Operating Manual

Additional Service

LNG Road Tanker Loading

PE-OI-30-3-4-2

Document characteristics, issues, distribution and revisions

Characteristics of document

Substantive area	LNG Terminal operation
Category	Operating Manual
Substantive owner of document	Operating Division – Technical Dep. Manager
Prepared – date, name and surname	12.05.2016 Jan Rudnicki
Checked – scope, date, name and surname	17.05.2016 Tomasz Długosz
Checked – scope, date, name and surname	17.05.2016 Mariusz Kujawa
Checked – scope, date, name and surname	
Approved – date, name and surname	18.05.2016 Janusz Kurmański
Related internal regulations	Acc. to list in Section II

The regulation is of technical and functional character and it is not subject to giving opinions of the Legal Department, pursuant to the provisions of the Procedure of Supervision of the Documents and Entries.

Issues of document

Issue No.	Date of issue	Distribution of hardcopy				Intranet Yes/No
		Original	Copy 1	Copy 2	Copy 3	
1	----------,					-
2	01.10.2016	PE-DT				Yes
3	04.04.2017	PE-ET	PE-EE			Yes
4						

Updates, revisions, audits

Item	Date of implementa-tion	Scope of update, review, audit Description of modifications introduced	Date, name, surname	
			Entry	Approval
2	01.10.2016	Modifications were introduced: gas days and nights were replaced by days, program of training was changed, LNG owner was added in documentation of road tanker filling, the course of loading operations was updated	16.09.2016 J. Rudnicki	16.09.2016 J. Kurmański
3	04.04.2017	Updates: quick connection, max start temp.-70deg C inside LNG tanker, issue 3 of LNG filling Report, issue 4 of LNG Quality certific.	04.04.2017 J. Rudnicki	04.04.2017 J. Kurmański

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Section I: General provisions

The Operating Manual includes detailed information in scope of technical realization of Additional Service according to Terminal Operation and Maintenance Manual (TO&MM). The regulations of TO&MM have priority over the entries included in this Operating Manual.

1 Terms used in the Operating Manual

1) **PLNG, Company** – Polskie LNG S.A. – LNG Terminal Operator.
2) **LNG Terminal** – Liquefied Natural Gas Regasification Terminal in Świnoujście. Installation used for LNG unloading and regasification and Fuel Gas delivery to the Exit Point together with installations used for Process LNG Storage and the equipment used for rendering Additional Service.
3) **LNG Terminal Operator** - Polskie LNG S.A., energy company rendering the Regasification Services, including unloading, LNG Process Storage and regasification, responsible for operating the Terminal and rendering the Additional Service.
4) **Additional service** – a service rendered by the Operator in accordance with the provisions of the Terminal Operating Manual, including LNG reloading to Road Tanker.
5) **Terminal Operating Manual** – Terminal Operation and Maintenance Manual (TO&MM), issued by the Operator, being regulations for using the Terminal by the Terminal Users.
6) **LNG Terminal User** – natural person, legal person or organizational entity without legal personality, but possessing legal capacity, being a party to the Regasification Agreement as LNG Terminal user,
7) **Carrier** – A transport company rendering the service of LNG transportation by the order of the LNG Terminal User.
8) **Entity filling the LNG to road tankers** – in the meaning of ADR the LNG Terminal Operator realizing additional service of LNG reloading to road tankers, hereinafter the LNG loading.
9) **ADR –** European agreement concerning international carriage of dangerous goods by road (ADR), made in Genova on 30th September 1957 (Law Gazette of 2011 No. 110, item 641), with amendments applicable from the date of their entry into force for the Polish Republic, published in appropriate manner.
10) **Road Tanker** (tanker) – in the meaning of this Manual is identical to the concept "**tank truck**" used in the Restructured ADR Agreement valid from 1st January 2013 r., meaning in this case a vehicle structurally designed for the carriage of LNG. Apart from the vehicle itself or elements of the chassis used instead of the vehicle, the tank truck consists of one or several tanks along with their equipment and elements connecting the tanks with the vehicle or the chassis.
11) **LNG** (Liquefied Natural Gas) – natural gas in liquid form.

