Authorization and LNG Tank Truck Loading Manual

PX-OI-30-3
rev. 2.0

Świnoujście

Document characteristics, issues, distribution and revisions

Characteristics of the document

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REV.	DESCRIPTION OF CHANGES	AUTHOR	CHECKED BY	APPROVED BY	DATE
1.0	New operations manual – based on PE-OI-30-3-4-2 rev. 4.0	A.Sobierajski	M.Krysa	G.Błędowski	13.08.2021
2.0	Changing of technical data and numbering.	M.Bagiński	Michał Krysa	Grzegorz Błędowski	17.02.2022

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2022-02-17	Grzegorz Błędowski

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Chapter I: General provisions

This Operating Manual is supporting document to Terminal Code (TC). The following terms will have the following meanings and all capitalized terms are not otherwise defined in the Manual shall have the meaning given to them in the Terminal Manual

1 Terms used in the Operations Manual

1) **ADR** - The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), was done at Geneva on 30 September 1957 under the auspices of the United Nations Economic Commission for Europe, and it entered into force on 29 January 1968.
2) **BOG –** Boil-off gas.
3) **Business Day** – a day other than a public holiday within the meaning of the Act on Public Holidays.
4) **ESD** - Emergency Shutdown
5) **ERS** - Emergency Release System
6) **Loading Schedule** – a summary of information on the quantities of LNG planned for a given week to be reloaded into tank trucks or ISO containers, broken down into individual days, approved by the Operator, in accordance with the principles set forth in Chapter VIII clause 1.
7) **Operating Manual** – this Operating Manual for Additional Service of LNG loading on Tank trucks.
8) **Terminal Code** - the Terminal traffic and operation manual issued by the Operator serving as the Terminal Use Regulations by all Terminal Users.
9) **LCP** (Local Controll Panel) on the loading bay.
10) **Entity filling tank trucks with LNG** – within the meaning of ADR, an LNG Operator filling tank trucks with LNG.
11) **Operator** - Gaz-System S.A. or another energy company performing unloading, process storage and regasification of LNG responsible for operating the Terminal and providing the Additional Service.
12) **Loading Operator** – a natural person designated by the Operator to undertake specific actions to fill a tank truck with LNG (tank trucks and ISO containers).
13) **PLC -** Programmable Logic Controller
14) **Carrier** – a transport company providing LNG transport services at the request of a Terminal User.
15) **Loading bay** – a LNG loading bay including equipment and structures used for filling tank trucks with LNG.
16) **Terminal** – the LNG plant located in Świnoujście used for unloading and regasification of LNG, together with installations used for Process Storage, auxiliary installations and equipment used to provide Additional Services.
17) **Terminal User** - a natural or legal person, as well as an organizational unit without legal personality but having legal capacity which uses the Regasification

Services, or the Regasification and Additional Services based on the Regasification Agreement concluded with the Operator.

18) **Near miss** - an undesirable event which in unfavourable circumstances could cause a Breakdown and/or a Serious Industrial Breakdown.
19) **LNG tank truck trailer** - a combination vehicle adapted for road transport of LNG in tanks, including:
    - **Tank truck** - within the meaning of this manual it means a "**road tanker**" used in the ADR Agreement, meaning a vehicle designed for the carriage of LNG by road. In addition to the actual vehicle or chassis components used instead of the vehicle, a tank truck contains one or more tanks, together with their equipment and components connecting the tanks to the vehicle or the chassis.
    - **ISO container** – a transport device meeting the definition of a container, containing the tank and its equipment, including equipment to facilitate the movement of the trailer, designed for the carriage of LNG.

2 Objective of this Operations manual

The objective of this Operating manual is to specify the rules applicable to the delivery of the Additional Service according to the Terminal Code in the scope of organization and technical assistance during LNG loading into Tank trucks and ISO containers.

The Operating manual contains:

a) technical requirements for the handled LNG tank truck trailer,
b) rules on the approval of Tank trucks and ISO containers,
c) rules concerning the division of competences between the Operator, the Terminal User and the Carrier,
d) the rules for LNG loading documentation,
e) safety rules concerning the functioning of the LNG loading facility during normal operation and in emergency situations, and the rules applicable to the personnel concerning the safety of people, environment, installations and property of the Carrier during LNG loading.

3 Purpose of the Manual

This Manual is intended for the Operator's employees and co-workers who organize, perform and supervise works related to the performance of the LNG Tank Truck Loading, as well as for the personnel of Terminal User and the Carrier who organize and participate in LNG loading operation at the Terminal.

4 Legal basis

1) ADR – European Agreement concerning the international carriage of dangerous goods by road.

2) Act of 19 August 2011 on the carriage of dangerous goods. (Journal of Laws of 2020, item 154 as amended).
3) All other legislation regulating business activity related to filling tank truck trailers with LNG, trade, carriage, receipt of LNG.

Chapter II: Related internal regulations

1 Base documents

1) Terminal Code ;
2) PX-OI-30-1 Operating manual – Tank truck loading system;
3) PX-OI-30-2 Dangerous goods transport safety plan;

2 Output documents

1) PX-OI-30-1-F-1 Checklist for Driver and LNG tank truck/ ISO Container;
2) PX-OI-30-1-F-3 LNG filling report;
3) PX-OI-30-1-F-4 Weight bill;
4) PX-OI-30-1-F-5 LNG Quality Certificate - calculated based on the gas chromatograph by the laboratory staff;
5) PX-OI-30-3-Z-1 Working range of loading arms and flexible hoses ;

Chapter III: Description of tank trucks loading facilities

1 General description

A general plan with Loading Bays location is presented in Appendix No. 2 "Plan of Tank Truck Zone at the LNG Terminal".

The process LNG loading installation consists of three LA-3011-A/B/C Loading Bays which are used to transfer LNG from TK-2011 or TK-2012 storage tanks.
Each Loading Bay is equipped with an LNG loading arm and a BOG return arm for returning boil-off gas to BOG header.
The LA-3011-C loading bay is additionally equipped with flexible hoses mounted in skid , used for side loading.

The LNG is fed to the loading facility from a header supplied by low-pressure LNG pumps submerged in the LNG storage tanks.

Boil-off gas (BOG) discharged from the LNG tank truck through the BOG return arms or the BOG return flexible hose is directed by a manifold to the BOG handling system.

Each Loading Bay is equipped with a shut-off valve and LNG flow control valve. The BOG return lines are equipped with a shut-off valve and pressure control valve in the boil-off gas return header. All valves are controlled by a local PLC.

NOTE: It is possible to carry out loading simultaneously at two Loading Bays.

2 Design and operation data of the Loading Bays

The following table shows the design and operating data of the Loading Bays:

a) Loading with loading arms – only rear loading:

Designation label of the device		**A / B**	
Description		**LNG loading arm**	**BOG loading arm**
Product handled		LNG	BOG
Pressure	**Working (operating)**	8.4 [barg]	3.0 [barg]
	Design	18.9 barg	18.9 [barg]
Temperature	**Working**	from -162 to -150 [°C]	from -140 to -70 [°C]
	Design	-170/65 [°C]	-170/65 [°C]
Maximum volumetric flow rate [vol.]		90 [m3/h]	440 [m3/h]

b) Loading with flexible hoses – both rear and side loading:

Designation label of the device		C	
Description		LNG flexible hose	BOG flexible hose
Product handled		LNG	BOG
Pressure	Working (operating)	8.4 [barg]	6.0 [barg]
	Design	18.9 barg	18.9 [barg]
Temperature	Working	from -162,2 to -150 [°C]	from -140 to -70 [°C]
	Design	-170/40 [°C]	-170/40 [°C]
Maximum volumetric flow rate [vol.]		90 [m3/h]	440 [m3/h]

Each Loading Bay is equipped with a weighbridge (A-3051-A/B/C) enabling measurement of loaded LNG quantity for settlement purposes. Maximum load capacity of each weighbridge is 60 tons.

