy Terminal berths. Furthermore, during the summer navigation period (tentatively 15 July to 15 September, depending on weather and ice conditions each year), cargoes will be transported 106 also from three nearest river ports (Figure 5.20): Salekhard River Port JSC (operted by the Labytnangi Station of the Severnaya Railway of the Russian Railways OJSC), Urengoisky River Port LLC and Serginsky River Port LLC (operted by the Korotchayevo and Priobje stations of the Sverdlovskaya Railway of the Russian Railways OJSC).

<sup>&</sup>lt;sup>106</sup> GBS Plant for production, storage and offloading of liquefied natural gas and stabilized gas condensate. Design documentation. – M.: NIPIgaspererabotka JSC, 2019





<sup>&</sup>lt;sup>105</sup> Sources: Investment application (declaration of intent): Obsky Liquefied Natural Gas Terminal. GT MORSTROY CJSC, 2019.

Investment application (declaration of intent): Complex for production, storage and offloading of liquefied natural gas and stabilised gas condensate at the Salmanovskoye (Utrenneye) oil, gas, and condensate field. Remote terminal Utrenniy at Sabetta Port. Justification of sea channel dimensions in the north of the Ob Estuary. GT MORSTROY CJSC, 2016.

# Table 5.7: Turnover of general cargoes delivered to the Utrenniy Terminal<sup>107</sup>

Cargo category	Vessel type and deadweight	Type of	Number of handled vessels per year							
		navigation	2019	2020	2021	2022	2023	2024	2025	2026-2040
	Pavlin Vinogradov, Pioner Moskvy, deadweight 6-7 th.t	Long-range cabotage	27	90	90	49	55	28	6	10
Mixed and loose	SO-23, SA-15, bulk carrier Grumant, design 743 (Viktor Tkachev), bulker Bontrup, deadweight 19.6-23.7 th.t	Long-range cabotage	12	40	35	19	35	13	2	4
cargoes	Omsky-141, Sibirsky-2129 with deadweight of 30.0-3.5 th.t	Local shipping	22	8	5	4	4	7	6	7
	Barges of design R-56, 16801, deadweight 2.8-3.1 th.t	Local shipping	27	10	6	5	5	8	6	10
Roll-on cargoes	Barges of design 942M, 81218, deadweight 0.9-1.0 th.t	Local shipping	0	0	0	0	22	0	0	0
Oversize and heavy cargoes	Module carriers Xiang Yum Kou, Red Box, Combidock I, Roll Dock (type `S'), Happy (type `S')	Long-range cabotage	0	0	6	0	0	0	0	0
			Planned volumes of supply:							
Liquid bulk cargoes		Long-range	diesel fuel - 40.71 thousand TPA during 2020-2023;							
(diesel fuel, marine fuel, technical	Tankers of types Varzuga, Lena-Neft, Altai, chemical tanker Nordstraum	cabotage and local	50.91 thousand TPA during 2024-2026;							
methanol)		shipping	METHA	NOL - 9.5	5 thousar	nd TPA du	uring 202	4-2026		
		MARINE FUEL - no data is available								
<b>Total</b> without passenge 2021 is 8250), liquid be of wastes (the design g	88	148	142	99	111	56	20	31		

<sup>&</sup>lt;sup>107</sup> Source – Utrenniy Liquefied Natural Gas and Stabilised Gas Condensate Terminal. Amendments to the design documentation. Section 1. Explanatory memo. Volume code 4020-P-LM-PDO-01.01.00.00.00-00. – StPb: LENMORNIIPROEKT, 2019





# 5.9 Utrenniy Airport

The local airline airport Utrenniy (category I, class D) is designed for year-round (9:00 - 19:00) air transportation of rotation-shift workforce and production cargoes to the Salmanovskoye (Utrenneye) OGCF using aircraft An-12 (design prototype), as well as Gulfstream G550, An-24, An-26, ATR-42, ATR-72, Dash-6-400, Dash-8 (Q-200, Q-300), L-410, Mi-8, Mi-26, and aircraft of lower class. The airstrip size will be 1550x36 m. Passenger flow capacity of the airport passenger terminal is 100 passengers per your; cargo turnover is category IV group C as per the 'arctic freight depots' classification / 15 tons per day.

The airport site is located 15 km east of the berth structures. Its total area is 259.2516 ha, of which 243.8481 ha is acquired permanently, and 15.035 ha is allocated for the period of construction.

The airport will be operated by Sabetta International Airport LLC, a subsidiary of Yamal LNG OJSC. Nova LLC performs the Client function at the stage of design development for the airport<sup>108</sup>; LLC "Arctic LNG 2" acts as land lessee<sup>109</sup> and issues technical specifications for the utility connections and supply.

The airport facilities include:

- Improved airstrip 1550x36 m;
- Taxiways RD-A (209 m) and RD-B (194 m);
- Apron for aircraft taxiing and parking (333 m);
- Aircraft de-icing area;
- 2-4-floor service and passenger terminal with a control tower, passenger flow capacity 100
  passengers per hour;
- Terminal square of 0.76 ha with vehicle parking lots;
- Emergency rescue station;
- Training area for fire response crews;
- 2 garages for specialised vehicles;
- Bulk materials store;
- Covered fuel filling station (note: no aviation fuel supply facilities are provided, as aircraft fuelling will be arranged in Sabetta Airport);
- Covered gas cylinder storage site;
- Cargo store with design cargo turnover 15 t/day;
- Works building of the specialised vehicles service and airfield service;
- Building of the electrotechnical flight support service;
- Boiler plant;
- Water supply pumping station with a water treatment unit;
- Radio sites (6 units);
- Surface runoff treatment unit;
- Access road of 2.4 km between the airport and the road network within the field territory;
- Gas supply pipeline of 16 km;
- Hotel for 160 beds, with a canteen, food and materials storage facilities;
- Patrolling road of 5.236 km;
- Fence.

The airport design is developed by a group of companies under general supervision of Design Institute Krasaeroproekt LLC (Main Designer). FAI Glavgosekspertiza of Russia approved the engineering survey reports and design documentation for the airport in December 2019. The airport will be constructed in 45 months, with a peak number of 369 of construction workers. The available materials do not specify the planned time of the airport commissioning for operation: In the tender announcement in 2018, the Company mentioned year 2020 as time for completion.

<sup>&</sup>lt;sup>109</sup> Nova LLC sub-leases the land from LLC "Arctic LNG 2".





<sup>&</sup>lt;sup>108</sup> Before 2008 - Samarskoye Narodnoye Predpriyatiye "Nova" OJSC. Incorporated in Novokuibyshevsk, on the basis of NovokuibyshevTruboprovodStroy Group. The core business is construction of pipeline trunk mains, oil and gas field facilities (corporate website <a href="http://www.snpnova.com/">http://www.snpnova.com/</a>).

# 6. PROJECT ALTERNATIVES

# 6.1 Benefits of LNG Technology

The core process within the Project is liquefaction of natural gas for subsequent transportation to consumers. The development of this technology dates back to the first experiments in the 1910s and industrial implementation in the 1940s in the USA. Today, this is a priority global approach for the international transportation of gas, successfully competing with pipeline gas transportation systems if consumers are located remotely and thanks to the advantages associated with increased modular deliveries.

Prospects for the further spread of LNG technology are associated with the expansion of global consumption of liquefied natural gas, including its use as a motor fuel, as well as the concomitant use of high technologies and modern materials, which contributes to the development of other industries.