12) **BOG** (Boil off gas) – boil off gas from LNG.
13) **PLC** – local controller.
14) **LCP** – local control panel on the skid.
15) **ESD** – emergency shutdown system.
16) **ERS** – emergency release system of the loading arms
17) **Skid** – LNG road tanker loading installation.
18) **Settlement Period** – a time specified in the Tariff for which settlements for Regasification Services or Additional Service are effected.
19) **Working Days** – days from Monday to Friday, excluding public holidays.
20) **Emergency Situation** – a situation causing: (i) loss of technical efficiency of the Terminal installations, (ii) direct threat for life, health, property, environment (iii) an urgent need to prevent emergence of the aforesaid threats or a necessity for actions to avoid them and to remove the effects caused by their occurrence and resulting in restrictions in rendering the Additional Service.
21) **Terminal Capacity** – means technical capability of the Terminal for LNG unloading, Process Storage and regasification, which may be offered by the Operator in order to provide the Regasification Services and render the Additional Service.
22) **Regasification Order** – attachment to the Regasification Agreement, specifying in particular the type and duration of Regasification Services or Additional Services.

2 Purpose of Operating Manual

The purpose of this manual is more detailed specification of the rules binding at realization of Additional Service acc. to the Terminal Operation and Maintenance Manual, in scope of organization and technical support of LNG loading to road tankers. The manual includes:
a) technical conditions for the handled LNG road tankers,
b) rules concerning division of competences between the LNG Operator, User and Carrier,
c) rules for documenting loading the LNG,
d) safety rules concerning functioning of LNG loading installation during normal operation and in emergency conditions and rules to be observed by the staff to keep safety of people, the environment, the plant equipment and the Carrier's property when loading the LNG.

3 Application of Operating Manual

The manual is intended for the Operator's staff and co-workers organizing, carrying out and supervising the works associated with realization of Additional Service – loading the LNG to tank trucks as well as for the personnel of the Terminal User and LNG Carrier organizing and/or participating in loading of the LNG at the Terminal.

4 Regulations

1) European agreement concerning international LNG carriage by road (ADR), made in Geneva on 30 September 1957 (Law Gazette of 2011 No.110, item 641) as amended, with alterations valid from the date of their entry into force in relation to the Republic of Poland, announced in appropriate manner – item 1.10.3.2, regarding Plans of ensuring safety of carriage of dangerous goods.
2) Act on the Carriage of Dangerous Goods of 19 August 2011 (Law Gazette of 2011 No.227, item 1367 as amended).
3) All other legal acts governing the business activity connected with filling the transport tanks, trading, carriage, receiving LNG.

Section II: Related internal regulations

1 Base documents

1) Terminal Operation and Maintenance Manual,
2) PE-OI-30-3-4 Operating Manual – LNG Road Tanker Loading System,
3) PE-BI-30-8-6 Instructions for HSE at the Workplace – LNG Road Tanker Loading Installation,
4) PE-BI-00-7 Plan of Ensuring Safety of the Carriage of Dangerous Goods,

2 Forms for documenting the filling of the LNG road tanker

1) Form PE-OI-30-3-4-F-1 Checklist of Driver and LNG Road Tanker,
2) Form PE-OI-30-3-4-F-2 Report of LNG Road Tanker Filling,
3) Form PE-OI-30-3-4-F-3 Pattern of the Weight Receipt – Printout from the System Accuload,
4) Form PE-OI-30-3-4-F-4 Pattern of LNG Quality Certificate,

Section III: Description of the installation for loading the LNG road tankers

1 General description

General diagram of LNG loading stations location is presented in drwg. in Encl. 2.
Installation for road tanker loading is used for sending the LNG from LNG storage tanks TK-2011 or TK-2012 to the LNG road tankers. For loading the LNG to road tankers three loading skids LA-3011-A/B/C are carried out.
Each road tanker loading skid is equipped with LNG loading arm as well as one boil off gas return arm from road tanker to BOG manifold (header), in order to avoid the excessive pressure increase in the road tanker.
LNG is led to the loading installation from a common manifold, supplied from LP LNG pumps submerged in LNG storage tanks.

Boil off gas (BOG) received from road tankers through the BOG return arms, is directed by a common manifold to the boil off gas (BOG) system.