3 Process control

Each LNG loading bay is equipped with a programmable logic controller (PLC), controlling the LNG and BOG shut-off valves and the flow control valve on the LNG line.
After placing the vehicle on the weighbridge and connecting the grounding conductor, the PLC (according to the programmed logic) opens the shut-off valve on the BOG line.

After configuration of the installation i.e., after connecting the arms/flexible hoses to the LNG tank truck, confirmation of all signals and data allowing to start the loading procedure, the PLC opens the LNG line shut-off valve. Then, after selecting the loading mode on the local panel, it opens the LNG flow control valve in order to start loading at a pre-set flow rate.

Automatic LNG loading process consists of initial stage with the low flow rate, a flow increase stage, LNG loading stage at a constant high flow rate (approx. 600 kg/min), followed by a flow rate reduction and stopping at a low flow rate. After a certain volume of LNG is loaded, the controller sends a signal to the shut-off valves to close. The final stage consists of checking the weight of the vehicle on the weighbridge and sending the data to the iSupervisor master system.

4 Measuring equipment applied:

4.1 Weighbridge

Measurement of the weight of LNG loaded in the Terminal is performed using non-automatic Precia Molen XDs10 truck scales.
The device meets the legal requirements for metrological control of measuring instruments and has authorisation certificates issued by the District Office of Measures.

Metrological properties of Weighbridge

- Maximum load: Max = 60 000 [kg]
- Minimum load: Min = 400 [kg]
- Value of the verification scales interval: e = 20 [kg]
- Scale interval value: d = 20 [kg]
- Accuracy class: III

4.2 Gas Chromatograph

For assessment of quality and composition of the LNG, Yokogawa GC 8000 Process Gas Chromatograph GC 8000 located on the tank truck loading facility is used in the Terminal. The device has valid Certificate of Compliance and is calibrated at appropriate frequency by District Office of Measures.

Metrological properties:

- Scope of natural gas analysis: $C_1 - C_{6+}, N_2, CO_2$
- Sampling lines compliant with PN-EN-ISO 8943:2012 standard,
- Capacity to analyse up to 999 components of the analysed gas,
- Minimum flow of purging gas: 4400 [l/h],
- Minimum purging time: 21 [min],
- Type of purge gas: Air,
- Minimum overpressure: 1,5 [mbar]
- Maximum overpressure: 15 [mbar]
- Sampling pressure: 2 - 6 [bar],
- Sample temperature range: 5 - 40 [˚C],

Chapter IV: Technical requirements for LNG tank trucks

1. General requirements for LNG tank trucks

The Terminal User shall ensure that the Carrier, the Driver and the tank truck used for LNG transport at the request of the Terminal User, meet all safety requirements under applicable law, including ADR, with respect to the transport of dangerous goods such as LNG.

1) The Terminal User shall ensure in particular that:
   a) The LNG tank truck trailer has the required documentation, including that required under ADR,
   b) The LNG tank truck trailer has no defects or missing equipment, including those which might compromise safety,
   c) After finished the LNG loading, there is no leak or spillage from the LNG tank truck trailer,
   d) The LNG tank truck trailer has valid Certificate of Fitness,
   e) The required warning marking and stickers, including those required under ADR regulations, are placed on the LNG tank truck trailer,
   f) LNG tank truck trailer and its equipment has been properly maintained in a manner which guarantees that under normal conditions of use the LNG tank truck trailer shall meet the ADR requirements until the next test,
   g) additional checks of the LNG tank truck trailer have been carried out in case there is a suspicion that the safety of the Tank truck or its equipment has been compromised as a result of repair, changes made or an accident.
2) The LNG tank truck which arrived for filling the LNG will be cooled to the temperature suitable for filling the LNG, and the atmosphere inside will contain the LNG vapour. The content of oxygen and other substances that may pose a threat to the loading and transport of LNG is unacceptable.
3) The LNG tank truck must be equipped with a diesel (B) or Dual Fuel Compression-ignition engine fuelled with diesel (B) or natural gas (CNG, LNG).
4) Entry to the Loading Bay of the LNG tank truck trailer with a tractor equipped with a spark ignition engine fuelled with natural gas (CNG, LNG) or petrol (E) is permitted provided that individual arrangements are made, a risk analysis is performed and a dedicated loading procedure is developed.
   Loading LNG into a tank truck trailer with a tractor equipped with a spark ignition engine fuelled with liquefied petroleum gas (LPG) is not allowed.
5) The pressure in the LNG tank truck trailer provided for LNG filling should be max. **3.0 barg**. In the case of higher pressure, the Operator will reduce the pressure to the required level before the loading starts, and the Carrier/representative of the Terminal

User shall accept any losses he may incur as a result of this operation. Exceeding the above-mentioned pressure may cause delays in loading.

6) The Terminal User shall bear all risks and responsibility for non-compliance with safety requirements of the tank truck trailer provided for LNG loading, and the Operator may refuse to load LNG if the above requirements are not observed.

2. Connections of arms and hoses to tank truck nozzles

	Fitting on loading arms/hoses	Fitted on LNG tank
LNG	DN 50 Tr81 x 8LH (DIN103)	DN 50 Tr 80 x 8 LH
BOG	DN40 Tr70 x 8LH (DIN103)	DN40 Tr 69 x 8 LH

It is required that the connection installation of the LNG tank truck trailer be equipped with fittings or adapters according to the table above.
Additionally LNG Truck should be equipped with compatible tools to connect/disconnect or seal them.
Tank truck and ISO container with Pressure Safety Valves setpoint below **6,0** barg can't be approved for loading.

3. Working range of loading arms and flexible hoses (LNG, BOG)

The Terminal is equipped with an LNG handling installation enabling the filling of Tanks provided with rear connection for loading and unloading equipment. Additionally, one of the Loading Bays is equipped for LNG loading via flexible hoses connected to the side of the tank.
The working range of loading arms, flexible hoses and the position of the Tank truck's fittings for connecting the LNG and BOG arms and hoses are presented in the drawing in the attachment PX-OI-30-3-Z-1.

4. LNG tank truck trailer approval procedure

Before the first LNG loading, each LNG tank truck trailer must undergo a two-stage approval procedure performed by the Operator. In the first stage it consists in verification of technical parameters and required documentation, compliance with the requirements of the LNG Terminal and applicable regulations, and in the second stage it covers actual loading at the Loading Bay and assessment of the procedure.

4.1 Approval Application

The Terminal User applies for the LNG tank truck trailer approval using a template published on the Operator's website.

Pre-approval procedure begins after the Terminal User has submitted a package of required documents.

The application should contain:

- dimensions of the LNG tank truck trailer (tractor and tank /ISO container (length, width, height)*,
- location of flanges/nozzles/connections (distance from the side of the trailer, height over the ground),
- photos of connections including installation, nameplate,
- technical data, e.g., medium, volume, pressure and temperatures allowed, settings of safety devices (safety valves),
- P&ID (Piping & Instrumentation Diagram) of the tank including fittings,
- valid ADR documents/certificates of the LNG Transport Wheel Set in Polish or English,

  NOTE:

  If the ISO-container is transported on the semi-itrailer, the Terminal requires valid ADR documents / certificate for the semitrailer.

  It is because of possibility of changing Container-trailer under ISO-containers.
- Coupling types located in valve chest,

4.2 Preliminary approval – Stage I

Within three (3) Business Days from the receipt of the full set of required documents, the Operator shall assess the conformity of the LNG Tank truck trailer and inform the Terminal User about the results of the approval process carried out and whether the first loading of LNG is permitted.
In case of refusal to grant preliminary approval, the Operator shall indicate the reason for refusal.

Based on the assessment of documents, the Operator shall issue an approval letter for the given LNG Tank truck trailer in the form of a certificate.

