

Appendix 15.1: Occupational Health and Safety

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1 Occupational Health and Safety

1.1 Introduction

The Project will require a very large workforce during the Construction and Pre-Commissioning Phase. It is estimated that, at its peak, the number of construction workers will be more than 2,000, when work will be taking place simultaneously on land and offshore. The total number of workers' hours during the entire Project is estimated to be in excess of 20 million, distributed over a period of approximately four years. To put this figure into context it can be compared with the working hours required to build a small one storey house (approx. 3,000 workers' hours) or with the hours required to build the Nord Stream pipeline (approx. 23.5 million).

The nature of any large scale construction process is such that personnel will be exposed to the risk of injuries and it is the duty of the employers to ensure that working conditions are safe and such risks are minimised. This Appendix provides an overview of the incidence of accidents and injuries in Russia, Bulgaria and Turkey (unrelated to any specific industrial sector), in the Oil and Gas Industry worldwide and in a similar project (the Nord Stream pipeline) to provide a reference framework. Such an overview is comparable to a "baseline" assessment and provides a series of benchmarks against which South Stream Transport will plan its safety performance.

This Appendix also discusses the potential Occupational Health and Safety (OHS) hazards associated with the Project and provides an overview of the control and mitigation measures that South Stream Transport will put in place, via the Project Health, Safety, Security and Environmental Integrated Management System (HSSE-IMS), to minimise the potential for the occurrence of ill-health, injuries and fatalities during the Construction and Pre-Commissioning Phases of the Project and on into the Operational Phase.

The purpose of this discussion is to demonstrate how South Stream Transport will follow some of the requirements of IFC PS 2, Labour and Working Conditions:

- To promote compliance with national employment and labour laws; and
- To promote safe and healthy working conditions, and the health of workers.

Other requirements related to IFC PS 2 are addressed in **Chapter 14 Socio-Economics**.

1.2 Occupational Health and Safety Regulations, Guidelines, Standards, Systems and Codes of Practice

1.2.1 Russia

The main laws related to OHS in Russia are Article 37 of the Constitution of the Russian Federation and the Labour Code; both of which are summarised below along with brief information on other relevant OHS legislation.

1.2.1.1 Labour Code

The Constitution of the Russian Federation Article 37 is the primary governing legislation for OHS in the Russian Federation. Article 37 documents the constitutional right to labour in safe conditions and is supported by the Labour Code (Section X: Articles 209 - 231). The Code regulates:

- Principles of national policy in occupational health and safety;
- Organisation of national regulating systems in occupational health and safety;
- Employers' and employees' obligations;
- Requirements for medical examination of the employees;
- Requirements for industrial units;
- State expert assessments of labour conditions;
- Organisation of HSE in businesses and legal responsibilities of HSE committees;
- Employees' rights and their guarantees;
- PPE requirements;
- Prophylactic nutrition allowance for unhealthy working conditions;
- Medical and sanitary services;
- HSE education;
- Budgeting of HSE measures; and
- Principles of accident investigation and reporting.

Federal Law of July 17, 1999 No. 181- FZ "Protection of Labour" (as amended on 20 May 2002, 10 January 2003, 9 May 2005, 26 December 2005) also contains relevant information including Article 12: Labour protection service in the organization; Article 17: Providing employees with personal protective equipment; and Article 18: Education on labour protection and training on health and safety.

1.2.1.2 Sanitary Standards and Regulations

The Labour Code and Federal laws "On principles of population health care", "On sanitary and epidemiologic welfare", and "On road safety" (as well as numerous other associated laws and subordinate acts) govern the requirements for environmental and sanitary conditions. Other sanitary welfare regulations (including for temperature and microclimate, noise, vibration, luminance, air pollution, ionising radiation, magnetic and electromagnetic fields, microorganisms, space organisation, labour process specifics) in workplaces are contained in various sanitary standards and regulations [SanPiN]. For example, SanPin 302h of 12.04.2011 issued by Ministry of Health and Social Development contains lists of hazardous and harmful factors of labour processes, appropriate requirements for medical examinations and leave criteria for various employment types.

1.2.1.3 Employer Obligations

Federal law "On compulsory social insurance against occupational incidents and occupational diseases" and its associated laws and subordinate acts regulate mandatory accident insurance. "Special assessment of labour conditions" is a new act which came into force in 2014 to replace former systems of workplace legislation.

Minimal standards regarding PPE supply are issued by appropriate Federal governing bodies (Ministry of Health and Social Development, Ministry of Labour and Social Security) depending upon the industry and occupation.

Education and control of employees' competence in occupational health and safety are regulated by Enactment No. 1/29 of 13.01.2003 by Ministry of Health and Social Development and Ministry of Education.