The most important conditions and prerequisites for successful application of LNG technology for Russia include:

- Strengthening the position of the Russian Federation in the global market for LNG production, shipping and sales;
- Developing LNG production and shipment projects simultaneously in several Russian regions with sea coasts and / or large hydrocarbon reserves such as the Yamal-Nenets and Nenets Autonomous Okrugs, Sakhalin and Leningrad Regions, Primorskiy and Khabarovskiy Krai; and
- Exploiting and developing the Russian sector of the Arctic, with the Yamal-Nenets Autonomous Okrug as one of the key areas.

The first Russian plant for the liquefaction of natural gas was launched in 2009 in the Sakhalin Region with the joint participation of PJSC Gazprom and international companies Shell, Mitsui and Mitsubishi. The prospects of several LNG projects that are being implemented or planned in Russia are largely driven by the benefits of the LNG technology, namely:

- Technical and environmental safety of LNG (the liquid does not burn, is not prone to spontaneous ignition or explosion, re-gasifies and quickly mixes with air under atmospheric conditions, is not toxic);
- Relatively small footprint and minimal associated impacts on ecosystems; and
- Economic efficiency and motivation for development of technologies and regions of presence.

To date, there are 12 known versions of the gas liquefaction technology, differing mainly in the natural gas cooling mode, the composition of the refrigerants used and the compressor equipment drives<sup>110</sup>. The most common option is the use of a mixed refrigerant with preliminary propane cooling, developed by APCI (a variation of this process is used for natural gas liquefaction under the Yamal LNG Project).

Another common solution which is applied in Sakhalin Region is the double mixed refrigerant (DMR) process presented by Shell who also participates in the Sakhalin 2 Project.

For the Arctic LNG 2 Project the Company selected the mixed fluid cascade (MFC) process by Linde AG which is based on using three separate loops with mixed refrigerants.— It was this process that has become the main one used for the northmost LNG plant in Europe - Snohvit, which has been successfully operated by the Norwegian company Statoil since 2008.

Annex 20 presents the results of comparison of the selected gas liquefaction technology with the most common alternative and the main advantages of the Linde technological assembly - the basis of the projected LNG and SGK Plant. The two comparative technologies, Linde's MFC and APCI's DMR, are among the most energy-efficient and environmentally friendly and compete mainly in terms of time and material resources for their implementation<sup>111</sup>. MFC technology, which is more complex from an engineering point of view, tends to outperform competitors in terms of energy costs and, as a result, greenhouse gas emissions.

Yao Xinyue. An Analysis of the Energy Consumption and Environmental Impact on the Emissions of Carbon Dioxide and Methane of the Offshore Natural Gas Liquefaction Process in Facilities with Utilizing Dual Mixed Refrigerant (DMR) Process Technology. - Theses, Dissertations and Capstones. 2017. 1104. http://mds.marshall.edu/etd/1104





<sup>&</sup>lt;sup>110</sup> I.V. Meshcherin, A.N. Nastin Analysis of technologies for the production of liquefied natural gas in the Arctic climate // Proceedings of the Gubkin Russian State University (National Research University). Chemical Sciences. 2016. No. 3. P. 145-157.

<sup>&</sup>lt;sup>111</sup> Zhang J., et al. Comprehensive review of current natural gas liquefaction processes on technical and economic performance // Applied Thermal Engineering. 2020. Vol. 166.

Industry experts also note that the advantages of each of the compared technologies are fully realized for large LNG plants with high productivity and are practically leveled when comparing small enterprises.

When comparing the variants of technological configuration of the Plant, the Company proceeded from the possibility of using either two trains with the capacity of about 7.5 million tons of LNG per year, or three trains of smaller capacity - 5.5 million tons of LNG per year. Both concepts are recognized to be realized under accepted conditions, and each of them has both advantages and disadvantages. In particular, the use of three trains requires large specific costs of material and technical resources, more land and water space as well as more operations, including their towing. The option with 2 technological lines is simpler and more attractive from these points of view, but is characterized by a higher level of technological risk: there is no experience in construction and operation of such powerful LNG companies in the world yet. The configuration chosen for the final design, with 3 trains and a capacity of 6.6 million tons of LNG for each train, combines the main advantages of the compared options and reduces their disadvantages and risks to the minimum possible level.

# 6.2 Benefits of GBS Technology

The Arctic LNG 2 Project has an important technological feature which differs it from the nearby Yamal LNG Project: the Company decided to construct the LNG and SGC production facilities on a gravity-based structure. This arrangement offers the following advantages:

- Short time required for installation of the LNG & SGC Plant installation without application of expensive heavylift and transportation equipment;
- Main components of the Plant can be towed by sea to long distances;
- Main components of the Plant can be reused at other sites at a later time;
- Low failure rate of the Plant;
- Minimal land acquisition requirements for onshore facilities of the Plant;
- High energy performance;
- Minor environmental impact of the Plant (compared to other arrangements).

According to the pre-FEED materials and design documentation for the Plant, this arrangement can be considered as an optimal technical solution to minimize pollution emissions to the sensitive air environment of Gydan Peninsula and the Ob Estuary. Firstly, at the construction stage, the contribution of the sources is minimized by carrying out most of the manufacturing and installation work at remote shipyards and other technical sites, including foreign ones. Secondly, the power gas needs of the Plant's gas turbine generators will be met by collecting and using the boil-off gas (90% of gas consumption will be in a standby mode, that is, without loading a tanker or gas carrier). The remaining 10 percent will be supplied by getting gas from the mercury adsorbers. Feed gas will only be used at the start-up stage of the Plant, when the above-mentioned secondary hydrocarbon streams are not available. Thirdly, there will be no permanent flares at the Plant: gas mixtures will only be cold or warm flared for the start-up and commissioning of the main equipment of the Plant, in case of the equipment malfunction, maintenance or shutdown of the Plant.

For the gravity-base foundations of the Plant's technological lines, the design of reinforced concrete was adopted, which proved to be the most stable and accident-free for offshore objects of oil and gas industry. Comparison of concrete bases with the most common alternative - steel platforms - indicates several clear advantages of the selected technological option, namely<sup>112</sup>:

- (i) Concrete bases installed not on piles but resting on the bottom of the whole surface are better able to withstand the loads of storm waves, wind, ice and accumulated sediment;
- (ii) Within concrete bases it is more convenient to arrange compartments for various purposes, including the storage of hydrocarbons;
- (iii) Bases made of steel structures are more difficult to inspect, and their technical examination should be carried out more often and include more parameters and areas to be inspected;
- (iv) Concrete gravity bases are more resistant to low temperatures, which is especially important for Arctic projects;
- (v) time and financial resources for production of concrete GBS are much less;

J.K. Widianto et al. Concrete Gravity Based Structure: Construction of the Hebron offshore oil platform // Concrete International. 2016. Vol. 38. No.6.





<sup>112</sup> A.W. Otunyo. Design of Offshore Concrete Gravity Platforms // Nigerian Journal of Technology. 2011. Vol. 30. No. 1. P. 34-46.

K. Sadeghi, et al. Gravity Platforms: Design and Construction Overview // International Journal of Innovative Technology and Exploring Engineering. 2017. Vol. 7. Issue 3. P. 6-11.

• (vi) GBS production requires mostly common, low-responsibility operations, while steel platforms need highly skilled welding which also requires special inspection methods.

## 6.3 Geographic Alternatives

The options that the Company has considered for further transportation of hydrocarbons beyond the boundaries of the license area are illustrated in the scheme below (Figure 6.1). In accordance with the subsoil license conditions (Supplement No.1 to the Subsoil License ref. No. CJX 15745 H3, i. 13.1.1), the products were to be transported to the treatment facilities of the LNG plant located on Yamal Peninsula. Therefore, construction of the Plant on Gydan Peninsula was not considered by the license recommendations. The conventional pipeline transportation of gas and gas condensate which is commonly used in Russia requires allocation of vast territories, and in the site-specific circumstances would also include a section across water area of the Ob Estuary of the Kara Sea. The alternative solution is construction of the natural gas liquefaction and condensate stabilisation facilities, and further offloading both products to tankers and gas carriers for transportation to end customers by sea.