4.3 Final approval – Stage II

The final approval of the LNG Tank truck trailer is carried out by the Operator during the first loading of LNG at the Loading Bay.
In order to obtain full approval, the LNG Tank truck trailer should:

- be equipped with connection fittings compliant with the standard in force at the Terminal (according to chapter IV, point 2). **LNG**: DN50 TR 80x8-LH **BOG**: DN40 TR 69x8-LH)

- be equipped with an installation designed to allow effective loading, drainage and purging the arms / flexible hoses.

The Terminal User is obliged to inform the Operator about the first loading of the LNG Tank truck trailer granted preliminarily approval by placing appropriate information in the agreed LNG loading schedules.
Based on the first loading, if necessary, the Operator shall specify additional approval conditions.

If special conditions occur or if the Operator refuses to grant the final approval, the Operator shall indicate the reason and inform the Terminal User about this fact.

4.4 Validity of approval

The validity of approval granted by the Operator is not time limited.

The Operator shall revoke the approval of the LNG Tank truck trailer if it occurs that:

a) the LNG Tank truck trailer or its equipment (including process installations) lost its technical compatibility with the Terminal facilities,

b) technological changes have been made which affect safety, change the filling technology or extend the filling time,

c) the documentation required by law has become invalid,

The Terminal User is obliged to inform the Operator in writing or by e-mail about any modernization carried out in previously authorized LNG Tank truck trailer.
All changes and modifications must be supported by valid documents confirming the approval of the LNG Tank truck trailer for normal operation.
Based on the information received, the Operator shall have the right to subject the previously approved LNG Tank truck trailer to technical inspection at the Terminal, reverification of the documentation and re-approval procedure.

Chapter V: Safety

The LNG terminal is a plant classified as Upper Tier Establishment (UTE). Safety rules in accordance with the UTE regulations and internal regulations of the Terminal apply all over the Terminal area. The Carrier, the Driver and the Tank truck carrying out the cargo of LNG on behalf of the Terminal User must meet all safety requirements imposed by law, including ADR, with respect to the transport of dangerous goods such as LNG.

1. Hazard connected with the technological process.

Source of hazard	Place of occurrence	Potential effects	Hazard effects mitigation
LNG leakage (pressure, low temperature)	LNG loading arms / flexible hose , headers and LNG pipelines	Fire, explosion, frostbite, severe skin and internal injuries, burns, death.	Periodic technical inspections and preventive maintenance of the process plant, flame-retardant anti-electrostatic clothing tightly fastened, personal protective equipment, training, gas detectors,
BOG leakage (pressure, low temperature)	BOG return header BOG return arm / flexible hose	Fire, explosion, severe skin and internal injuries, burns, death.	Cyclical technical inspections, protective clothing, personal protective equipment, training, gas detectors,
Electric current	Electric networks, loading arm/hose electrical panels and auxiliary systems	Electric shock, severe injury, burns, death.	Limited access to electrical equipment, warning signs, protective clothing, personal protective equipment,
Equipment manoeuvring	Loading arms / flexible hoses	Injuries, fractures, severe injuries	Personal protective equipment, training, Following instructions and procedures,
LNG leakage from the Tank truck	Tank truck on the weighbridge (valves chest with fittings)	Fire, explosion, Thermal radiation, severe injury, burns, death. Fire, explosion, severe skin and internal injuries, burns, death.	Visual controls and overviews of loading fittings before starting procedure. Protective clothing, personal protective equipment, training, gas detectors,

2. Hazards arising from exposure to physical and chemical agents

Physical factors			
Hazard	**Source of hazard, injury factor**	**Probable effect**	**Hazard effects mitigation**
Stumbling and falling on flat surface or at different levels	Moving along passageways, rough surface, platforms, differences in levels	Fractures, contusions, sprained joints,	Increased concentration of attention while moving. Moving along designated passageways, paying attention to safety signs. Use of B3 class boots, above ankle.
Contact with electric current	Poor condition of cables and equipment, flooding, mechanical damage to the electrical system.	Electric shock, skin burns, death.	Safe organization of work on electrical equipment. Inspections of the electrical installation at the facility in terms of insulation resistance and protective bonding efficiency test in accordance with applicable regulations, proper operation of equipment. Protection against electric shock,
Sudden leakage of the system (leakage of high-pressure medium).	Systems and tanks under pressure.	Bruises, dislocations, fractures, Multiple organ internal and skin injuries	Use of personal protective equipment. Following instructions and procedures. Hermetisation of technological process, Gas detection systems. Portable gas detectors. Taking a safe position while performing work. Focused attention while performing work activities.
Flammable and explosive substances and mixtures	Leakage of the LNG installation - filling the space with natural gas in 5-15 % concentration mixed with air and ignition. Explosion or fire of natural gas	Possibility of surface or radial fire and explosion of a vapour-air mixture. Multiple organ bodily injuries, bruises, fractures, death.	Use of personal protective equipment; Machine and structure the grounding conductor system, Ex rated equipment, Methane detection system combined with acoustic-optical warning system; portable gas detectors. Performing timely inspections and maintenance in

			accordance with operating manual. Maintaining technical standards. Increased attention during work activities.
Fire in electrical equipment	Defective electrical installation, incorrect operation of electrical equipment, machines. Defective lightning or grounding system. Lack of electrostatic protection.	Burns, ~~poisoning~~, asphyxiation with fumes, death.	Visual inspection of equipment before starting up (in terms of its working order). Periodic inspections of electrical and lightning protection systems and grounding in accordance with applicable regulations, proper operation and maintenance of equipment. Smoke detectors, sprinkler installation. Handheld fire and extinguishing equipment on the LNG Terminal site and on the tank truck. Knowledge of Fire Safety Instructions. Compliance with the provisions contained in procedures, instructions, orders. Compliance with safety rules, maintaining order on the site and in the workplace. Increased attention while performing work activities.
Transport / traffic accident, (hitting or crushing by moving vehicles)	Movement of vehicles, pedestrian traffic. Arriving at and departing from the workplace.	Multiple organ internal and external injuries	Compliance with traffic regulations and internal arrangements on the movement of vehicles and persons around the Terminal. Psychological examinations and certifying of Drivers. Light and sound signals installed in vehicles. Technical tests of vehicles, TDT/UDT approvals, efficient vehicle safety systems. Ensuring current and periodic technical inspections and

			proper maintenance of machines, devices and vehicles. Increased attention while driving or walking on the Terminal grounds. Using warning vest or clothes made in correct visibility class.
Contact with sharp, rough surfaces, hitting against stationary objects - mechanical injuries,	Objects, structures, process lines, working in a limited space, moving around confined area.	Cuts, bruises, abrasions, bruises and bumps, injuries.	Use of personal protective equipment (gloves protecting against mechanical factors). Safety marking. Safe arrangement of equipment. Maintaining order in the workplace. Ensuring free and safe passage and access. Increased attention to work activities and while moving around.
Contact with cold components or process medium.	Process installation with LNG. Performing operational activities related to connecting the loading arms/hoses during tank truck loading. Accidental contact with icing on the process installation.	Cryogenic injuries to the skin, eyes, mucous membranes, respiratory tract, hypothermia.	Use of personal protective equipment. Using individual multi-gas detectors. Safe operation of equipment and process fittings and Tank trucks or ISO containers. Use of insulation on cryogenic installation. Safety markings. Increased attention during work activities.
Chemical factors			
Utilities: LNG, BOG.	Emergency incidents, leaks of substances from installations, tank trucks or ISO containers and spills of substances in emergency situations: spills, loss of integrity, leakage, explosion, fire, toxic irritating combustion and	Explosion, fire (LNG, BOG), cryogenic burns, external and internal burns, asphyxiation with fumes, death.	Hermetization of the technological process. Operation, maintenance of process equipment, according to O&MM, Procedures, operating manuals and safety rules. Safety marking, according to safety data sheets for substances and mixtures which may pose some hazard. Gas detection systems. Portable gas detectors. Use of personal