1.2.1.4 Other OHS Standards Regulations

There are numerous acts which stipulate OHS standards and requirements for most fields of activity (construction, offshore, onshore, welding, excavation, mining, etc). General compliance enforcement with OHS regulations is carried out by Federal Labour Inspection within the Ministry of Labour and Social Security, with some related authorities delegated to sanitary, technical, marine and other administrative compliance. Specific OHS requirements are contained in various standards and regulations adopted by the appropriate governing bodies. Those in most general use include:

- Primary and regular medical examinations of employees are associated with either designated categories of the employees (employees under the age of 18, employees with a recognised degree of disability) or designated types of work (unhealthy working conditions; sources of increased danger, e.g. vehicles, electricity, firearms; access to classified documentation; government, security and military service; several public services);
- Operation of vehicles: Federal law "On road safety", Road Traffic Rules and Basic Requirements to permitting of vehicles operation (RF Government enactment N 1090 of 23.10.1993 with several amendments);
- Operation of electric equipment: Regulations for Electrical Equipment Construction (initially implemented in 1988 and undergoing 7th revisions), inter-industry regulations of safe electrical equipment operation (POT R M-016-2001 / RD 153-34.0-03.150-00);
- Operation of lifting equipment: Inter-industry regulations of safe lifting operations and positioning of load (POT R M -007-98);
- Safety regulations of hazardous industrial units using lifting equipment (Federal technical, environmental and nuclear administration [Rostekhnadzor] act N 533 of 12.11.2013); and
- Vessels under pressure: Regulations to construction and safe operation of pressurised vessels (PB 03-576-03).

1.2.2 Turkey

The main law related to OHS in Turkey is Law No. 6331 "Occupational Health and Safety Act 2012" (official gazette No. 288339, Date 20 June 2012) which is also supported by Law No. 4578 "Labour Act 2003".

The Law No. 6331, Section 2: Duties, Authority and Responsibilities of the Employer and Workers contains the following articles:

Article 4: General responsibility of the employer:

1. The employer shall have a duty to ensure the health and safety of workers in every aspect related to the work. In this respect, the employer shall:
 - a) Take the measures necessary for the safety and health protection of workers, including prevention of occupational risks and provision of information and training, as well as provision of the necessary organisation and means that ensure measures are adjusted taking account of changing circumstances and aim to improve existing situations;
 - b) Monitor and check whether occupational health and safety measures that have been taken in the workplace are followed and ensure that non-conforming situations are eliminated;
 - c) Conduct a risk assessment of the workplace;
 - d) Take into consideration the worker's capabilities in regards to health and safety where he entrusts tasks to another worker; and
 - e) Take appropriate measures to ensure that workers other than those who received adequate information and instruction are denied access to areas where there is life-threatening and / or special hazards.
2. In case an employer enlists competent external services or persons, this shall not discharge employer from responsibilities in this area;
3. The workers' obligations in the field of safety and health at work shall not affect the principle responsibility of the employer;
4. Measures related to health and safety at work may in no circumstances involve the workers in financial cost; and
5. The employer will take all necessary measures to ensure the safety of workers, including training and provision of information on health and safety at work with no cost to employees.

Article 16: Worker information:

1. The employer shall inform the workers and workers' representative of the following issues taking into account the characteristics of the enterprise for the purpose of ensuring the occupational health and safety of workers is maintained:
 - a) The safety and health risks and protective and preventive measures;
 - b) Their legal rights and responsibilities; and

- c) Workers designated to handle first aid, extraordinary situations, disasters, fire-fighting and the evacuation.
2. The employer shall:
- a) As soon as possible, inform all workers who are, or may be, exposed to serious and imminent danger of the risk involved as defined in Article 12 and of the steps taken or to be taken in regards to protection;
 - b) Ensure that employers of workers from any outside undertakings and / or enterprises engaged in work in his undertaking and / or enterprise receive adequate information concerning the points referred to in paragraph 1 which is to be provided to the workers in question; and
 - c) Ensure that support staff and workers' representatives shall have access to the risk assessment, protective and preventive measures related to safety and health at work, the information yielded by measurements, analysis, technical controls, records, reports and inspections.

Employers will provide employees with personnel protective equipment, information concerning OHS and inform employees of the risks associated with the work.

1.2.3 Bulgaria

The main laws related to OHS in Bulgaria are the Labour Code and the Occupational Health and Safety Act; both of which are summarised below along with brief information on other relevant OHS legislation.