The Arctic location of the Salmanovskoye (Utrenneye) OGCF in combination with remote location in relation to consumers of gas and gas condensate (over 5 000 km) motivate adoption of the approach where downhole fluid is first separated at the field facilities, then natural gas without condensate is fed to LNG & SGC Plant for further removal of acid gas and mercury, liquefaction by cooling down to minus 160°C, and is finally supplied to customers in cryogenic tanks of the gas carrier vessels.



#### Figure 6.1: Project alternatives (the preferred option is shown with red arrows)

Selection of site for the Plant within the license area considered various layout options including offshore, onshore, and in the coastal area with the main plant facilities established offshore on a gravity-based structure and auxiliary facilities built onshore. The latter option was selected as preferred one, as it enables spatial integration of the Plant with the port facilities needed for this option, minimizes the need for land allocation and at the same time beneficially limits the use of the Ob Estuary area (the activities will be





concentrated in the coastal area where the Plant and Port are located), and also provides for full utilization of the benefits of GBS technology. Options for gas transportation to customers are considered in more detail below.

#### 6.3.1 Preliminary identification and selection of options

The following options have been considered in the process of decision making on transportation of hydrocarbons from the Salmanovskoye (Utrenneye) field:

- 1. Gas transportation by pipeline installed on the sea bed in the Ob Estuary, to the LNG plant constructed as part of the Yamal LNG Project in Sabetta, Yamal Peninsula;
- 2. Pipeline transportation of gas to the Yamburgskaya compressor station (Yamburgskaya CS);
- 3. Construction of LNG & SGC plant on Gydan Peninsula and transportation of liquefied natural gas to consumers by tankers, including:
  - a. construction of onshore LNG & SGC Plant;
  - b. construction of plant on gravity-based structures in the coastal area.

Analysis of the three natural gas transportation alternatives (pipeline across the Ob Estuary, gas main to Yamburg, and LNG & SGC Plant) is provided below.

#### 6.3.2 Comparison of solutions for hydrocarbons transportation from the Salmanovskoye (Utrenneye) OGCF

Studies of the natural environment in the area of pipeline construction according to Option 1 identified the following environmental hazards which may cause adverse impacts during the pipeline construction and operation (also refer to Table 6.1):

- Drifting and fast ridged ice is present during 9-10 months per year. Sea bed may be exarated (ploughed) by keels of drifting ice ridges. Sea bed gouging by ice ridges is most probable within the depth range of 15 m to the coast line. The maximum predicted gouge depth is more than 2 m;
- Large quantity of water features and bogs on Yamal shore and southern part of Gydan shore (within the district boundaries), and multiple rivers;
- Highly broken terrain in the northern part of Gydan shore (height drops and cliff faces of 20-50 m within the above boundaries);
- Omnipresent permafrost soil;
- The pipeline may be exposed to impacts of deposition or erosion of bottom sediments in the areas of river estuaries during the short high-water period in spring which accounts for major part of the annual liquid and solid flow of the rivers.

Besides the technical challenges of construction in Arctic conditions and the high environmental risks, pipeline to the Yamburgskaya CS (Option 2) is very likely to produce negative impact on the customary economic activity of Nenets people - nomadic reindeer herding - as the pipeline will intersect the herds migration routes.

The three options for transportation of hydrocarbons from the Salmanovskoye (Utrenneye) OGCF to consumers are summarized in Table 6.1.

RAMBOLL



# Table 6.1: Natural gas transportation options

Scheme of hydrocarbons transportation from the Salmanovskoye (Utrenneye) OGCF	Assessment criteria	Advantages	Disadvantages	Conclusion
Option 1. Gas transportation by pipeline installed on the sea bed in the Ob Estuary, to the LNG plant constructed as part of the Yamal LNG Project in Sabetta, Yamal Peninsula	Environmental and social impact	GHG emissions would normally be smaller than with the Plant option. Impact on surface water, terrestrial ecosystems and reindeer herding would be minor, due to shorter onshore linear facilities.	Significant impact on the environment due to construction of onshore compressor stations. Disturbance of habitats of valuable species of fish in the Ob Estuary (feeding grounds, wintering holes). Drifting and fast ridged ice is present during 9-10 months per year. Sea bed may be exarated (ploughed) by keels of drifting ice ridges. Sea bed gouging by ice ridges is most probable within the depth range of 15 m to the coast line. The maximum predicted gouge depth is more than 2 m. Large quantity of water features and bogs on Yamal shore and southern part of Gydan shore (within the district boundaries), and multiple rivers.	The gas main to the LNG plant in Sabetta would be routed across multiple water streams and bogs, and its construction would cause significant adverse impacts on natural environment including destabilization of permafrost soil, disturbance of habitats (spawning grounds, wintering holes, feeding grounds of commercial fish species. Pipeline installation on the bottom of the Ob Estuary is associated with high technological risks, due to the challenging climate and ice conditions that increase the risk of accidents. Bypassing the most dangerous areas would mean increasing the gas main length and therefore its construction cost.
	Technical and economic performance	Cost saving, due to cancellation of the Plant construction	Construction of the gas main in challenging hydrological and ice conditions. High risk of accidents on the gas pipeline exposed to impacts of the ice ridge keels. Difficulties at the gas pipeline operation and maintenance.	Savings achieved due to cancellation of the Plant construction will not cover the cost of pipeline construction on the Ob Estuary bottom, and the high operating costs (including repairs in case of damage by ice ridge keels).





Scheme of hydrocarbons transportation from the Salmanovskoye (Utrenneye) OGCF	Assessment criteria	Advantages	Disadvantages	Conclusion
Option 2. Pipeline transportation of gas to the Yamburgskaya compressor station	Environmental and social impact	Lower risks for the marine environment of the Ob Estuary and coastal ecosystems in the Plant area. Smaller impact on fish fauna in the Ob Estuary, and on the marine mammals. GHG emissions lower than from the Plant.	Construction and operation of the gas pipeline from the Salmanovskoye (Utrenneye) OGCF to Yamburgskaya CS with a minimum length of 300- 400 km routed across the Taz Estuary and rivers of the highest fishery category will inevitably disturb the flow regimes of the affected streams and bogs. It will further result in fragmentation of terrestrial vertebrates' habitats and affect agricultural activities in the areas adjoining its protection zones. The customary economic activity of indigenous peoples - reindeer herding - will also be affected, as the gas pipeline will intersect the reindeer migration routes.	Besides the technical challenges of construction in Arctic conditions and the high technological and environmental risks of pipeline installation on the bottom of Taz Estuary, this option is very likely to produce negative impact on the customary economic activity of Nenets people - nomadic reindeer herding - as the pipeline will intersect the herds migration routes.
(Yamburgskaya CS)	Technical and economic performance	Pipeline transportation of hydrocarbons is a conventional practice in various regions of Russia, including YNAO.	Implementation of this option would inevitably require further technical solutions for delivery of hydrocarbons to end users. Compared to the option with construction of the Plant, implementation of the gas pipeline toward the Yamburgskaya CS would require acquisition of much larger land areas, both in the short term (for the period of construction) and in the long term. Further technological and environmental risks are associated with the failure rate of the gas pipeline which may be high, due to the challenging geotechnical, hydrological and climatic conditions in Tazovskiy Municipal District of YNAO.	Option 2 is the least preferred solution, due to the uncertainties related to gas supply to end consumers and the high environmental risks.