Each LNG loading installation skid is fitted with LNG cut-off valve XV-10 and a valve FV-02 for LNG flow regulation. The boil off gas return pipelines are equipped with cut-off valve XV-04 and pressure control valve PCV-02. All valves are controlled by a local controller PLC.
LNG flow regulating valve (FV-02) is used for control of the LNG flow to road tanker in order to ensure the course of loading according to the flow rate characteristics set in the PLC.
Pressure control valve PCV-02 is to maintain the pressure in the tanker during loading the road tanker at a set level, 1,5 barg as a standard.
Operator has at his disposal two modes of measuring the quantity of loaded LNG:
1) acc. to mass of tank truck measured on weighbridge A-3051A/B/C,
2) acc. to LNG quantity measured by means of mass flow meters.

NOTE: Loading of two LNG road tankers can be carried out at the same time.

2 Design and operating data of road tanker loading skids

In the table below design and operating data regarding the equipment included in scope of road tanker loading skids are presented.

Technological designation of equipment		**LA-3031-A/B/C-LA1**	**LA-3031-A/B/C-LA2**
Description		**LNG loading arm**	**BOG return arm**
Handled product		LNG	BOG
Pressure	**Working (operating)**	4 barg	1.5 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 flow rate by volume		90 m3/h	440 m3/h

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

3 Process control

For each road tanker loading station a local control panel (PLC) has been provided that controls the LNG (XV-10) and BOG (XV-04) inlet cut-off valves as well as LNG flow regulating valve (FV-02).
After a suitable configuration of the installation, i.e. after connecting the arms to the road tanker, confirmation of all signals permitting starting, the PLC opens the BOG cut-off valve and after choosing the loading mode it opens the LNG cut-off valve and

controls opening of the flow regulating valve FV-02 in order to start the loading according to the programmed flow rate.
Automatic LNG loading process consists of initial stage, where the flow rate is low, flow rate increasing stage (ramp up), LNG loading stage at a constant high flow rate (ca 600 kg/min), followed by a flow rate reducing stage (ramp down) and stopping at a low flow rate, after loading the quantity of LNG specified in a notification and confirmed during the initial actions and checking - at the road tanker acceptance for loading the LNG.

Section IV: Technical requirements for LNG road tankers

1 General requirements for road tankers

The LNG Terminal User shall ensure that the LNG Carrier, its driver and road tanker, realizing LNG transport by the order of Terminal User, fulfil all safety requirements imposed by the provisions of law, including ADR, in scope of transportation of dangerous goods which is LNG.

1) The Terminal user shall in particular ensure that:
- the road tanker has a documentation required by ADR,
- the road tanker is free from any defects or shortcomings in its equipment, resulting in deterioration of safety,
- on completion of the reloading of LNG there are no leakages or untightness in the road tanker,
- a date of next technical examination for road tanker has not expired,
- on road tankers there are markings and warning labels (stickers) required by ADR regulations,
- maintenance of road tankers and their equipment is carried out in the way that guarantees that under normal operating conditions the road tanker shall be meeting the ADR requirements until the next examination,
- additional checks of road tanker are carried out in case where there is a suspicion that the safety of road tanker or its equipment has been affected by a repair, modifications or as a result of an accident.

2) Road tanker provided for filling the LNG shall be in a cooled down condition, suitable for filling the LNG and the atmosphere inside the road tanker shall contain LNG vapours. The content of oxygen and other substances that may cause threat for loading and transporting LNG is not permitted in the road tanker.
3) BOG pressure in the tanker provided for filling the LNG should be max.1,8 barg. In case of higher pressure in the tanker, the operator will have to dump the excess pressure to the Terminal BOG system before starting the loading.
4) The Terminal user shall bear all risks and responsibility for non-compliance with safety requirements for road tanker provided for filling the LNG and the LNG Terminal Operator

may refuse loading the LNG onto road tanker in case of failure to comply with the above requirements.

2 Connections of arms to LNG road tanker nozzles (stub pipes)

1) LNG and BOG arms of loading installation at LNG Terminal are ended with flanges DN 65, PN 25. In case of other road tanker nozzles (stub pipes), the Carrier shall provide the road tanker nozzles with flanges DN 65, PN 25.
2) LNG adapter/ quick release coupling. LNG loading arms are equipped with a nozzle DN 50, being a standard in Poland, with "Methane" nut with internal left-hand thread TR80x8LH.
3) BOG adapter/ quick release coupling. The BOG arms quick connection are equipped with a nozzle DN40, like a standard Air Liquide, with nut with internal left-hand thread TR70x8LH.