	thermal decomposition products.		protective equipment, in accordance with the Safety Data Sheets for dangerous mixtures that could pose a risk. Spillage tank. Safe position while working. Increased attention when performing work activities. Knowledge of safety data sheets and mixtures that could pose a risk.
Hydraulic oil.	Emergency incident, leakage, loss of integrity, fire, toxic irritant products of combustion and thermal decomposition.	Skin irritation, eye irritation, allergies, vapour poisoning, death.	Hermetisation of technological process. Operation, maintenance of process equipment, according to O&MM, Procedures and operating manuals and safety rules. Safety marking, according to safety data sheets for substances and mixtures which may pose a risk. Use of personal protective equipment, in accordance with safety data sheets for hazardous substances and mixtures that may pose a risk. Safe position during work. Increased attention when carrying out work activities. Knowledge of safety data sheets for substances and mixtures that could pose a risk.
Diesel Oil	Emergency incident, leaks, tank's loss of integrity. Fire, toxic irritating combustion and thermal decomposition products.	Fire, explosion, vapour poisoning, internal and external burns, death	Hermetisation of technological process. Operation, maintenance of process equipment according to O&MM, Procedures and operating manuals and safety rules. Safety marking, according to safety data sheets for substances and mixtures which may pose a risk. Use of personal protective

			equipment, in accordance with safety data sheets for hazardous substances and mixtures that may pose a risk. Taking a safe position during work. Increased attention when carrying out work activities. Knowledge of safety data sheets for substances and mixtures that could pose a risk.

3. Principles of safety organisation of work

During the works related to loading LNG in Tank trucks / ISO-containers, it is necessary to observe the requirements concerning occupational health & safety and fire safety rules specified in separate regulations, operating manuals and in accordance with the following conditions:

3.1 Actions before starting the work

a) after parking and securing the Tank truck in the designated parking lot, the Driver shall arrive at the main gate and collect a pass authorising the entry to the Terminal,

b) each person entering the Terminal area is obliged to participate in an induction health and safety training, which takes place in the Health and Safety Coordination Room (unless he/she has attended such a training before and he/she holds a valid training certificate). Participation in the training is confirmed by a certificate of completion of an induction training in occupational health and safety issued by Occupational Health and Safety Department.

NOTE!

Induction training in occupational health and safety is valid for 3 years from its completion. However, if a person has not been present at the Terminal for a period over one year, the training should be repeated.

c) The tank truck entering the Terminal area must be in working order.

d) The portable fire-fighting equipment fitted to the Tank truck shall be in working order and have valid MOT certificate (technical inspection).

e) The Driver shall hold valid ADR qualifications.

f) The Driver must be familiar with the contents of the manuals with emphasis on the risks and safe working methods.

g) The Driver shall be equipped with working boots with hard toe cap and an anti-slip sole, anti-electrostatic flame-retardant clothing, protective helmet, safety goggles, protective visor, anti-electrostatic fitter's gloves and cryogenic gloves, and any other garment suitable to the hazards that may occur during the work,

h) After completing all formalities and receiving permission to enter the Terminal from the Loading Operator who administers the loading process, the Driver enters the tank truck loading zone,

i) After receiving a consent from the Loading Operator who administers the loading of the tank trucks, the Driver enters the loading bay indicated by the Loading Operator, taking all required precautions.

j) The Driver, when the vehicle is stopped, pulls up the handbrake and places the chocks under the wheels of the Tank truck,

k) The Driver shall check that the tank truck has been properly secured at the loading bay.

3.2 Activities during performing the work:

a) carry out continuous measurements of atmosphere parameters at the workplace,

b) use footwear, protective clothing and personal protective equipment appropriate to the risks likely to occur during the work.

NOTE!!

- Use protective footwear when performing the work.
- During work, and especially in potentially explosive atmospheres, working/protective clothing must be fully buckled.
- When working with detachable connections, where there is a risk of medium leakage, a protective visor should be used.

c) The Driver should carry out his activities according to the rules described in the Operating Manual with emphasis on compliance with the rules and regulations of occupational health and safety, fire safety regulations and environmental protection,

d) Stay focused on the safe performance of all work activities in the loading zone and during moving around.

e) Maintain constant communication and coordination with the Loading Operators.

f) Immediately report to the Loading Operators any disturbances, malfunctions in the operation of the process installation and the Tank trucks or ISO containers being loaded and act to their instructions in accordance with all safety rules.

g) If the Driver must leave the workplace, this fact must be reported to the Loading Operator in advance.

3.3 Post-work activities:

a) The Driver should check that the shut-off valves are properly closed when the operations at the workstation is completed. Keep the place in order and tidy, i.e., take tools away, inspect the place where the work has been performed and the adjacent areas for potential hazards and fire sources (if any irregularities are found, immediately notify the Loading Operator thereof and follow his instructions).

b) Upon the consent of the Loading Operator, the Driver removes the chocks from under the wheels of the tank truck, collects the loading documents and leaves the loading bay.

c) When leaving the loading bay, the Driver shall observe all precautionary rules in order to leave the Terminal area safely.

3.4 Prohibited activities

Description	Pictogram
Performing work in breach of this manual and violating the principles of health and safety at work and fire safety is strictly prohibited	
Use of vehicles not approved for use in explosion hazard zones is strictly prohibited	
Smoking prohibited.	
Use of open fire is prohibited.	
Use of mobile phones not intended for use in explosion hazard zones (Ex) is strictly prohibited	
Blocking the firefighting access routes is strictly prohibited	
Access of unauthorised persons is prohibited	
Exceeding the speed limit 20 [$\frac{km}{h}$] on the premises of the LNG terminal is prohibited.	

Description	Pictogram
Exceeding the speed limit 5 [km/h] in the loading area by tank truck and ISO-containers is prohibited.	
Opening pressure relief valves in the Tank truck before entry to the Terminal is strictly prohibited	-
Changing the scope of work and place specified in the documentation of the work without the consent of the Loading Operator is prohibited.	-
Changing the position of actuators, apparatus and cut-off valves used to prepare the workplace, removing fences, shields, barriers, warning signs, if this does not result from the technology of performing the work, without the consent of the person responsible for the loading operation is prohibited.	-

3.5 Procedures in case of emergency, accident, fire of breakdown

Workers should be trained before being allowed to perform the work and know the regulations regarding:

- dealing with dangerous situations or accidents at work.
- performing firefighting response action according to the Fire Safety Instructions,

3.6 Occurred emergency situations

If an emergency (dangerous incident, near miss) occurs, follow the instructions in the Procedure for reporting and analysing hazardous situations in LNG Terminal .

3.7 Accident at work

In case of an accident at work, follow the provisions of the Procedure for determining the circumstances and causes of accidents, particularly the Instructions on First Aid in LNG Terminal.

3.8 Fire

In case of fire, follow the provisions of the Fire Safety Instructions.

3.9 Failure removable according to the operating manuals

If the failure in question is described in this approved operating manual, follow the steps described therein.

4. Personal Protection Equipment

Personal Protection Equipment	Pictogram
Protective helmet.	
Working gloves (summer, winter) or cryogenic gloves during activities posing high risk of exposure to LNG, BOG.	
Footwear/ (it is required to use protective footwear in the process area).	
Workwear/ anti-static protection against fire (winter, summer) is recommended to be worn fully buckled during work.	
Protective goggles always used while in the process area of the Terminal. It is recommended to use safety glasses on top of prescription glasses if necessary.	
Protective visor (used when connecting and disconnecting the LNG tank truck trailer and when remaining in the loading arms'/hoses' operating envelope).	
Portable gas detector with valid calibration.	
Cryogenic personal protective equipment for work with high risk of exposure to LNG, BOG	

5. Basic requirements for personal protective equipment

Description	Pictogram
Flame protective clothing.	
Anti-static protective clothing.	
Working/Protective gloves.	
High visibility clothing The X character indicates a category (1-3), with category 3 representing the highest level of visibility.	