Scheme of hydrocarbons transportation from the Salmanovskoye (Utrenneye) OGCF	Assessment criteria	Advantages	Disadvantages	Conclusion
Option 3. Construction of LNG & SGC plant on Gydan Peninsula and	Environmental and social impact	The area of onshore impact is relatively small, no need to build pipelines across onshore water bodies. Impact on reindeer herding is minimized, as there is no need for long pipelines crossing the traditional routes of reindeer migration.	Implementation of this option would require construction of a port and associated dredging operations, therefore, its impact would include adverse impacts on the marine environment and habitats of commercial fish species in the dredging and dumping areas.	Land acquisition requirements for construction of a plant on Gydan Peninsula are significantly smaller, as this option does not provide for construction of long pipelines. Therefore, the impact on surface water, natural ecosystems, flora and fauna, and on the customary economic activities of indigenous peoples is minimized.
transportation of liquefied natural gas to consumers by tankers	Technical and economic performance	Development of new capacities for production of LNG. Fulfilment of the strategic regional development objective. Meeting the growing demand for LNG in the global market.	Remote location in relation to the construction sites and equipment suppliers. Sea lines of communication with challenging navigation conditions (severe climate and ice conditions) have to be used.	Economic and technical feasibility studies have demonstrated that construction of the LNG & SGC Plant is economically feasible and technically practical. Therefore, decision was made to develop the option with plant construction on Gydan Peninsula in more detail.





# 6.3.3 Comparison of the Plant implementation options

Options with the Plant construction on the shore (in the license area) or offshore, on gravity-based structures (GBS), have been considered (Table 6.2).

# Table 6.2: Plant location options

Implementation options for the LNG & SGC Plant	Assessment criteria	Advantages	Disadvantages	Conclusion
Option 1 Onshore plant	Environmental and social impact	No need for construction of long pipelines and utilities between the Field and the Plant, hence lower adverse environmental impacts of linear infrastructure facilities	<ul> <li>Land acquisition for operational sites;</li> <li>Disturbance and loss of natural habitats;</li> <li>The Plant is expected to produce a more significant impact on customary land use conditions, due to potential disturbance of spawning and feeding grounds in the fishing areas of indigenous peoples as a result of land acquisition for construction</li> </ul>	Construction of the onshore Plant will cause significant adverse impacts on natural environment and customary nature use practices of ISPN.
	Technical and economic performance	The Field infrastructure can be used to serve the needs of the Plant	<ul> <li>The Plant construction in the area of ubiquitous presence of permafrost soil;</li> <li>High risk of cryogenic processes;</li> <li>Cost of maintaining temperature conditions of the permafrost soil</li> </ul>	Construction of the Plant on shore is associated with significant technological risks, mostly associated with omnipresent permafrost soil.
Option 2 Construction of the Plant on gravity-based structures in coastal area	Environmental and social impact	<ul> <li>Significantly smaller land acquisition requirements and reclamation needs;</li> <li>Smaller impact on habitats of terrestrial vertebrates;</li> <li>Smaller impact on the areas of traditional nature use activities of ISPN (reindeer herding, fishing);</li> <li>Limited impact on the vulnerable ecosystems of Gydan Peninsula and Ob Estuary, as major part of structures will be fabricated at dedicated remote sites and delivered to the Plant site as complete modules ready for installation;</li> <li>Shorter period of civil and erection works and reduced duration of the Plant construction impacts, due to fabrication at remote sites</li> </ul>	<ul> <li>Dredging activities required for implementation of this option will cause negative impact on the marine environment and biological resource of the Ob Estuary in the construction area;</li> <li>Risk of emergency spills of hydrocarbons in coastal area of the Ob Estuary;</li> <li>Additional costs associated with measures to protect the archaeological monument identified within the designed Plant site</li> </ul>	Construction of the Plant on gravity-based structures will significantly reduce adverse impacts on natural environment and traditional nature use practices of indigenous peoples.
	Technical and economic performance	<ul> <li>No need for long access roads for transportation of oversize process modules from the port to the Plant construction site;</li> <li>No need for transportation of the Plant products to the port, as LNG and SGC production will be integrated with facilities of the products offloading to tankers or gas carriers;</li> </ul>	<ul> <li>Solid and liquid wastes from the Plant would have to be transported to onshore treatment facilities and landfills for disposal;</li> <li>Compact layout of the main and auxiliary process equipment and storage systems in the limited space available on GBS</li> </ul>	The GBS Plant option would substantially reduce duration and scope of construction activities in the Ob Estuary and minimize the scope of onshore construction.





Implementation options for the LNG & SGC Plant	Assessment criteria	Advantages	Disadvantages	Conclusion
		<ul> <li>The Field infrastructure will be used to serve the needs of the Plant;</li> <li>Short time required for GBS installation (much faster than with pile foundations) without application of expensive heavylift and transportation equipment;</li> <li>GBS can be towed by sea to long distances</li> </ul>		

As a result of feasibility studies and environmental and social review, construction of the Plant on gravity-based structures in the coastal area was identified as a preferred option.





# 6.4 Detailed Assessment of the Plant Location Options

#### 6.4.1 Overview of Potential Plant Location Sites in the Coastal Area

The Plant site selection in the coastal area is based on the results of assessment of location options for the port facilities (seasonal port) on the coast of Gydan peninsula in the area of the Salmanovskoye (Utrenneye) OGCF which was conducted earlier (at the stage of EIA for the Berth Facilities of Salmanovskoye (Utrenneye) OGCF). Four potential locations were identified for the port facilities as shown in Figure 6.2.

Proposed options:

- Option 1 on Syabuta-Yakha River (alternative name of Khaltsyney-Yakha) (the Northern Point);
- Option 2 Centre (2 km to the south-east of Syabuta-Yakha River);
- Option 3 on Nyaday-Pynche River;
- Option 4 South (3.2 km to the south-east of Nyaday-Pynche River).



Figure 6.2: Schematic map of the port facilities (seasonal port) location options

#### Source: Morstroitekhnologiya, 2014<sup>113</sup>

#### 6.4.2 Approach and Criteria

Each of the four options has been assessed in terms of environmental (marine environment, surface waters, natural hazards), social and logistics parameters, including availability of existing infrastructure that can be used to minimize acquisition of undisturbed land.

#### 6.4.2.1 Marine Environment

The scope of dredging activities required to make the port accessible for marine vessels is an important factor of influence on the marine environment. The scale of such activities depends on the sea depth in the approach area. Therefore, the length of the shortest route to the 4 m isobath (depth) line was calculated for the four options:

- Option 1 400-410 m;
- Option 2 400-410 m;
- Option 3 410-430 m;
- Option 4 480-530 m.

<sup>&</sup>lt;sup>113</sup> Berth structures infrastructure at Salmanovskoye (Utrenneye) OGCF. Design documentation. Section 12. Environmental Impact Assessment. Morstrojtechnologia LLC, 2014





For this criterion, the best options are Options 1 and 2.

6.4.2.2 Onshore Surface Waters

The options selection considered the distance from CGTP (complex gas treatment plant) to the Plant site which determines the length of the pipeline for gas transportation to the Plant. Gas pipelines and other linear facilities may cause negative impacts on surface water streams that they cross along the route, especially at the construction phase. Those include adverse impacts on hydrology and water quality at the intersection points, as well as draining or water-logging of areas immediately adjacent to the intersection points, as a result of changes of surface runoff conditions. The above impacts can be mitigated by using adequate construction methods (e.g. aerial pipeline crossings or road bridges), however, residual impacts and risks may still persist.

Review of the four options concluded that the greatest risk of impacts related to stream crossings is associated with Option 4. The risk levels in case of implementation of Options 1, 2 and 3 are roughly the same.