1.2.3.1 Labour Code

The main law related to occupational health and safety in Bulgaria is the "Labour Code" (State Gazette (SG), issue 26/1986, last amended and supplemented in SG, issue 75/2006). Chapter XIII (13) of the Labour Code regulates relations between government, employers and employees in relation to OHS. The employer's duty to provide occupational safety and health and the right of the Minister of Labour and Social Policy, alone or jointly with other ministers, to issue acts on providing OHS are regulated. The Minister of Labour and Social Policy and the Minister of Health, alone or jointly, are mandated to establish unified regulations for providing OHS, which are to be applied in any sector or activity.

1.2.3.2 Occupational Health and Safety Act

The "Occupational Health and Safety Act" (SG, issue 124/1997) is fully harmonised with the EU Framework Directive on the "Introduction of Measures to Encourage Improvements of Workplace Health and Safety" (89/391/EEC). The Act determines the rights and duties of the State, the employers, the workers and other organisations and legal entities to manage occupational health and safety. The Act is applied in all enterprises or places where labour activity is performed, regardless of the organisational form or the type of ownership.

1.2.3.3 Social Security Code (SG, issue 110/1999)

The Social Security Code (in effect since 1 January 2000) regulates public social security in case of general disease, occupational accident, occupational disease, maternity, unemployment, old age and death as well as additional social security.

The Social Security Code defines the term "occupational accident" as any sudden health injury experienced during and in relation with or on account of the work's implementation, as well as during any activity performed in the enterprise's interest as a result of which disability or death has occurred.

"Occupational disease" is defined in the Social Security Code as a disease which has occurred exclusively or mostly under the influence of the harmful factors of the working environment or the working process on the worker and that is included in the List of Occupational Diseases issued by the Council of Ministers.

The procedure of identification, investigation, recording, and reporting of occupational accidents and the procedure for notification, recording, confirmation, appealing and reporting of occupational diseases is established by a Decree of the Council of Ministers.

1.2.3.4 Ordinance No. 7 on the Minimum OSH Requirements at the Working Places and for Using the Working Equipment (SG, issue 88/1999)

This Ordinance establishes the minimum OHS requirements to be provided by the employer with regard to:

- Enterprise territory;
- Production buildings and premises;
- Working environment factors (physical, chemical, biological, psycho-physiological);
- Use of working equipment;
- Work organisation;
- Water-supply and sewage systems;
- Fire protection and actions in case of accidents;
- Sanitary and everyday service; and
- Provision of personal protection means and special working clothes.

The minimum OHS requirements for construction and assembly works are determined by Ordinance No.2/2004, issued by the Minister of Labour and Social Policy and the Minister of Regional Development and Public Works (SG, issue 37 of 4 May 2004).

1.2.3.5 Ordinance No. 5 on the Terms, Manner and Periodicity of Performing Risk Assessment (SG, issue 47/1999)

Article 16 of the "Occupational Health and Safety Act" obliges the employer to make an assessment of the OHS risks covering the working processes and working equipment, the premises, the working places, the work organisation, the use of equipment and materials and other factors, as well as to ensure suitable measures for risk prevention in accordance with the performed assessment, and where this is not possible, to ensure the protection of workers and other persons.

The risk assessment is conducted by the employer together with the participation of the Occupational Health Services, the OHS authorities, and other specialists from the enterprise. Where necessary, the employer can involve other external organisations or specialists.

The Ordinance determines the requirements with respect to the knowledge and skills of the persons performing risk assessment and the assessment procedure and documentation.

1.2.3.6 Ordinance No. 14 on Occupational Health Services (SG, issue 75/1998)

This Ordinance was issued by the Minister of Health. The "Occupational Health and Safety Act" obliges the employers to provide Occupational Health Services for their workers and employees. The Ordinance specifies the terms and conditions for providing such Occupational Health Services, their functions and objectives and the requirements for staff qualification.

This Ordinance also specifies the minimum required time (in hours for one worker) for the service provided by the OHS specialists (a physician qualified in health services, an OHS specialist, a specialist with secondary specialised medical or non-medical education and other specialists depending on the specific risks) for the different labour categories specified in the Labour Categorisation Rules.

1.2.4 International

In addition to national legislation, the Project will follow the standards and guidelines of financing institutions and other relevant Good International Industry Practice (GIIP) standards including:

- International Finance Corporation Environment Health and Safety (IFC EHS) Guidelines 2012;
- Occupational Health and Safety Management System (OHSAS) ISO 18001:2007;
- Safety Of Life At Sea (SOLAS) 74 International Convention for the Safety of Life at Sea (SOLAS), Consolidated Edition 2009;
- International Convention for the Prevention of Pollution from Ships 1973 (MARPOL 73/78), as modified by Protocol of 1978, Consolidated Edition 2011; and
- International Safety Management (ISM) Code 2010.