6. First aid measures

First aid measures	Pictogram
First aid kit as part of tractor equipment and in the Loading Operators' welfare cabin.	
AED (automatic external defibrillator) in the Loading Operators' welfare cabin.	

7. Additional requirements

Description	Pictogram
Before starting work, read this manual, the hazards at the workplace, equipment manuals and safety data sheets for relevant hazardous substances and mixtures.	

Description	Pictogram
Tools for work in an explosive atmosphere should be approved for use in an explosive atmosphere and have ATEX certification.	
Any emergency incident, emergency or accident shall be immediately reported to the Loading Operator.	
The Driver should pay attention to and comply with all safety fences and horizontal and vertical signs and markings.	

8. Graphical identification of hazards

Description of the hazard	Pictogram
Cryogenic fluid leakage.	
Cryogenic liquid vapour persistence (at temperature -110 °C vapours are heavier than air).	
Presence of an explosive atmosphere.	
Ignition	
Physical explosion, BLEVE	
Leakage from the process installation.	
Sudden leakage. High-pressure medium.	
Fire.	

Description of the hazard	Pictogram
Electric shock.	
Cuts.	
Falling at the same level and at a different level.	
Zone 1 is an area in which an explosive atmosphere is likely to occur occasionally in normal operation. It may exist because of repair, maintenance operations, or leakage. In the loading arm connection area with tank truck fittings at the time of disconnection, and in emergency at emergency release system (ERS), at the time of activation and in emergency in the areas of the LNG spill collection channels at the loading facility and in the area of the LNG spill containment tank (A-3031).	
Zone 2 is a place in which an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only. These areas only become hazardous in case of an accident or some unusual operating condition. In the entire area of LNG loading installations.	

Chapter VI: Responsibility in the transport of LNG

1. Ensuring safety of LNG carriage

The Terminal has developed a **Safety Plan for the carriage of high-risk goods (LNG)**, which concerns the operations related to LNG loading in the tank trucks.

a) The purpose of the implementation of the Safety Plan is to satisfy the legal requirements arising from the European Agreement concerning the international carriage of LNG by road. The safety plan shall describe the organisational safety measures, as well as define the competences and requirements for the personnel performing work in the tank truck / ISO-containers handling and filling supervision zone, to ensure the safety of LNG carriage and tank filling operations.

b) The Safety Plan does not cover the process of LNG carriage to the consignee which is performed by the Carrier transporting LNG on behalf of the Consignor (Terminal User). In this respect, it is the responsibility of the Terminal User to ensure the Safety Plan for the carriage of high-risk goods (LNG) according to ADR requirements.

c) The Safety Plan for the of the carriage of high-risk goods concerns all persons organizing, participating in and supervising the works related to the filling of the LNG tank truck trailers at the Terminal with respect to the process implementation and employees of the Company Security Dept of Gaz-System S.A. with respect to ensuring physical security of loading operations.

2. Administrative duties related with documentation of LNG carriage according to ADR

1) Operator

An entity in charge of LNG filling (in accordance with ADR) by the order of the Terminal User. Responsible for safe filling of the Tank truck and preparation of the documentation on the filling of the so-called "Tank truck filling report" which includes:

a) Name and address of the LNG Filler (Operator),
b) Name and address of the person ordering LNG loading (Terminal User),
c) Name and address of the LNG owner at the time of handing over the filled Tank truck to the Carrier,
d) Name of the Carrier,
e) Name and address of the LNG recipient
f) Vehicle marking – LNG Tank truck,
g) Name, address of the Carrier and full name of the Driver,
h) Tractor and Tank truck registration number,
i) Name, designation and characteristics of the dangerous goods (LNG) according to ADR,
j) The quantity and quality of the loaded LNG and the gross weight of the LNG tank truck (laden).

k) In case of caring cargo by ISO-container, "Holding Time" in a loading report is required.

2) Terminal User

Is the sender / shipper (according to ADR), obliged to observe the legal regulations in the LNG trade and ensuring safety in the carriage and receipt of LNG at the place of unloading, and for drawing up transport documentation including the International Consignment Note (CMR).

Chapter VII: Qualifications of persons involved in loading of LNG tank trucks

1. Qualification to operate the filling equipment

The staff operating the LNG filling facilities should have qualifications confirmed by TDT (Transport Technical Supervision) to operate facilities for filling and emptying the transport tanks for hazardous materials class 2 according to ADR.

2. Training of persons for technical handling of LNG loading

A Carrier or a representative of the Terminal User is granted authorisation to load LNG at the Terminal after they have obtained a qualification according to item 1 above, and after they have completed the required internal training in the OHSE rules applicable at the LNG Terminal.

3. Minimum requirements for Drivers of tank trucks / ISO containers

- The Driver should be able to communicate in Polish or English,
- The Driver should have knowledge of the safe and efficient operation of the LNG tank truck trailer process installation. Otherwise, the Operator has the right to refuse or interrupt the loading process.
- To enter the Terminal premises, the Driver should hold a valid training certificate in the safety rules in force at the Terminal.

The training in safety rules in force at the Terminal is conducted by the Operator's representative. The training includes in particular :

- types and description of hazards occurring in the LNG filling zone,
- traffic rules and evacuation,
- indicate assembly points ,
- minimum personal protective equipment requirements.

The training is valid for three years, provided that the Driver is present at the Terminal at least once a year.

Chapter VIII: LNG loading schedules, Tank truck notice of arrival

The rules of applying for the authorisation and LNG Tank Truck Loading are described in the Terminal Code.

1. Loading Schedule

1) The Terminal User shall submit the Loading Schedule to the Operator by 10:00 a.m. every Thursday in the week preceding the one to which the information pertains, unless the Operator and the Terminal User agree otherwise.

2) The Operator provides information about the approval of Loading Schedule by Friday by 10:00 a.m.

3) The Terminal Operator and the Terminal User may agree to make changes to the approved Loading Schedule.

4) The Loading Schedule should contain information necessary for the Operator (the Filler) to issue a filling report and safe organization of loading, i.e.:

   a) Date and time of loading,

   b) The desired quantity of LNG to be loaded in [t],

   c) Name of the LNG owner at the time of handing over the laden Tank truck to the Carrier,

   d) Name of the Carrier,

   e) Driver's details (full name),

   f) Recipient's data (name, full address),

   g) Additional comments, including but not limited to:

      - information about the tank truck granted preliminary approval - first loading,
      - required health and safety training for Drivers,
      - loading method (the rare or the side of the tank),
      - type of vehicle (Tank truck/ISO container),
      - information on updating the Loading Schedule (marked in red color compared to the previous version),
      - Driver replacement,
      - other information necessary for the efficient and trouble-free loading process.

2. Rules for planning the number of tanks / ISO containers in the Loading Schedule,

The maximum numbers of loading possibility to release during day, results from operational-technical ability which is 30 Tank truck loadings with rear filling or 20 Tank truck loadings with side filling, according to below rules:

a) In case of Tank trucks with rear filling (Loading bay A,B,C):
20 loadings per day shift (07 a.m – 07 p.m.),
10 loadings per night shift (07 p.m – 07 a.m.),

b) In case of Tank trucks with side filling (Loading bay C):
10 loadings per day shift (07 a.m. – 07 p.m.),
10 loadings per night shift (07 p.m. – 07 a.m.),

c) In case of loadings both types of LNG tank truck trailers, rear and side filling, (Loading bay A, B + C), above data are appropriately corrected, e.g. : 10 side filling Tank trucks per day shift gives possibility to load10 Tank trucks with rear loading. Similar during night shift.
For example:

- Day shift

Amount – side filling Trucks	Amount – rear filling Trucks
1	19
2	18
3	17
4	16
5	15
6	14
7	13
8	12
9	11
10	10

- Night shift

Amount – side filling Trucks	Amount – rear filling Trucks
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
10	0

It is possible to load maximum at two loading bays at the same – refers to rear filling Trucks. It is impossible to load simultaneously two side loadings.