#### 6.4.2.3 Customary Nature Use Practices of Indigenous Peoples

The options have been compared considering the risk of impact on traditional nature use practices of ISPN. Based on this criterion, the worst options are 1 and 3, as near-mouth the parts of Syabuta-Yakha (Khaltsyney-Yakha) and Nyaday-Pynche Rivers represent fishery value for the indigenous communities<sup>114</sup>.

#### 6.4.2.4 Hazardous Natural Factors and Processes

Safety and reliability of port facilities in the Arctic environment depend on the flow patterns and prevailing winds that determine direction and force of waves, and also on ice conditions. Other important factors are soil properties in the coastal area and hydrology of rivers.

The options selection process included scored evaluation of the following factors:

- presence of drifting ice;
- ice thickness and duration of ice season;
- sea level fluctuations considering tidal effects and high water periods of the rivers;
- sector of hazardous wave direction;
- overall summary current effect;
- transported river deposits on the port structures and overall sediment load forecast.

The above factors were used for the scored expert assessment of the port facilities location options.

Score 1 is assigned for the minimum level of negative impact, and score 4 is for the maximum impact (if a factor has equal impacts for all options, score 1 is assigned to all options).

Results of the assessment are shown in Table 6.3.

Table 6	3: Scored	assessment of	port facilities	location options	(Morstroitekhnologiya, 2014	4)

	Port facilities location options					
Characteristics	Option 1 Syabuta- Yakha River	Option 2 Centre	Option 3 Nyadajpyngchyo River	Option 4 South		
Distance from the coast line to 4 m isobath line	1	1	2	4		
Distance from coast line to sopka mountains	2	3	3	4		
Distance to the Salmanovskoye (Utrenneye) OGCF	4	4	2	2		
Crossings of rivers, streams, roads to the Salmanovskoye (Utrenneye) OGCF	1	1	1	2		
Impact on traditional nature use practices of indigenous peoples (fishery)	4	1	4	1		
Sector of hazardous wave direction	4	4	3	2		
Overall summary current effect	3	2	3	1		
Sea level fluctuations considering high water periods of the rivers	3	2	3	2		
Drifting ice	3	3	2	1		

<sup>&</sup>lt;sup>114</sup> Ethnographic Survey conducted in Tazovskiy Municipal District of Tyumen Region within the Salmanovskoye (Utrenneye) OGCF. Research report. "Purgeocom" LLC, Tyumen, 2015.





RAMBOLL

	Port facilities location options					
Characteristics	Option 1 Syabuta- Yakha River	Option 2 Centre	Option 3 Nyadajpyngchyo River	Option 4 South		
Duration of ice season	1	1	2	2		
Ice thickness	1	1	2	3		
Transported deposits on port structures	3	2	2	3		
Sediment load (overall forecast)	1	2	2	3		
Total score	31	27	31	30		

The port location in point 2 – Centre – has been identified as preferred solution, based on the scored assessment. This option was chosen for the Port siting.

At the early stages of the Plant construction, the port facilities will be used for delivery of equipment, construction materials, fuel and other goods. Therefore, tentative location of the Plant site is selected in the vicinity of point 2.

## 6.4.3 Specific positioning of the Plant process trains in the port area

Topside production modules and structures of the Plant process trains are supported by gravity-based structures (GBS) (refer to Chapter 5). Location of GBSs in the port water area was identified in the course of selection of layout options for the Utrenniy Terminal, considering the strong technological and logistics interfaces between the berths and the Plant process trains. 12 layout options were proposed by GT MORSTROY and examined for implementation of the basic design solution which had been adopted at an earlier stage.

The basic design provided for installation of GBSs parallel to the shore, 350 m to the east of the existing berth structures of the Salmanovskoye (Utrenneye) OGCF (Figure 6.3).



# Figure 6.3: Basic layout of the Plant process trains

Layout options proposed by GT MORSTROY:

- installation of GBSs in one line at different angles to the coast line;
- GBSs facing each other on the opposite sides of the access channel;
- installation of GBSs some distance off the coast line, with the access channel routed closer to the shore;
- GBSs parallel to the coast line;
- GBSs perpendicular to the coast line;
- various mixed options.

The process of selecting the preferred solution included development of assessment criteria and scoring system. In particular, the following factors have been considered:

• similarity of environmental conditions for each GBS;





- soil conditions including uniformity of soil for each GBS;
- ice loads and impacts on GBSs;
- parallel alignment in relation to the coast line (±15°);
- orientation in relation to certain direction of wind;
- possibility of personnel evacuation from each GBS using separate routes;
- safety of tankers mooring against potential drifting and piling of ice. Protection from ice impacts;
- self-clearing of water area from ice (drifting and broken);
- protection of moored tankers against wave impacts;
- minimization of dredging operations in the permafrost area;
- possibility of considering results of the earlier studies (GBSs positioning in recommended zone, based on geotechnical conditions);
- scope of offshore civil and erection works;
- minimization of structures to be erected in the area of potential development of mud deposits;
- thawing of permafrost soil.

As a result of the assessment of the proposed 12 layout options according to the listed criteria and taking into account the cost, option 2 was selected as the optimal layout for the plant's process trains (Figure 6.4).

# **Design options "GT Morstroy" Option 2**



#### Figure 6.4: Preferred layout of the Plant process trains, Option 2

# 6.5 Selection of Preferred Design Solutions

The selected preferred option provides for construction of the Plan on the western shore of the Gydan peninsula, in the direct vicinity of the Salmanovskoye (Utrenneye) oil, gas, and condensate field. This development option has been further elaborated to provide design for the following key elements:

- Location of dredged soil dumping area;
- Sources of water supply;
- Solid waste disposal options;





• Wastewater disposal options.

Detailed discussion of all options is provided below.

# 6.5.1 Dredged soil dumping options

The party responsible for dredging works is FSUE Rosmorport, therefore, dredging is considered as associated activity, i.e. activity which is not directly controlled by the Project Operator (refer to Section 5.7). Alternative dredging strategies are discussed below.

One of the key issues related to the Project implementation is disposal of about 16 million m<sup>3</sup> of dredged soil from the maneuvering area of the Port, construction of the sea port access channel, and area preparation for towage and installation of GBS. Estimated total volume of soil to be dredged over 50 years of operation is up to 100 million m<sup>3</sup>. Two main disposal options have been considered for dredged soil:

- Onshore landfill;
- Ob Estuary water area.

The two options are discussed below.

# 6.5.1.1 Onshore landfill

There are no existing landfill sites in the Project area. A new landfill would be required for onshore disposal of dredged soil.

A landfill development process includes the following steps:

- Development of a network of access roads for transportation of construction materials;
- Construction of dams around fill sites using sand from local quarries;
- Construction of settlement ponds;
- Construction of a system of dredge fill pipelines, including a 2.7 km main dredge line;
- Construction of a drainage system for removal of clarified seepage water;
- Construction of 1.6 km underwater siphon (subsea pressure pipeline).

Potential location of the dredged soil landfill (soil fill sites) is shown in Figure 6.5.



RAMBOLL





# Figure 6.5: Schematic map of location of dredged soil fill sites

The main environmental impacts of dredged soil disposal activities will be associated with the following factors:

- Land allocation;
- Impact on terrestrial flora and fauna;
- Impact of underwater pipeline on water environment, marine flora and fauna.

Onshore disposal of dredged bottom soil would mean complete loss of vegetation cover and appearance of some 61 ha of disturbed areas.