1.3 Health and Safety Statistics

1.3.1 OHS Statistics in Russia, Krasnodar Krai and Anapa Resort Town

The levels of occupational injuries in Russia are reported to be 4 to 5 times higher than those in Western European countries. The Russian Government instructed the regions to adopt their own programmes to improve working conditions and safety in accordance with the healthcare reform packages developed by the Health Ministry of Russia at the end of 2011.

In 2012, levels of occupational injuries in Russia decreased and the number of fatal incidents compared to 2008 decreased by 27% (1,104 deaths). The reduction occurred in 71 regions with the most significant reductions occurring in Murmansk, Irkutsk, Magadan, Sverdlovsk, Kemerovo, Tomsk, Lipetsk regions, Udmurtia, Perm, Krasnoyarsk, Khabarovsk, Primorye and Krasnodar Territories, Yamal-Nenets Autonomous District, St. Petersburg (Ref. A.1).

In Krasnodar Krai the number of occupational injuries in 2012 increased compared to 2011 and was 104.9% (measured as a ratio between the levels in 2012 to the levels in 2011). There were increased cases of severe injury (128.1%), increased cases of group injuries (158.6%), and an increase in loss of working days due to temporary disability (164.4%). There were, however, less cases of death as a result of occupational injury (92%).

In Krasnodar Krai, during the period from 2008 to 2012, assessments of labour conditions at 37.6% of working places was completed. According to the results, 51.7% of jobs in the working places that were assessed were recognised as being in safe working conditions, 48.1% in hazardous conditions and 0.2% of employment in very hazardous conditions.

Analysis of occupational diseases in Krasnodar Krai has shown that in 2011, 59 cases were registered involving a confirmed first time diagnosis of occupational disease. In 2010, there were 74 cases; in 2009 there were 74 cases; in 2008 there were 38 cases, and in 2007 there were 53 cases. The breakdown of occupational diseases in the Krasnodar Krai in 2011 indicates that 71.2% of the registered cases were due to exposure to physical factors. Physical overload ranked second with an incidence of 15.2%, followed by exposure to industrial aerosols at 9.1%, exposure to biological agents (tuberculosis and brucellosis) at 3.0%, and exposure to chemical factors at 1.5%.

Cancer as an occupational illness was recorded in 2007 only and during that year accounted for 1.5% of the total number of occupational diseases.

According to the report "on sanitary-epidemiological situation and consumer rights" 2012 Krasnodar Krai (Ref. A.1) it is recognised that the reported level of the country's occupational disease is underestimated. Indicators of occupational disease in Russia are ten times lower than in developed countries. This under reporting is attributed to a lack of a high quality occupational disease monitoring system. The above figures, for instance are not correlated to the numbers of hours worked, as is normal practice in Western Europe and elsewhere; it is therefore difficult to interpret the frequency of injuries and accidents in a meaningful context.

According to the Department of Labour (Ref. A.2), in Krasnodar Krai, the main causes of incidents with severe consequences were reported to be the poor organisation of production work, traffic violations, violation of workers' labour regulations and labour discipline, lack of adherence to work procedures, deficiencies in the organisation and lack of provision of training for health and safety.

Data available from the International Labour Organisation (ILO) Department of Statistics (Ref. A.1) for fatal and non-fatal occupational incidents for the period up until 2008 shows that the trend in the Anapa Resort Town municipal district is similar to that in Krasnodar Krai. There is an increase in the number of incidents, no change in the number of fatalities and an increased number of lost working days due to temporary disability.

1.3.2 Occupational Health and Safety Statistics in Turkey

The Turkish Ministry of Labour and Social Security in cooperation with The Occupational Safety Centre (CSGB) publish an Occupational Health and Safety Magazine detailing OHS statistics every quarter. Access to an up-to-date publishing source is not available.

Another source of occupational health and safety data is the OGP Safety Performance Indicators 2012 Data (Ref. A.3); Turkey Lost Time Injury Frequency Rate (LTIFR) for 2012 was 2.61 and 0.92 for 2011 (this includes fatalities and lost work day cases (LWDC) per 1,000,000 hours worked). The data indicates that Turkey has one of the highest LTIFR in the Middle East (the geographic region where OGP classifies Turkey)

1.3.3 Occupational Health and Safety Statistics in Bulgaria and Varna

OHS statistics in Bulgaria indicate that the rate of occupational injuries has declined over the period from 1994 to 2005. The incidence rate of accidents at work was reported to be 85 per 100,000 persons in employment by 2005, in comparison to the 122 reported in 1994. While it is likely that the number of reported incidents is considerably lower than the number of actual incidents, this suggests that OHS standards are improving. Bulgaria reported only 0.6% of workers as having suffered an injury at work and only 4.9% of workers as having experienced one or more work-related health problems; a figure significantly lower than the average recorded by Eurostat for EU-27 at 8.6% (Ref. A.4). An EU poll on OHS also found that 60% of Bulgarians consider themselves informed about health and safety risks in the workplace, a noteworthy improvement from 2009 which indicated that only 32% of workers felt informed.