Planning of the loadings in the schedule takes place from 07:30 a.m. to 05:30 p.m. for the day shift, and from 07:30p.m. to 05:30 am for the night shift.

NOTE: If the Driver / representative of the Terminal User reports to the Operator that on a given day the Driver will not arrive at the time specified in the Loading Schedule, he will be served in the next free loading window.

3. Loading Schedule updates

The Loading Schedule should be updated by the Terminal User each time when:

a) the number of loading operations on a given day has been changed,
b) the date and/or time of loading has been changed,
c) the volume of LNG to be loaded on the Tank truck has been changed,
d) LNG owner at the time of handover of the laden Tank truck has been changed,
e) the Carrier has been changed,
f) the Driver has been changed (replaced),
g) the cargo recipient has been changed (together with address).

Any updates to the Loading Schedule should be visibly marked, e.g. a different font colour and described in the Comments column.

Updated Loading Schedule shall be sent to the Operator to the addresses indicated below:

a) kierownik.zmiany@gaz-system.pl
b) zaladunek.lng@gaz-system.pl

and to other persons as indicated by the Terminal User and the Operator.

The Operator provides feedback on acceptance or rejection of the updated Loading Schedule at the earliest opportunity. Updates to the weekly Loading Schedule shall be approved by the Shift Manager.

4. Correspondence concerning the approval of Loading Schedules

Correspondence to the Operator concerning the weekly Loading Schedule shall be sent to the following e-mail address:

a) michal.krysa@gaz-system.pl , mobile: +48 795 515 659
b) adrian.sobierajski@gaz-system.pl, mobile: +48 885 850 538

5. Correspondence to the Operator concerning the update of the Loading Schedule shall be sent to the following e-mail address:

a) kierownik.zmiany@gaz-system.plmobile: +48 885 258 799
b) zaladunek.lng@gaz-system.pl., mobile: +48 723 100 353

Contact number for Drivers (for communication with the operational staff of the Terminal): **+48 723 100 353**
Each Party is required to notify the other Party in writing of any change to the data referred to above. The change of data is effective with respect to the other Party at the time of the above notification. The change does not require any amendment to this Operating Manual.

6. Electronic Scheduling System for Tank Truck Loading Service.

1) The Electronic Scheduling System for Additional Services is used to establish Loading Schedules.

2) Until the implementation of the Electronic Scheduling System for Additional Service referred to above, the basic form of information exchange shall be electronic mail.

Chapter IX: LNG Tank truck filling procedure

1. Preliminary actions and checks

Prior to starting the loading, the dedicated Loading facilities must be cooled down to the temperature below -140°C.

NOTE:

The operating of the valves of the Tank truck is allowed only to the driver.

Step	Person accountable	Operations and activities
1	Driver/ Security guard	Driver arrives at the Tank truck parking area located at the main gate, at building 8040.
2	Driver/ Security guard	The Driver walks to the security building (8040) to collect the long-term entry pass. Security guard, having verified the identity of the Driver, issues the pass.
3	Driver/ Security guard/ Loading Operator	The Driver returns to the tank truck and moves towards gate number 6 (Tank truck loading gate) The security guard informs the Managing Operator of the arrival of the tank truck to the gate number 6. After verifying the Loading Schedule, the Loading Operator instructs the security officer to let the Truck in.
4	Driver/ Security guard/ Loading Operator	The Driver approaches the Security Office with the Tank truck (building 8094) and stops the Tank truck in front of internal gate number 7.
5	Driver/ Security guard/ Loading Operator	Security guards carry out inspection activities and then the Driver goes to the building where the Loading Operator is waiting. The Loading Operator fills in the Driver and vehicle checklist according to PX-OI-30-3-F-1 (page 1).
6	Driver/ Loading Operator	After completing the documents, the Loading Operator hands out to the Driver the folder with documents and the card required to start loading at the loading bay. The Driver returns to the tank trucks and, using his own long-term pass, opens the gate by touching the scanner.
7	Driver	After passing through the gate, the Driver, drives to the parking area in front of the Loading Bays. The Loading Operator receives a set of documents from the Driver and informs him which loading bay is available.

NOTE:

The Driver collects long-term entry pass after HSE training during first visit at the Terminal. Entry pass is released at the building 8040 by security guard. Validation time of the long-term entry pass is defined by HSE training validity date. The Driver keeps the entry pass to the end of HSE validity time.

2. Parking the Tank truck / ISO Container at the Loading Bay

Step	Person accountable	Operations and activities
1	Driver/ Loading Operator	Following the instruction of the Loading Operator, the Driver drives onto the weighbridge and stops the vehicle, in a suitable position to connect the loading arms / flexible hoses, on the weighbridge
2	Driver	The Driver switches off the engine, immobilizes the Tank truck on the weighbridge, puts chocks under the Tank truck wheels.
3	Loading Operator	Connects the Tank truck to the grounding control system. When the green light on the grounding control system is on, it indicates the correct grounding of the Tank truck.

3. Tank truck filling process documentation

The Loading Operator shall fill in the form PX-OI-30-3-F-1 "LNG Tank truck Filling Checklist" in accordance with the progress of the operation. The completed form PX-OI-30-3-F-1 is an internal note of the Terminal documenting the process of LNG tank truck filling and remains in the Operator's archive.

4. Connection and preparation of flexible arms/hoses for loading

Step	Person accountable	Operations and activities
1	Driver	Confirms closing of the valves on the LNG and BOG nozzles of the tank truck / ISO-Container and gives permission to connect the loading arms / flexible hoses.
2	Loading Operator	After connecting the grounding conductor, the valve on the BOG line is automatically opened. The Loading Operator connects the BOG return arm / hose to the tank truck nozzle. The Loading Operator connects the LNG loading arm / hose to the Tank truck nozzle.
3	Loading Operator	The Loading Operator performs an integrity check of the connection between loading arms / flexible hoses and fittings in the valves chest. Operating medium - nitrogen from the arm's/hose's installation, pressure min. 3 barg, visual check by covering the connections with leak tester.
4	Loading Operator	Inerting of arm/hose connections - at least twice. The loading operator injects nitrogen into arms/hoses and then discharges the gas in the direction of the Tank truck vent collector.

5. Checking the temperature in the Tank truck

The Driver declares in the Driver and vehicle checklist PX-OI-30-3-F-1 the cooling condition of the tank truck and the atmosphere inside it (only the LNG vapours), whether it is fit for filling the LNG. The Loading Operator does not perform cooling operations on "warm" LNG Tank trucks / ISO-Containers.
The Loading Operator may, before starting to fill the Tank truck, check whether the temperature in the Tank truck is suitable for this operation. The temperature in the Tank truck provided for filling with LNG may be determined by measuring the temperature of the LNG vapour received by the BOG arm/hose, measured at the Loading Bay.

The temperature should not be higher than **-70°C**.

Process of checking the temperature in the Tank truck, (LNG loading arm/ hose(s) previously cooled):

Step	Person accountable	Operations and activities
1	Driver/ Loading Operator	The Driver opens the automatic and manual valve on the boil-off gas line of the Tank truck. The Loading Operator opens the manual valve on the BOG return arm/hose. BOG from the Tank truck is discharged through the pressure control valve to the pressure value of 3.0 barg.
2	Driver/ Loading Operator	The Driver opens the automatic and manual valve on the LNG line of the Tank truck. The Loading Operator opens the manual valve on the LNG arm/hose.
3	Loading Operator	Loading Operator opens the valves on the by-pass of the shut-off valve on the LNG line. Then he opens the manual valve on the by-pass of the control valve to the LNG flow rate of max. 5m3/h (approx. 35kg/min) - measurement on a mass flow meter. The temperature of BOG from the Tank truck indicated by the temperature transmitter should be below -70°C within a few minutes, which means that the LNG loading process can be started
4	Loading Operator	Closes the manual valves on the LNG line

***NOTE**:*
All pressure discharges from Tank trucks and ISO containers are directed to the vent. The carrier is obliged to arrive at the appropriate pressure indicated in this manual.