Besides immediate destruction, flora and fauna of the tundra would be exposed to complex adverse impacts including:

- Disturbance of the natural landscape which developed in the permafrost conditions;
- Destruction or damage of tundra plant communities;
- Alteration of plant growth conditions in surrounding areas (development of new orographical, lithological and hydrological conditions, potential local contamination of ground);
- Disturbance of subsoil heat exchange patterns under damaged vegetation cover which may result in lowering the permafrost table, increased thickness of layers affected by seasonal thawing, and therefore induce development of hazardous cryogenic processes.

Reclamation of land disturbed by economic activities implemented by the Company in compliance with the statuary requirements (the Land Code of the Russian Federation No.136-FZ of 25.10.2001) is extremely difficult in the severe arctic natural conditions.





Reclamation of agricultural land is conducted in two stages: technical and biological (Order of RF MinPrirody No. 525 and Order of RosComZem No. 67 of 22.12.1995). Technical reclamation is well possible, however biological reclamation is extremely difficult in the conditions of omnipresent permafrost soil, low productivity of biocoenoses and slow biological cycle of organic matter. In such conditions, restoration of vegetation on disturbed land takes very long time, while hazardous cryogenic processes (thermokarst, thermal erosion, solifluction) rapidly develop on the exposed mineral mass.

Reclamation of disturbed land in Arctic regions requires massive efforts and additional studies to identify effective methods of restoration of soil and vegetation cover, which means extra financial costs. The cost of reclamation in the Far North conditions may be as high as 1.5 M RUB per 1 ha of disturbed land.

It should be noted that soil disposal at the proposed site on the shore of the Ob Estuary would affect estuary of the Nyaday-Pynche River which represents fishery value for local people (PurGeoKom, 2015).

In addition, onshore disposal of soil implies construction activities in a 200 meters strip with the length of some 3 km within the water protection zones (WPZ) and shore protective belts (SPB) of the Ob Estuary, Nyaday-Pynche River and other streams. Complex technical solutions will be required to maintain adequate conditions for economic activities within WPZ and SPB in line with requirements of the RF Water Code, in particular:

- Protective dams shall be constructed around onshore burrow, in order to prevent seepage of dredged soil from the burrow to water environment of the Ob Estuary and nearby water bodies. The bottom soil is mainly composed of pulverous sand and silt. The dredged bottom soil may not be used for the dams construction, as its characteristics (porosity, permeability, organic content) do not meet the requirements applicable to materials for construction of hydraulic structures. The construction material will have to be sourced from onshore sand quarries.
- For avoidance of flooding of the bunding dams, including at crossings of rivers and creeks, construction of culverts, alteration of stream configurations or other technical solutions will be required to avoid potential flooding of the bunding dams, in particular at crossings of rivers and creeks.
- Clarified seepage water from the onshore burrow would be discharged to the Ob Estuary, causing temporary increase of suspended solids content in water.
- Special measures will be required to preserve aquatic biological resource, e.g. construction of special culverts (fish-passing facilities) for the fish living in the Ob Estuary, migrating to upper reaches of rivers for spawning, and also for fry emigration to the estuary.
- Increased water turbidity would result in deterioration of living conditions in aquatic habitats, in particular for commercial fish species. Estimated short-term damage that may be caused to aquatic biological resource through loss of zooplankton and zoobenthos by discharge of clarified water is 0.33 ton per 1 million m3 of bottom soil. Estimated cost of restoration of damaged aquatic biological resource (release of muksun fry to water bodies within the West-Siberian Fishery Basin) would make up about 200 thousand rubles per 1 million m3 of bottom soil disposed onshore.

# 6.5.1.2 Ob Estuary water environment

Environmental aspects of dredged soil disposal in the Ob Estuary primarily concern the impacts of sedimentation on sea bed ecosystems (e.g. inhibition and loss of benthos) and appearance of cloud / increased turbidity zone in the sea water. Impacts on fish fauna will include disturbance of food resources and habitats (feeding grounds, wintering holes) of valuable fish species. In respect of mammals and birds, the main factor to be considered is nuisance.

# Selection of preferred soil dumping option

Tentative site location for disposal of dredged soil has been selected considering the economic and technical factors including distance to dredging site, distance to the Plant, hydrological parameters of the area (water depth, currents, wave and ice conditions). Results of the environmental survey of 2017 by Fertoing were used for assessment of the tentative location of soil dumping site in the Ob Estuary. Schematic location of the sites is shown in Figure 9.3.2 in Chapter 9. In particular, the assessment is based on the following findings of the survey:

- Zooplankton species diversity in the proposed area of soil dumping is poor, whereas population numbers are normal for the Ob Estuary;
- Ichthyoplankton is very scarce in terms of diversity (fry of only one specie arctic smelt was identified by the survey), and also recorded number of fish fry;





- Species diversity of phytoplankton is relatively rich (90 species), but the population numbers are at the normal level for the Ob Estuary;
- Species diversity of zoobenthos within the proposed dumping area was extremely poor (6 species), as of September 2017. Total numbers and biomass values are small, however similar to the common values reported for the Ob Estuary;
- Fish fauna diversity in the surveyed area is limited too. Out of the 35 species living in the northern part of the Ob Estuary, only two were found in catch: smelt and four-horned sculpin;
- No wintering holes were identified in the selected dumping area;
- Marine mammals and bird fauna are also characterised by low density and scarce diversity. Three
  encounters of pinnipeds (two with ringed seal and one with sea hare) were reported over the
  observation period in September 2017; the prevailing bird species were Heuglin's gull and
  oldsquaw;
- Field studies in September 2017 did not identify any distinct bird migration corridors through the works area.

Conclusions made in 2017 about scarcity and small numbers of the biodiversity elements at the soil dumping site were also confirmed by the Comprehensive Studies in 2019.<sup>115</sup>

Therefore, no habitats of valuable / protected fish species, or increased concentration of marine mammals or birds were identified by the studies in the proposed soil dumping area.

Based on the survey results, impact of soil dumping in the water area is assessed as moderate, local scale.

Preliminary estimations of the environmental impact charges and remediation costs associated with various dredged soil disposal options are summarised in the table below.

 Table 6.4: Comparison of environmental impact charges and remediation costs associated with various dredged

 soil disposal options, million rubles<sup>116</sup>

Environmental component or pollution source	Onshore dump	Offshore dump in the Ob Estuary
Fauna	115.0	0
Fish resource	559.853	151.310
Waste disposal	17,546.280	0
Water resource	404.144	173.576
Total period of construction	18,625.277	324.886

# 6.5.1.3 Conclusions

- 1. Dredged soil may not be used for construction of dams around onshore burrows.
- 2. Onshore dumping of dredged soil will cause significant impact on ecosystems in the construction area including:
  - Loss of soil and vegetation cover which is extremely difficult to restore;
  - Loss of habitats and degradation of living environment for animals;
  - Development of hazardous exogenous processes as a result of disturbance of thermal balance in permafrost soil;
  - o Pollution of water bodies affected by construction of onshore disposal site;
  - Alteration of lake-and-river systems morphology due to changes in stream configurations and construction of culverts;
  - Disturbance of spawning migration routes of fish and impact on fishing areas used by indigenous communities.
- Construction costs, charges for pollution of the environment and compensation payable for the damage caused to biological resource would be considerably higher in case of onshore disposal of dredged soil.

Therefore, the conducted studies have demonstrated that potential environmental impact and financial costs associated with onshore disposal option would be higher than in case of underwater dumping in the Ob Estuary. Based on the assessment results, water area of the Ob Estuary is identified as a preferred location for dumping of dredged soil.