According to Eurostat, the incidence of fatal work-related accidents in Bulgaria is declining, although it is still higher than the EU average. In 2008, there were more than five fatalities per 100,000 workers in Bulgaria, this fell to just over three per 100,000 workers in 2009, the latest year for which statistics are available. By comparison, the average fatality rate across the EU remained constant at around two per 100,000 over the same period. Eurostat indicates that the level of work-related incidents is under-reported in Bulgaria; this and the comparatively high incidence of fatalities suggest that OHS systems and a "safety culture" are still developing.

1.3.4 Oil and Gas Industry Health and Safety Statistics

The International Association of Oil and Gas Producers (OGP) publishes every year a compendium of health and safety statistics collated from its members, which in 2012 included 49 oil and gas operators from all continents.

The "Safety Performance Indicators – 2012 Data" report by OGP has been used in this assessment to provide an overview of the type and frequency of accidents that occurred in 2012 in the construction and operation of oil and gas developments worldwide.

The key indicators summarised in this assessment are fatal accident rate and number of lost work day cases. The OGP report includes many other indicators that have not been considered in this assessment to reduce the complexity of the assessment itself. The causes of injury or fatality are divided by OGP into 10 categories, as follows:

- Assault or violent act;
- Confined space;
- Explosions or burns;
- Exposure electrical;
- Overexertion, strain;
- Struck by (falling or moving objects);
- Caught in, under or between;
- Cut, punctures and scrapes;
- Exposure to noise, chemical, biological and vibration;
- Falls from height;
- Pressure releases; and
- Water related, drowning.

The 2012 statistics are based on 3,691 million workers' hours of data of which approximately 750 million hours relate to the companies and approximately 2,950 relate to contractors. The data covers activities in 107 countries.

1.3.4.1 Fatalities

The main indicator for fatalities is the Fatal Accident Rate (FAR), which is expressed as the number of company / contractor deaths per 100 million hours worked. The FAR for 2012 was 2.38%, which equates to a total of 88 deaths. A total of 12 fatalities occurred among Companies' employees and 76 fatalities occurred among Contractors' employees.

The largest proportion of fatalities (44%) was caused by explosions / burns. The second greatest contributors (18%) were accidents associated with entrapment or crushing (caught in, under or between). The third contributors (16%) were accidents where personnel were struck by moving or falling objects.

The activities that led to the most fatalities were associated with “maintenance, inspection and testing” with 41 fatalities, followed by “construction, commissioning and decommissioning” with 14 fatalities, “transport by air, land and sea” with 13 fatalities (two, nine and two fatalities respectively for air, land and sea transport) and “drilling, workover and well services” with 11 fatalities. It should be noted that the above statistics are skewed by the occurrence of a single incident where 31 fatalities occurred, during the maintenance of a gas pipeline in Mexico.

1.3.4.2 Accidents and Injuries

The main indicator for non-fatal accidents and injuries is the Lost Work Day Case (LWDC), which is expressed as the number of incidents resulting in at least one full day of work lost as a result of an accident or injury. This indicator does not take into account minor injuries and fatalities and does not describe the severity of the incident, which is expressed as the number of lost days per incident.

In 2012, OGP members reported a total of 1,699 LWDCs, which equates to 0.4 incidents per million workers’ hours. A total of 1,356 incidents were Contractor related and 343 were Company related.

The three main contributors to LWDCs were incidents associated with employees being struck by moving or falling objects (24%), caught in, under or between (20.7%) and slips and trips (15.6%).

The activities that mostly contributed to LWDCs were drilling, workover, well services (21.2%), maintenance, inspection and testing (16.9%), oil and gas production operations (12.4%) and other unspecified activities (12.4%).

1.3.4.3 Severity of the Incidents

The severity of each incident is expressed as the number of days lost for each incident. Not all OGP companies reported the total number of lost days associated with each incident and the database for this analysis is therefore reduced to a total of 2,876 million working hours or 78% of all reported hours.

Based on the reported data, in 2012 the average number of lost days per incident was approximately 40, which equates to 18 days per million working hours.

1.3.4.4 Nord Stream Pipeline

The Nord Stream pipeline is a project of similar size and characteristics to the South Stream Offshore Pipeline; construction activities were completed in 2012. The Nord Stream pipeline has therefore been considered a pertinent example to predict potential accidents and injuries that could occur during the Project and to enable South Stream Transport to develop adequate measures to prevent and minimise the occurrence of such incidents.