3 Scopes of LNG and BOG loading arms operation

The Terminal is equipped with LNG reloading installation, enabling filling only the LNG road tankers with rear connection of filling and receiving devices.
Working ranges of loading arms and the areas of position of road tanker nozzles for connecting the LNG and BOG arms are presented in the drwg. in attachment No.3.

4 Road tanker authorization by the LNG Terminal Operator

Working range of arms is limited, as presented in item 3. In case the arm moves beyond the working area, the emergency release system (ERS) will activate. This is a safeguard against uncontrolled passing of the road tanker with connected arms at the loading station. Arms connection to the road tanker has to be carried out with a safe reserve from the extreme positions, and to confirm such a possibility the road tanker (or road tanker type) authorization is made, before confirmation of acceptance for loading of LNG.
1) Each LNG road tanker (or road tanker type) which will be planned for loading at the Terminal for the first time is subject to the Operator's authorization with respect of compliance with technical conditions and possibility of connecting the arms of the Terminal LNG loading installation.
3) If technical documentation of LNG road tanker does not enable the confirmation of the technical possibility of loading LNG to it at the Terminal reloading installation, the Terminal User/Carrier shall be asked for the road tanker arrival to the Terminal in order to make authorization.
4) User / Carrier shall present the road tanker for authorization one week in advance before its planned first LNG loading at the Terminal.
5) The risk connected with bringing an unauthorised road tanker for loading and refusal to load it is borne by the Terminal User.

Section V: Safety

The LNG Terminal is the Upper Tier Establishment (UTE) in terms of a risk of occurrence of a serious industrial failure. At the Terminal area safety rules in accordance with the legal regulations regarding UTE and the Terminal internal regulations are applicable. In the event of a serious industrial failure at the Terminal area the rescue activities are governed by the Internal Operational and Rescue Plan, and in the case of the threat outgoing beyond the Terminal area, according to the External Operating and Rescue Plan.

1 Safety marking

1) Explosion zones:
a) zone 1 – occurs in the area of loading arms connection to road tanker nozzles during disconnecting the arms, and in emergency, in the connection area of the arms Emergency Release System (ERS), during their activation, and in emergency, in the area of ducts collecting LNG leakages at loading installation and in the area of LNG leakage impounding basin (A-3031),
b) zone 2 – occurs in the whole area of the installations of the LNG loading jetties.
2) Signs of prohibition, injunction, as well as warning and information signs placed at workplace have to be respected by the persons who are in the workplace area.

2 Health, Safety and Environment

1) Basic hazards connected with technological process.

Source of hazard	Place of occurrence	Potential results	Reducing the risk of occurrence of the hazard effects
LNG leakages (high pressure, low temp.)	LNG loading arms, LNG manifolds and pipelines	Fire, explosion. Frostbite, severe injuries, burns	Working and protective clothing, personal protection equipment, trainings, gas detectors,
BOG/natural gas leakages (high pressure, low temp.)	BOG return manifold, BOG return arm	Fire, explosion, severe injuries, burns	Working and protective clothing, personal protection equipment, trainings, gas detectors,
Electric current	Electric networks, loading arm electric panels and auxiliary systems	Electric shock, severe injuries, burns	Limited access to electrical appliances, precautionary markings, working and protective clothing, personal protection equipment,
Manoeuvring of the equipment	Loading arms	Injuries, fractures, severe injuries	Personal protection equipment, trainings,
LNG leakages	LNG road tanker at weighbridge	Fire, explosion. Thermal radiation.	Working and protective clothing, personal

Source of hazard	Place of occurrence	Potential results	Reducing the risk of occurrence of the hazard effects
from road tanker		Severe injuries, frostbites, burns	protection equipment, trainings, gas detectors,

2) Hazards resulting from exposure to physical, chemical factors.