 $<sup>^{\</sup>rm 116}$  EES statement on the onshore burrow provided to the Consultant on 22.03.2018





<sup>&</sup>lt;sup>115</sup> Comprehensive environmental studies of the Ob Estuary in the area of potential impact of the Arctic LNG 2 Project and adjacent water areas. Final Report. IEPI JSC, 2020. 287 p.

#### 6.5.2 Water intake alternatives

No existing water supply systems are available in the construction area of the Arctic LNG 2 Project facilities. The following alternatives have been considered in the process of selection of water source<sup>117</sup>:

- Surface water intake from rivers and lakes in the area of the Salmanovskoye (Utrenneye) OGCF;
- Ground water intake using drilled wells;
- Water intake from the Ob Estuary.

The three options are discussed below.

#### 6.5.2.1 Ground water intake

Survey of the local aquifers concluded that ground water resources are not sufficient to satisfy the Project needs. The construction area is located in the area of ubiquitous presence of permafrost soil, therefore, ground water (first aquifer) is located close to the surface (0.1 to 0.3 m) and may not be used for potable water supply. Prospecting and exploration studies that were conducted in the area did not find any adequate ground water resources.

6.5.2.2 Water intake from the Ob Estuary

Ob Estuary provides sufficient water resource to serve the Project needs, however, construction of the intake facilities is complicated by the high industrial load anticipated in the future, intensive shipping, significant fluctuations of water level due to tidal effects, and excessive concentration of salt at the level of water intake.

6.5.2.3 Water abstraction from surface sources

The majority of fresh water lakes in the areas are shallow. They freeze to the full depth in winter and may not be used as sources of water supply. Suitable sources of water supply for the Project facilities are: for the Northern Dome - unnamed lake, meander of Khaltsyney-Yakha River (water intake facility No.3.1), and additional source at the sand production quarry No.25n (water intake facility No.3.2); for the Central Dome - water intake facility at quarry No.31n; for the Southern Dome - water intake facility at quarry No.2g. Water for fire fighting and for water curtain at the berth facilities will be supplied from the Ob Estuary.

6.5.3 Wastewater disposal alternatives

All wastewater generated by the Project, including sanitary, conventionally clean storm water runoff, contaminated drainage and industrial wastewater will be directed to the treatment plant to be constructed as part of the Salmanovskoye (Utrenneye) OGCF Facilities Setup.

The following options have been considered for arrangement of disposal of industrial wastewater and contaminated drainage water<sup>118</sup>:

- Injection of pre-treated wastewater to formation
- Thermal destruction of wastewater (incineration).

The two options are discussed below.

#### 6.5.3.1 Wastewater injection to formation

Wastewater may be injected to formation only after pre-treatment to specified standards, in compliance with the subsoil use requirements. Therefore, this option implies construction of facilities to treat chemically contaminated wastewater, sanitary wastewater, as well as process wastewater and stormwater runoff from industrial sites. In addition, absorbing (operating) and monitoring wells will be required.

6.5.3.2 Thermal destruction of wastewater

This option provides for construction of Wastewater Thermal Destruction Facilities fuelled with the locally produced gas. Combustion of fuel will result in emissions of polluting substances including greenhouse gases.

Based on technical and economic comparison, and considering the environmental factor (i.e. preference is given to the option with the least impact on the environment), injection of industrial wastewater and contaminated drainage water to formation has been selected as the preferred solution for disposal.

<sup>&</sup>lt;sup>118</sup> Report of LLC YUZNIIGIPIGAS INSTITUTE. Salmanovskoye OGCF Facilities Setup. Design concept, Vol. 3.







<sup>&</sup>lt;sup>117</sup> Report of LLC YUZNIIGIPIGAS INSTITUTE. Salmanovskoye OGCF Facilities Setup. Design concept, Vol. 3, 2018

In compliance with the applicable regulatory requirements, implementation of this option will be preceded by geological studies including studies of filtration properties of the selected reservoir bed, and a network of groundwater monitoring wells will be established to prevent potential ingress of contaminated wastewater from the reservoir bed to other subsoil horizons.

Storm water and sanitary wastewater will be pre-treated before discharge to the Nyaday-Pynche River.

#### 6.5.4 Solid waste management options

No disposal facilities for solid wastes of hazard class 3-5 are currently available in or near the Project area. The following options have been considered for management of wastes of hazard classes 3 to 5 (refer to the comparative analysis in Table 6.5):

- Waste collection in the Project area and transportation to remote landfills or waste treatment facilities (WTF);
- Establishing a landfill for disposal of wastes of hazard classes 3-5 within the license area of the Project;
- Waste thermal destruction.

#### Table 6.5: Comparison of solid waste disposal options

Option	Benefits	Disadvantages
Transfer to the berths of JSC Arkhangelsk Sea Commercial Port (Arkhangelsk) or of PJSC Murmansk Commercial Sea Port (Murmansk) for subsequent transportation to disposal sites	<ul> <li>No need to meet the landfilling requirements in the Project area</li> <li>Lower environmental impact in the Project area</li> </ul>	<ul> <li>Need to comply with the requirements to temporary accumulation and transportation of waste</li> <li>Longer haulage distance (logistics issues)</li> <li>Increased cost of transportation</li> <li>Fees for negative environmental impact caused by waste disposal</li> </ul>
Landfill in the LA	<ul> <li>No need to meet the waste withdrawal requirements</li> <li>Lower transportation cost</li> </ul>	<ul> <li>Increased land allocation requirements within the license area of the Project</li> <li>Establishing a landfill in the area with permafrost conditions</li> </ul>
Incineration	<ul> <li>Smaller volume of residual waste to be disposed</li> <li>Segregation of non-hazardous wastes is possible</li> <li>No need to meet the waste transportation requirements</li> </ul>	Significant pollution emissions

The main driving factors for the decision to reject the option of disposing solid wastes via the remote ports in Murmansk or Arkhangelsk are the logistics challenges associated with transportation of wastes, in particular by sea in the adverse weather and ice conditions, and the financial costs. In summary, considering the above aspects, the preferred solution for management of wastes of hazard class 3-5 is a combination of two options: construction of landfill in the license area and incineration of wastes at thermal destruction facilities. Wastes of hazard class 1-2 will be transferred to specialized contractors.

# 6.5.5 *Options for managing wastes from drilling producing wells*

The Company considered several alternatives for managing the wastes generated by drilling of producing wells within the Salmanovskiy (Utrenniy) LA.

**Option 1.** If sump drilling method is used, the drilling wastes are collected in a mud pit. Curing and disposal of drilling wastes in mud pits is a common method widely used in drilling activities in the fields of the Western Siberia (RD 51-1-96, RD 51-00158758-221-2001). This method is based on a simple technology where drilling wastes are cured in mud pit with addition of cement. Cured wastes are left in the mud pit which serves as a waste disposal facility; such facility must be registered as such in the State Register of waste disposal facilities, and the applicable charges must be paid for the negative environmental impact. This method of disposal is possible if the owner of the waste holds a license for collection, transportation, treatment, disposal, neutralization, placement of waste of hazard classes I - IV. This method has the greatest negative impact on the environment; therefore, this option meets resistance during discussions of the planned activities with local communities.

**Option 2.** The pitless (sumpless) technology provides for collection of drilling wastes in mobile tanks or in dump truck body and their removal to remote sites for decontamination, treatment and disposal. Russian





law allows for temporary storage of wastes on site during a maximum period of 11 months. There are no specialised disposal facilities for drilling wastes in Tazovskiy Municipal District of YNAO, and transportation to third parties' waste disposal facilities in other districts of the Okrug would be infeasible, from both economic and environmental perspective. Pitless drilling technology can be also considered for application in combination with mobile units for drilling waste treatment or disposal in the well pad territory.