The injury rate during construction of the Nord Stream pipeline was lower than average compared with European standards in the industry. In addition, there were no work-related fatalities or permanently disabling injuries within the 23.5 million hours worked on the pipeline.

1.4 Discussion of Potential Injuries and Accidents Associated with the Project Activities

Throughout the Project construction process, the workforce, both on land and at sea, will be exposed to a number of different hazards and associated risks by nature of the construction and pre-commissioning activities that are needed to lay the pipelines for the Project.

If no risk controls or ineffective risk controls were implemented, injuries and fatalities could possibly occur during the construction process. Injuries could also occur during the inspection and maintenance activities to be carried out during operations.

For the purpose of this discussion, the OGP categories of causal factors (Ref. A.3) have been used and a summary explanation of each category is included below in Table 1.

Table 1 OGP Categories of Causal Factors

OGP Causal Factor	Description
Assault or violent act	Assaults or acts of violence against an individual in the workplace can cause pain, distress and even disability or death. Physical attacks are obviously dangerous but serious or persistent verbal abuse or threats can also damage employees' health through anxiety or stress. These categories of incidents are rare on project work sites but can happen at any stage during project execution.
Caught in, under or between	Caught-between incidents occur when a person is crushed, pinched, or caught between a moving object and a stationary object, or between two moving objects. These incidents can result in minor injuries such as bruises, cuts and scrapes to severe injuries such as amputated body parts, and even death. These categories of incidents can occur across all project worksites and are related to heavy lifts requiring manual handling during rigging, heavy plant manoeuvring and general maintenance tasks etc.
Confined Space	Dangers can arise in confined spaces because of lack of oxygen, poisonous gas, fume or vapour that either enter the space or build up due to the nature of work being performed i.e. welding, liquids or solids which suddenly fill the space, fire and explosion etc. This category of incident can occur on vessels requiring maintenance and inspections of tanks.
Cut, puncture, scrape	Some injuries can be classed as superficial and are nothing more than an abrasion or small puncture wound, whereas more severe injuries, cuts or punctures could require medical assistance and may result in LWDCs. These categories of incidents can occur across all project worksites as they are related to all tasks.

Continued...

OGP Causal Factor	Description
Explosions or burns	An explosion is a rapid increase in volume and release of energy in an extreme manner, usually with the generation of high temperatures and the release of gases that may result in personal injury, fatality or multiple fatalities. A burn is a type of injury to flesh or skin caused by heat, electricity, chemicals, friction, or radiation. Burns can be superficial or can penetrate into deeper tissues. This category of incident can occur in workshops, hot pass (welding cylinders) both onshore and offshore.
Exposure electrical	Exposure to electrical hazards will result in an electrical shock, which could have mild to fatal consequences. This category of incident can occur across all project worksites and at any phase of operations.
Exposure noise, chemical, biological, vibration	<p>Noise exposure can cause hearing loss and in some instances induce tinnitus (a condition that causes a permanent ringing sound in the ears). This category of incident can occur across all project worksites at any stage of operations.</p> <p>Chemical exposure through ingestion, inhalation or absorption through the skin could have health implications of varying magnitude depending on the quantities, exposure and entry point. This category of incident can occur across all project worksites and at any phase of operations although for the Project, no significant amounts of chemicals will be handled at any stage of the construction process or during operation and maintenance of the pipeline.</p> <p>Biological exposure is extremely unlikely on the Project and would be limited to exposure to medical waste that contained active pathogens. This category of incident can realistically only occur on pipe-laying vessels where medical waste would be handled by the crew of the vessel. Onshore personnel are unlikely to come into contact with medical waste.</p> <p>Vibrations may cause 'Hand Arm Vibration Syndrome' (HAVS) and 'Carpal Tunnel Syndrome' (CTS) and could be caused by repetitive handling of vibrating tools in workshops and as part of the welding process (preparation and cut outs using angle grinders).</p>
Falls from height	The severity of injury increases with the height of the fall, but also depends on body and surface features and the manner of body impacts on to the surface. The chance of surviving increases if landing on the surface of high deformity (a surface that bends, moves, or compresses), such as snow or water. This category of incident can occur across all project worksites at any stage of operations.

Continued...