6. Weighing Tank truck, LNG loading

(If the operations according to point 2, 3 and 4 above have been performed, follow the steps from step 3).

Step	Person accountable	Operations and activities
1	Driver/ Loading Operator	Driver opens the automatic and manual valve on the boil off gas line on the Tank truck. Loading Operator opens the manual ball valve on the BOG return arm / hose. BOG from the Tank truck is discharged to a pressure level of 3.0 barg (control valve setting).
2	Driver/ Loading Operator	Driver opens the automatic and manual valve on the LNG line of the Tank truck. Loading Operator opens the manual ball valve on the LNG arm / hose.
3	Loading Operator /Driver	Loading Operator approaches the electronic loading ID card to Accuload card reader and confirms the loading data displayed on the screen of the Accuload scales controller.
4	Loading Operator /Driver	Loading Operator selects "Tare" option in Accuload to start the measurement of the Tank truck's Tare. Loading Operator, in the presence of the Driver, confirms the weight of the scantlingly laden truck tare displayed on the Accuload weight controller screen. He enters the weight to the checklist. The superior loading control system automatically corrects the required volume of LNG by the difference between the Tank truck Tare declared when entering data into the system and the Tank truck Tare recorded by the weighbridge.
5	Loading Operator	Loading Operator selects the loading mode from the available options of the Accuload "Press 1 to Load with Weighbridge system" (Press 1 to load based on the weighbridge reading), or "Press Start to load with Massmeter" (Press Start to load based on mass flow meter reading). After selecting the option (loading with the scales), before the procedure starts, the system asks for loading start confirmation with the START button. The Loading Operator records the displayed LNG volume calculated by Accuload and presses START.
6	PLC and Accuload	Performs the automatic loading process: - The PLC opens the shut-off valve. - The weighbridge platform controller sends a signal to the PLC controlling the opening of the control valve on the LNG line to start filling in low-flow mode in the first phase. When the proper

		weight is reached, the flow is increased to the nominal level. At the last 500 [kg] loaded, the controller reduces the flow by closing the control valve. The controller cuts off the flow at the control valve when the set weight is reached. - After the pre-set LNG quantity has been loaded, the shut-off valve on the LNG line is automatically closed and the message "Loading Complete" appears on the Accuload system display. (Loading finished). The Accuload system is ready to measure the gross weight of the laden LNG tank truck trailer. (The system controls the filling level of the Tanks during loading, and the Loading Operator at the documentation station sees the current filling level of the Tanks on a regular basis.) The Loading Operator makes sure that no employee is standing on the weighbridge during the measurement.
7	Loading Operator	Monitors the loading, checking: - correctness of opening of the shut-off valves on the LNG and BOG line at the beginning of loading, - LNG and BOG pressure, - loading information on the Accuload system display: flow rate, temperature, density, - correctness of closing of the shut-off valves after loading, - LNG or BOG spills, - not to exceed the permissible filling level in the tank indicated by the level gauge on the Tank truck.
8	Loading Operator /Driver	Loading Operator confirms the correctness of closing the shut-off valve on the LNG line (indicator "closed" on the valve drive and red control light on the LCP) and closes the manual valve on the LNG arm/ hose. Driver closes the automatic valves on the Tank truck's / ISO Container's LNG and BOG lines.
9	Loading Operator	Opens the drain/release valve, draining the LNG from the LNG arm/ hose connection.

7. Disconnecting LNG and BOG arms/hoses from the Tank truck

After the loading and draining the tank truck-arm / hose joint from LNG:

Step	Person accountable	Operations and activities
1	Driver / Loading Operator	Driver opens the by-pass valve on the LNG and BOG nozzle on the tank truck to connect BOG and LNG lines. The manual valve on the BOG arm/hose remains open until the LNG from the LNG arm/hose nozzle is completely drained, after which the Loading Operator closes the valve. Loading Operator opens the manual valve for nitrogen inlet in the BOG arm/hose connector to empty and purge the DTR line with nitrogen through the dedicated drainage valve. This also allows the arm/hose to be warmed to a safe temperature to disconnect the arm / hose.
2	Loading Operator /Driver	Loading Operator closes the drain valve, opens the nitrogen inlet valve on the LNG arm / hose. Driver opens the blow-out valves on the LNG and BOG nozzles on the Tank truck, then closes the manual valves on the LNG and BOG lines and the LNG/BOG by-pass on the Tank truck.
3	Loading Operator	Once a safe atmosphere is achieved, he closes the nitrogen injection valves on the LNG and BOG lines. Disconnects the LNG and BOG arms / hoses from the Tank truck and places them in the rest position at the Loading Bay.
4	Driver / Loading Operator	Checks and secures the loading installation on the Tank truck/ISO-Container. The Loading Operator disconnects the grounding conductor from the Tank truck/ISO-Container. Driver removes the chokes from under the Tank truck's/ISO-Container-s wheels.
5	Driver	Arrives by the Tank truck/ISO-Container to the control room and security building 8094 in order to collect the loading documentation.

Actions in steps 1, 2, 3 are typical for CRYOLOR, GOFA Tank trucks. Other Tank trucks may have a different configuration of the LNG and BOG connection system, then the activities of draining, inerting and warming the connections should be modified accordingly.

8. Disconnection of LNG and BOG flexible hoses from the Tank truck

(a) Tank truck/ISO-Container with by-pass between BOG and LNG lines.
When loading is completed and the pneumatic valves on the Tank truck are closed.

Step	Person accountable	Operations and activities
1	Driver / Loading Operator	The Driver opens the by-pass valve on the connection of the tank truck/ISO-Container LNG and BOG lines to connect them to the BOG and LNG flexible hoses. The manual valve on the BOG hose remains open until the LNG from the LNG hose connector is completely drained, after which the Loading Operator closes the valve. Loading Operator opens the nitrogen inlet valve on the BOG hose coupling to empty and purge the BOG and LNG hose couplings with nitrogen to the DTR line through the manual valve and warm up the hose couplings with the Tank truck/ISO-Container to a temperature that allows to disconnect them safely.
2	Loading Operator / Driver	Loading Operator closes the drain valve and opens the nitrogen inlet valve. Driver opens the blow off valves from the LNG and BOG connections on the tank truck/ISO-Container, closes the manual valves on the LNG and BOG lines and the by-pass LNG/BOG on the Tank truck.
3	Loading Operator	Closes the nitrogen inlet valves for BOG and LNG lines. Disconnects the LNG and BOG hoses from the Tank truck/ISO-Container and places them in the rest position at the Loading Bay.
4	Driver / Loading Operator	Checks and secures the loading installation on the Tank truck/ISO-Container. Loading Operator disconnects the grounding conductor from the Tank truck/ ISO-Container. The Driver removes the chokes from under the Tank truck's wheels.
5	Driver	Drives the Tank truck/ISO-Container to the control room and security building 8094, in order to collect the loading documentation.

b) Tank truck/ISO-Container without cross-over between BOG and LNG lines.