	Physical factors		
Item	**Threat**	**Source of hazard, injury factor**	**Probable result**
1	Traffic accident, hitting by vehicle.	Moving by road transport means, pedestrian traffic. Walk to the workplace and return from it.	Multi-organ internal and external injuries.
2	Contact with sharp edges, hitting the elements.	Facilities, structures, elements of equipment and installation. Limited space.	Injuries, cuts, contusions, abrasions, bruises and bumps.
Chemical factors			
1	Media: LNG, BOG, natural gas.	Emergency events, leakages, unsealing, explosion, fire, irritating toxic products of combustion and thermal decomposition.	Cryogenic burns (LNG, BOG), suffocation with vapours.
2	Hydraulic oil.	Emergency events, leakages, unsealing, fire, irritating toxic products of combustion and thermal decomposition.	Skin irritation, allergies, intoxication with vapours.

3) Working clothing, shoes and personal protection equipment.
At LNG road tanker loading station, working clothing, shoes and personal protection equipment in antistatic execution are required.
A helmet and protective glasses should be always used, and at the operations of arms connection and disconnection – safety shields.
At works where a risk of contact with surfaces of low temperatures (LNG or BOG) may occur, protective equipment to prevent cryogenic burns should be used.

4) Accident at work.
In case of an incident or accident at the Terminal area, the Shift Manager of LNG Terminal should be informed immediately. Further post-accident proceeding at the Terminal, in scope regarding LNG Terminal Operator, shall be according to the Procedure for determining the circumstances and causes of accidents in Polskie LNG SA.

3 Environmental Protection

During the operation of loading system the following threats for the environment may occur:

- Leakage from gas system – gas emission to atmosphere,

- Untightness of liquid installation – LNG leakage,
- Hydraulic oil leakage from the arms emergency release system,
- Leakage of operating fluids from road tanker.

During a normal operation a risk of occurrence of the described scenario is minimum due to technical conditions prevailing in the installation, automatic monitoring and shutdown systems.

In the event of a major failure resulting in a leakage of a large amount of gas or LNG, the installation should be turned off immediately in emergency mode, if it has not been turned off by the automatic emergency shutdown system ESD. Possible LNG leakage is directed by gravity to the impounding basin A-3011, where automatic rescue system covers the LNG spill with a light fire foam, limiting LNG evaporation to the intensity which reduces further spreading of hazard.

4 Warning and rescue systems

Integrated Fire Safety Management System supervises fire equipment, hazard detecting and warning systems as well as equipment and algorithms controlling the equipment installed in the area of road tanker loading installation.
The road tanker loading area is protected by:
1) Hazard detection systems: fire detection system, gas leak detection system, cold detection system (LNG leak).
2) Systems of alarming and warning about hazard: alarm sirens, flashing lamps, PAGA system.
3) Fixed fire-fighting equipment: water curtains, fire-fighting monitors, foam system.
4) Portable fire-fighting equipment, hydrants.

5 Emergency Shutdown Systems

Road tanker loading installation is equipped with emergency shutdown systems, each operating automatically, with a possibility of manual activation by the operator handling the loading of LNG:
- ESD, turning off LNG and BOG supply to the whole area of road tankers loading,
- USD, turning off locally LNG and BOG supply to loading skids and arms,
- ERS, loading arms and BOG return arms are equipped with hydraulically activated Emergency Release System (ERS), closing also LNG and BOG outflow from arms and road tanker. ERS is activated automatically by means of PLC in case of improper displacement of arms beyond the range of working zones, due to uncontrolled passing of road tanker with connected arms.

ESD, in the event of hazard, where the immediate shutdown flow of LNG to arms is required, can be activated manually by means of emergency push-buttons ESD on LCP for each loading skid.

6 Proceeding in case of fire or failure

Operator's personnel handling the loading of LNG road tankers is trained in scope of:
- fire-fighting operations acc.to Instructions for Fire Safety,
- rescue operations acc. to Internal Operating and Rescue Plan, in case of a major industrial failure.

In cases of threat or failure the following should be done:
- LNG and BOG supply to loading station should be turned off,
- The risk area should be left,
- Persons being in the vicinity of the risk area should be warned,
- The Terminal management or superiors should be notified of the occurrence of hazard.

LNG loading stations are explosion risk zone. In case of a failure causing LNG or BOG leakage at a loading station with the road tanker parked there, it is unacceptable to switch on electrical receivers and start the vehicle engine without the consent of the Head of rescue operations.
The Head of the rescue and evacuation operations is the Operator's Shift Manager, until the State Fire Brigade arrives. His instructions to be carried out or the announcements communicated by the system of loudspeakers should be followed.