OGP Causal Factor	Description
Overexertion, strain	<p>A strenuous effort related to physical work could affect workers involved in manual handling of materials and goods for long periods of time and could be accelerated by working in hot environments e.g. vessels engine rooms etc.</p> <p>A strain is an injury to a muscle or tendon in which the muscle fibres tear as a result of overstretching, a strain is also colloquially known as a pulled muscle. Prolonged straining of a muscle can lead to musculoskeletal disorders (MSDs) which can affect the body's muscles, joints, tendons, ligaments and nerves. Most work-related MSDs develop over time and are caused either by the work itself or by the employees' working environment. This category of incident is related to workers involved in manual handling of materials / goods or working in cramped spaces for long periods.</p>
Pressure release	<p>A sudden release of stored energy from a pipeline during testing, a pressurised gas canister or even a vessel mooring line breaking will result in objects, debris or pressured fluids being released at high velocity causing serious injury to anyone in the firing line of projectiles.</p>
Slips and trips (at same height)	<p>Slip and trips injuries are the most common in the workplace and the severity of the injuries varies, depending on the circumstances. An individual may suffer a slight shock from tripping over an object to a major injury or fatality if they trip or slip and land on a sharp instrument. This category of incident can occur across all project worksites and at any phase of operations.</p>
Struck by falling or moving objects	<p>Being struck by moving or falling objects can result in major and fatal injuries. The outcome will depend on the size, weight, height (dropped object) and velocity of the object and impact location on a person. This category of incident is related to activities in the marshalling yards, on-board vessels as well as road transportation incidents.</p>
Water related, drowning	<p>Falling overboard is one of the most dangerous and life-threatening things that can happen at sea. After a very short time in cold water the core temperature will dramatically drop (hypothermia), unconsciousness would follow rapidly resulting in a fatality. This category of incident is related to activities undertaken above, in and near water and is relevant to the offshore and nearshore construction activities of the Project.</p>

Complete.

1.4.1 Summary

Whereas all of the above categories of hazard can be conceivably experienced by Project personnel, statistics associated with worldwide oil and gas activities and with the Nord Stream pipeline indicate that the adoption of effective health and safety management systems can reduce the risk to negligible levels.

1.5 South Stream Transport HSSE-IMS

1.5.1 Overview

In order to effectively manage the OHS risks associated with the Project, ensure compliance with applicable OHS legislation and meet GIIP, South Stream Transport has developed a Health, Safety, Security and Environmental (HSSE) Policy and HSSE Integrated Management System (HSSE-IMS). This management system specifies how the above risks will be managed and monitored throughout the Project.

The principles of the HSSE-IMS are summarised below.

South Stream Transport's HSSE-IMS provides a robust framework for meeting the Project's HSSE objectives during the entire Project lifecycle. The HSSE-IMS is intended to apply to all phases of the Project including Construction and Pre-Commissioning, Commissioning and Operations and Decommissioning and applies to all Project personnel, including direct hire employees, advisors and consultants, contractors and sub-contractor personnel. The HSSE-IMS is designed to:

- Ensure high standards of management of HSSE issues;
- Provide a mechanism to ensure that contractors meet South Stream Transport HSSE performance requirements;
- Establish procedures to allow South Stream Transport to monitor its HSSE performance and to report such information to its stakeholders;
- Provide South Stream Transport with a mechanism to meet the commitments set out in its HSSE Policy; and
- Allow South Stream Transport to demonstrate to its stakeholders that it is committed to effective HSSE management through taking the requirements of the international standards ISO 14001:2004 and OHSAS 18001:2007 into consideration.

The HSSE-IMS applies to all aspects of Project activities, ranging from office work and transportation to construction activities. Implementation includes the completion of appropriate HSSE Plans, job safety analysis, activity risk assessments and method statements, HSSE information, training and instruction, as well as monitoring, inspection and audit.

Contractors are subject to a selection process to ensure they are competent and meet all relevant legal requirements, industry standards and South Stream Transport's minimum HSSE performance requirements prior to commencing any work on the Project. The selection process for the main work package contractors also includes an assessment against contract-specific HSSE performance requirements. Each contractor is required to demonstrate how they will ensure compliance with the Project HSSE-IMS through the development of its own management system and contract-specific HSSE Plans that address specific risks and hazards associated with its activities.

Whilst overall responsibility for the compliance of the Project with relevant OHS legal and other requirements rests with South Stream Transport, selected contractors are held responsible as a condition of contract for the compliance of their own activities, workers and any sub-contractors

with applicable Project OHS standards and the commitments made in their tender. These Project OHS standards include national laws, applicable international treaties and conventions, standards of international financial institutions and relevant requirements of the South Stream Transport HSSE-IMS.

In accordance with national health and safety related legislation and the South Stream Transport HSSE-IMS, every contractor will be required to undertake a systematic and structured risk assessment of all working activities prior to work commencing and to implement suitable controls to reduce the risk to workers to a level as low as reasonably practicable. The risk assessments will take account of the tasks to be undertaken, the techniques to be used, the environmental conditions and simultaneous operations in order to identify risk controls and safe working practices that achieve the risk mitigation targets stated in the HSSE-IMS, namely:

- No significant risks;
- Any residual risks must be tolerable according to recognized criteria; and
- Any residual risks must be As Low as Reasonably Practicable (ALARP).