**Option 3** is injection of drilling waste into dedicated well. Applicability of this method depends on local geology (availability of receiving formation, and confining strata above and under the receiving formation to prevent contamination of ground water). Drilling waste injection into formation is a fairly complex technology that requires a geological survey for identification of suitable receiving stratum, examination of ground conditions to prevent seepage of cuttings into surrounding strata, and the use of special equipment for injection of cuttings and mud.

Advantages of the above methods of managing drilling wastes, and disadvantages that provide grounds for rejection of specific options are summarised in Table 6.6.

No.	Drilling waste management option	Benefits	Disadvantages	Company's decision
1	Final disposal in mud pits at the GWP site (without removal elsewhere)	Relatively simple curing technology with addition of cement	High cost of site preparation. Mud pits are subject to state registration as waste disposal facilities. Site operator must hold a waste management license. Survey reports and design documentation is subject to the state ecological expert review. The highest negative impact on the environment	This option is not considered, due to its resource intensity and poor environmental performance
2a	Removal to remote sites for treatment, utilization and disposal	Lower cost of site preparation. No need for the state ecological expert review of the design documentation	Poor transport access to the GWP sites. Lack of available facilities for collection, treatment and disposal of drilling wastes	Waste treatment and disposal site that is being constructed as part of the Field facilities can accept a part of the drilling wastes. However, Options 2b and 2c are adopted as priority methods of managing drilling wastes.
2b	Temporary accumulation in special (holding) tanks during a maximum period of 11 months, and application of methods described in Options 2a and 2c	Drilling wastes can be utilized immediately in the holding tank (i.e. in the filled base of the site). Possibility of utilization and/or treatment of drilling wastes in a mobile unit delivered to the GWP site for the whole period of drilling activity	Risk of loss of integrity of holding tank during the drilling waste disposal activity	These methods are adopted as the main options
2c	Treatment and disposal of wastes at the source	No need to transport the wastes to remote sites for disposal. Safe utilization or final disposal of wastes is possible, after adequate treatment	A system of mobile units is required on site, for treatment and disposal of the wastes	
3	Injection of drilling wastes into deep formation	No need for utilization, treatment and disposal of the wastes	Need to trill additional wells and use additional equipment. Disposal of the wastes in the geological environment. Increased land acquisition	This method is not considered for disposal of drilling wastes and drilling wastewater

Table 6.6: Comparison of options for managing wastes from drilling the prospecting and producing wells

Based on review of the above options, the Company selected the method that provides for on-site treatment of drilling solid wastes and drilling wastewater as far as possible, and processing of the wastes to produce materials suitable for application in road construction and in other spheres, using mobile process units that are approved by the State Ecological Expert Review for their efficiency and safety. Characteristic of specific





technologies for managing wastes and wastewater generated at the well pads is provided in the thematic section in Chapter 5.

# 6.6 Zero Alternative

The Zero Alternative with regards of the Plant and Port means that other options would be implemented for treatment and transportation of hydrocarbons from the Salmanovskoye (Utrenneye) OGCF. The most probable of those – pipeline transportation to Sabetta or toward Yamburg - would require construction of pipeline mains across sensitive waters and acquisition of larger areas comparing with the selected option.

Cancellation of the Project altogether (including development of the Salmanovskoye (Utrenneye) oil, gas and condensate field) would have the following consequences:

- Results of the long-term prospecting and exploration of the field deposits that have been conducted since 1970 will remain unclaimed (and the investments will be wasted);
- No new base points for developing the Russian sector of the Arctic will be established on the Ob Estuary coast and in the inland areas of the Gydan Peninsula;
- The favourable external economic preconditions for increasing Russian hydrocarbons export to the remote consumers will not be used;
- The Socio-Economic Development Strategy of the Ural Federal District (of which YNAO is a part) for the period 2020, approved by RF Government Resolution of 06.10.2011 No.1757-r, will not be implemented to a full extent. The Strategy provides for priority development of the fuel and power sector in the north of the Western Siberia on the basis of its hydrocarbons resource base of the global significance;
- The existing Salmanovskoye (Utrenneye) OGCF facilities, mooring and other infrastructure will remain in their current locations, and their environmental impacts will not change. Due to the need for preservation or dismantling of the above facilities, cancellation of the Project does not offer any significant environmental or social benefits in the onshore and offshore part of the license area, or for Tazovskiy Municipal District and Yamal-Nenets Autonomous Okrug in general.

# 6.7 Summary

- 1. The core process within the Project is liquefaction of natural gas for subsequent transportation to consumers. Today, this is a priority global approach for the international transportation of gas that is successfully competing with pipeline gas transportation systems. The key advantages of the LNG technology are their safety at the process level and in terms of their environmental impact, the relatively small footprint, good economic performance and motivation for development of the regions of presence.
- 2. Considering the high technological and environmental risks associated with construction of a gas pipeline across the Ob Estuary, construction of the Plant on gravity-based structures in the coastal area of Gydan Peninsula has been selected as the preferred option. Selection of the Plant option is the optimum solution in terms of minimization of environmental and social impacts, mitigation of technological risks of construction in the Far North conditions, reduction of construction and operation costs.
- 3. Selection of site for construction of the Plant in the coastal area is based on the criteria of minimization of impact on natural landscape and traditional land use practices of indigenous communities (particularly fishery sections of rivers), as well construction and operation safety of technical facilities supported by GBS. Option 2 Centre has been selected based on results of comprehensive scored evaluation of the four options.
- 4. Specific layout of the process trains in the Port area was selected from 12 possible options of arrangement of GBSs. The selected optimum layout meets the criteria of convenience/safety of construction and operation, as well as safety of personnel and minimization of impact on the marine environment of the Ob Estuary.
- 5. Two options were considered in the process of selection of solution for disposal of dredged soil: construction of onshore landfill and underwater dumping in the Ob Estuary. The conducted studies have demonstrated that potential environmental impact and financial costs associated with onshore disposal option would be higher than in case of underwater dumping in the Ob Estuary. Water area of the Ob Estuary is identified as a preferred location for dumping of dredged soil.
- 6. Using the findings of biological studies in the estuary, a dumping site has been selected in the area where species diversity of fish fauna is relatively scarce, which does not contain any habitats of





valuable / protected species of fish, marine mammals or birds, or areas with high concentrations of representatives of such species.

- 7. The preferred option for arrangement of water intake for household-drinking and industrial water supply which has been selected, is abstraction of water from surface water bodies. Basically, the selected option is the only possible one, as the available ground water resource in the area is insufficient, and construction of water abstraction facilities in the Ob Estuary is economically and technically infeasible (except for the fire water).
- 8. All wastewater will be transferred for treatment to the treatment plant to be constructed as part of the Salmanovskoye (Utrenneye) OGCF Facilities Setup. Comparison of two options for disposal of treated wastewater concluded that injection of industrial and contaminated drainage water to formation is the preferred solution with much smaller impact on the environment, compared to thermal destruction of wastewater. Domestic and storm waters, including melt water, upon treatment to the fishery standards and disinfection, will be discharged to the Nyaday-Pynche River.
- 9. Among the solid waste management options which have been considered for the Plant (transfer to remote landfills or WTF, transportation to MSW landfill within LA, or thermal destruction), the preferred solution to manage wastes of hazard class 3-5 is a combination of two options: construction of landfill in the license area and incineration of wastes at thermal destruction facilities. Wastes of hazard class 1-2 will be transferred to specialized contractors.
- 10. The Company did not consider sump drilling method as an option for managing drilling wastes, due to its resource intensity and high negative impact on the environment. Based on review of several options, the Company selected the method that provides for on-site treatment of drilling solid wastes and drilling wastewater as far as possible, and potential utilization of the solid wastes in road construction.