Step	Person accountable	Operations and activities
1	Driver / Loading Operator	Driver closes pneumatic valves and manual valves on the Tank truck. Loading Operator opens the drainage valve on the LNG line and the valve towards the vent on the BOG line.
2	Loading Operator	After gravitationally draining the LNG pipe, Loading Operator closes the manual valves on both hoses. Then he fills the lines with nitrogen and depressurizes as above. Flexible hoses must

Step	Person accountable	Operations and activities
		be purged and depressurized at least 2 times in order to achieve a methane-free atmosphere.
3	Driver	Driver opens the valves on the Tank truck/ISO-Container so that the hoses can be purged uninterruptedly.
4	Loading Operator	When the cyclic purging is complete, Loading Operator sets the continuous nitrogen purging towards the Tank truck/ISO container discharge column.
5	Driver / Loading Operator	The Loading Operator checks whether only nitrogen is discharged from the Tank truck/ISO container, and then stops purging the hoses and starts disconnecting.
6	Driver	Driver closes the valves on the Tank truck/ISO-Container.
7	Loading Operator	Loading Operator starts disconnecting the hoses.

9. Certificate of LNG quality

The certificate of LNG quality, according to appendix 7 (Form PX-OI-30-3-4-F-5), is attached to the documentation of each LNG loading. The LNG quality certificate is drawn up based on the analysis of the LNG delivered to the tank truck/ISO-Container loading facility and performed using process chromatograph. The issued LNG quality certificate is valid for the subsequent 3 days of tank truck loading. In case of a switch of the storage tank from which the LNG is taken or a new delivery, a new quality certificate is issued.

10. Final activities after filling the Tank truck

Step	Person accountable	Operations and activities
1	Loading Operator	Prints the weighting system receipt. Based on the weight receipt and LNG quality certificate, Loading Operator prepares LNG Loading Report - form PX-OI-30-3-F-2 in 3 copies: 2 copies for the Driver (1 copy for the Carrier, 1 copy for the LNG recipient), 1 copy for the record.
2	Driver	Driver confirms with a signature and receives 2 copies of: LNG loading report, Weight Receipt and Quality Certificate of the loaded LNG. The tank truck/ISO-Container leaves the Terminal area.

Chapter X: Loading reporting, Tank Truck Loading invoicing

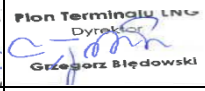
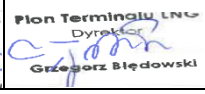
Reporting of the Additional Service of LNG loading into Tank trucks, arranging reports and invoicing is performed according to the Terminal Code.

Chapter XI: Supervision and updating of the Operating manual

1) Supervising compliance with the provisions of the Instruction and updating it is the competence of the Head of the Technological Processes Department.
2) Supervising compliance with the regulations of the Instructions, supervising the updates, reviews and implementation of necessary changes is the competence of the owner of the substantive process O.
3) The Instructions shall be reviewed and updated at least once every 2 years.
4) The update is made by the substantive owner of the process or the substantive supervisor of the regulation appointed by him.

Chapter XII: Appendices

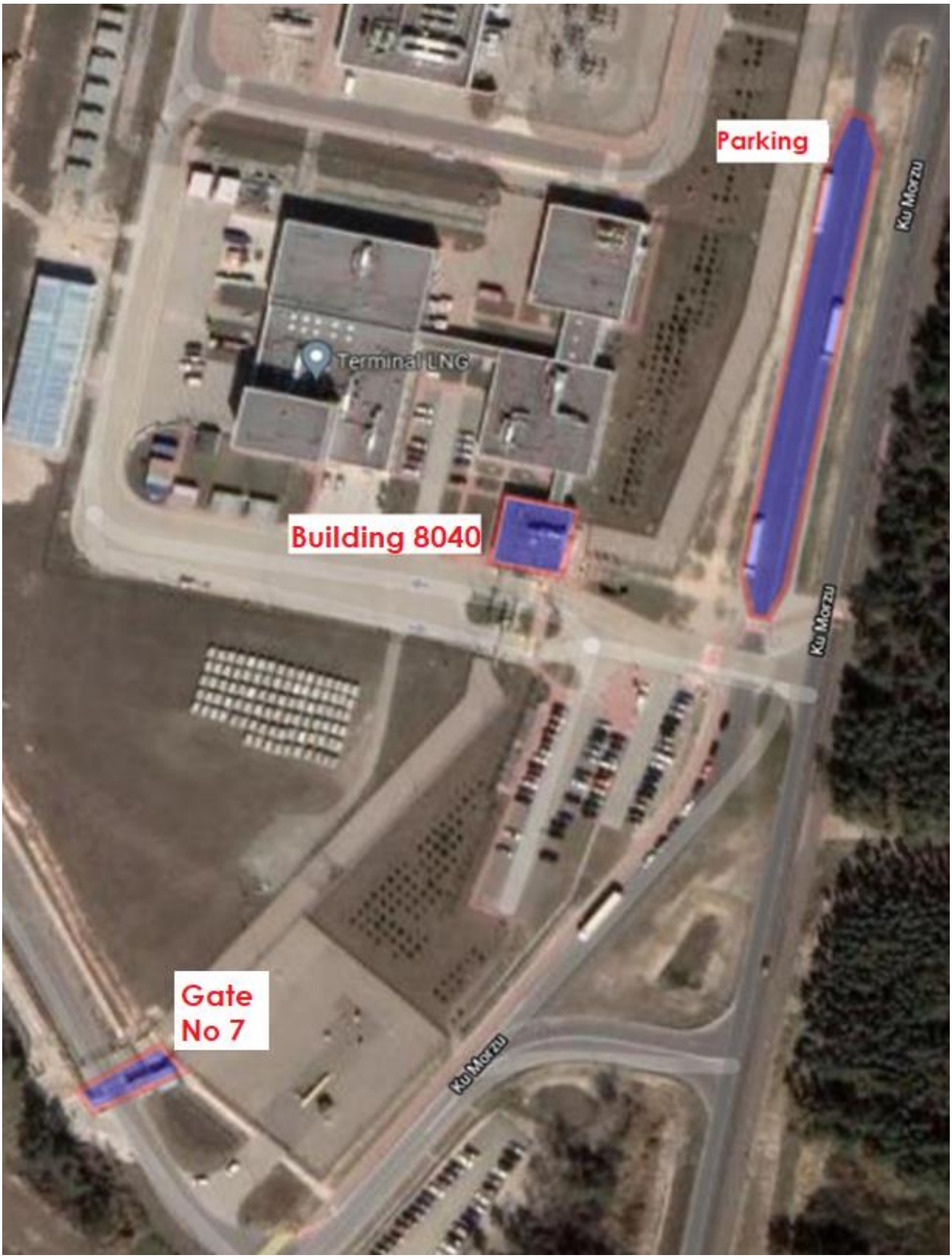
1. PX-OI-30-3-Z-1 rev. 3.0 - Working range of loading arms and flexible hoses
2. PX-OI-30-3-F-1 rev. 3.0 - Tank truck / ISO container Approval Application

No.	Appendix No	Rev.	Comments	ELABORATED BY	CHECKED BY	APPROVED BY	DATE
1.	PX-OI-30-3-Z-1	2.0	Changing the form	M. Bagiński	M. Krysa	G. Błędowski	2021.08.31
		3.0	Changing form of document and the number from PE-OI-30-3-Z-1.	M. Bagiński 	M. Krysa 	G. Błędowski 	2022.02.17
2.	PX-OI-30-3-F-1	2.0	Changing the form	M. Bagiński	M. Krysa	G. Błędowski	2021.08.31
		3.0	Changing form of document and the number from PE-OI-30-3-F-1.	M. Bagiński 	M. Krysa 	G. Błędowski 	2022.02.17

NOTE: The appendices below refer to the Instructions Operation of the LNG loading system (Area 30) PX-OI-30-1, which is available at the workplace in a paper version.

3. PX-OI-30-1-F-1 rev.7.0 Driver and tank truck/ ISO Container checklist for LNG loading
4. PX-OI-30-1-F-3 rev. 7.0 LNG filling report
5. PX-OI-30-1-F-4 rev. 7.0 Weight receipt - printout from Accuload system
6. PX-OsI-30-1-F-5 rev. 7.0 Gas quality certificate

Fig. 1 – Access map to the loading area.



Source: www.google.pl/maps