These risk controls and safe working practices will be implemented and monitored as part of the contractor's HSSE Plans and will be evaluated and regularly monitored by South Stream Transport via the performance monitoring mechanisms within the HSSE-IMS described below.

Workers and sub-contractors must be provided with the means to ensure compliance such as information, instruction and training, work equipment and personal protective equipment (PPE). Training shall include identification of potential hazards to workers, particularly those that may be life-threatening, as well as training in preventative and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.

Whilst South Stream Transport is committed to ensuring that Project personnel are operating in a safe and healthy working environment and takes steps, along with its contractors, to prevent accidents, injuries and disease, it is cannot be totally excluded that an accident involving injury to a worker may occur on site or personnel may be affected by ill health. In accordance with South Stream's minimum requirements and the outcomes of the contract-specific risk assessment, appointed contractors are required to provide appropriate welfare facilities, first aid facilities and health assistance and ensure that trained personnel are present on site. Such provisions will be established at worksites prior to the start of construction.

Major injury will require qualified medical aid and onward transportation to a hospital with accident and emergency facilities. Accordingly, and in line with GIIP, South Stream Transport requests that the appointed contractors liaise with the local emergency services prior to work commencing on site, establish their own Emergency Response Plan and communicate key information to the Project workforce.

Although the exposure of personnel to safety hazards will decrease substantially during the Operational Phase of the Project, South Stream Transport will develop specific management plans and procedures for the Operational Phase of the Project, which will address all planned tasks and unplanned events associated with maintenance, inspection and emergency response.

Impacts during the Decommissioning Phase depend on the alternatives chosen at that time - preservation of the Pipeline or complete removal. If construction activities (excavation, removal or pipeline rehabilitation) are carried out or construction equipment used, then the associated OHS risks are expected to be similar to those in the Construction and Pre-Commissioning Phase. However, a new risk assessment will be conducted at the time of decommissioning to identify specific hazards associated with the selected decommissioning techniques and assess the associated risks.

1.5.2 OHS Monitoring

The majority of activities which need strict management of OHS, are in the area of responsibility of the appointed contractors. South Stream Transport's contractual agreements and South Stream's HSSE-IMS request the appointed contractors to monitor and manage the OHS performance of their activities. For its own activities, South Stream Transport applies the same principles:

- Determine and understand the level of OHS performance achieved by Project activities, within the context of policy requirements and industry benchmarks;
- Ensure implementation of a management system that controls OHS risks;
- Demonstrate compliance with legal and other requirements, to provide assurance to authorities and other stakeholders that their requirements are met; and
- Verify the results of risk assessments with respect to potential hazards, aspects and impacts, and that the necessary control measures are implemented.

These mechanisms include HSSE performance monitoring, contractor self-assessments, HSSE performance reporting and analysis, HSSE meetings and HSSE audits.

Monitoring of OHS performance includes:

- High risk equipment examinations and inspections;
- Marine vessel inspections;
- Site inspections and walkdowns; and
- Workplace monitoring and occupational health surveillance.

Contractors are required to develop, maintain and deliver their own HSSE self-assessments covering their contract-related activities, including high risk equipment examinations, inspections, site inspections and walk downs.

South Stream Transport will on a periodic basis conduct analysis and review of OHS performance, utilising incident and other statistics from internal and Contractor HSSE reports, and compare it against the recognised industry benchmarks and statistics discussed in Sections 1.2 and 1.3.

South Stream Transport will ensure that all direct employees and contracted workers have access to an internal South Stream Transport grievance procedure. Contractors will be required to ensure that all their workers have access to grievance procedure. In any cases where

contractors or subcontractors are not able to provide a grievance procedure, South Stream Transport will extend its own grievance procedure to serve workers engaged by any third party.

Also, as discussed in the Human Rights Due Diligence in **Chapter 14 Socio-Economics**, South Stream Transport will also monitor the supply chain with respect to a range of occupational health and safety issues, including the use of child or forced labour.

References

Number	Reference
Ref. A.1	Report on sanitary-epidemiological situation and consumer rights 2012 Krasnodarsli Krai Ministry of Health of Krasnodar Krai website.
Ref. A.2	Department of Labour. Information and Analytical Bulletin № 4 (55). Labour Protection in Krasnodar Krai. 2012
Ref. A.3	International Association of Oil & Gas Producers (OGP), Safety Performance Indicators – 2012 data, Report No. 2012s, June 2013.
Ref. A.4	US State Department Report. 2008. http://bit.ly/10XoNJ