Section VI: Responsibility in LNG carriage

1 ADR – ensuring safety of LNG carriage

LNG Terminal Operator has a **Plan of ensuring safety of carriage of high risk dangerous goods (LNG)** – (hereinafter "Protection Plan"), which with respect of PLNG activity concerns operations connected with filling the road tankers with LNG.
1) The purpose of application of the Protection Plan is to fulfil the legal requirements resulting from the European Agreement concerning the international transportation of LNG by road - item 1.10.3.2 Protection Plan – in scope regarding operation of filling the road tankers with LNG. The Protection Plan describes organizational safety measures as well as determines competences and requirements for personnel carrying out works in the area of handling and supervision of LNG road tankers filling, to ensure safety of LNG carriage in scope regarding operations of LNG road tankers filling.
2) Protection Plan does not cover the safety of LNG transport from the Filling Contractor (LNG Terminal Operator) to the Client, which is carried out by the Carrier, transporting LNG by order of the Sender (Terminal User). In this scope ensuring the Plan of safety of high risk dangerous goods (LNG) carriage acc. to ADR requirements is within the competences of the Terminal User.
3) Purpose of protection plan.
The following are obliged to comply with the Protection Plan:
a) employees and co-workers of LNG Terminal Operator, performing and supervising the works related to handling the filling the LNG road tankers with LNG,

b) personnel of the Company Security Office and security staff in scope of ensuring a physical protection of operations connected with filling the LNG road tankers with LNG,
c) Carrier's personnel and other persons who participate in execution of works connected with handling or supervising filling the LNG road tankers at the Terminal.

2 Obligations of the parties in documenting LNG carriage according to ADR

1) LNG Terminal Operator.
This is the entity filling the LNG to road tanker by the order of the Terminal User, which is responsible for a safe filling of the LNG road tanker and preparation of the documentation of filling, including:
- name and address of the entity filling the LNG (LNG Terminal Operator)
- name and address of the entity ordering the LNG loading (LNG Terminal User)
- designation of a tank truck
- name and address of the Carrier and the Driver's name
- name, designation and characteristics of dangerous goods LNG acc. to ADR
- quantity and quality of loaded LNG and the gross weight of the tank truck after filling with LNG.

2) LNG Terminal User.
The Terminal User is a sender of the dangerous goods acc. to ADR, that is responsible for own safety, or through respective contractual provisions with its contractors , for ensuring legal regulations in LNG trading and ensuring safety in LNG carriage and receiving at the place of LNG tanker unloading.
The LNG Terminal User should provide the Carrier, apart from the document as per item 1 above, with a transport document, prepared by the Filling Contractor, including:
- name and address of LNG owner at the moment of delivery of the filled tanker to the Carrier,
- name and address of LNG Receiver (Customer).

Section VII: Qualifications of persons handling the loading of LNG road tankers

1 Authorization for operating the equipment subject to technical supervision (TDT)

Personnel handling the LNG loading equipment should have authorities (permissions) granted by TDT for handling the equipment for filling and emptying the transport tanks for dangerous goods class 2 (LNG) acc. to ADR.

2 Training of persons for technical servicing of LNG loading

Constant authorization of the Carrier's (User's) person for technical servicing of LNG loading at the Terminal may take place after obtaining of authorities (permissions) as per item 1 above and completion of required training acc. to the training program attachment No.1.

Section VIII: LNG loading schedules, notification of road tankers

Demand for Additional Service, allocation of the Terminal capacity for the Additional Service, Framework Schedule of LNG Reloading are determined in accordance with the procedure specified in the Terminal Operating Instructions.

1 Framework Schedule of LNG Reloading

It covers the amounts of LNG, planned for the Regasification Year or a period of rendering the Additional Service for the Terminal User, reloaded to road tanker, broken down into individual Gas Months. The Framework Schedule of LNG Reloading shall be sent by the User to the Operator 14 days in advance, before starting the period of rendering the Additional Service. The Operator shall approve the presented schedule or bring justified corrections to it within 7 days.

2 Weekly plans of loading the LNG road tankers

2.1) The Terminal User reports to the Operator the number of road tankers planned for the week "W", amount of LNG reloaded to each road tanker and a daily amount of reloaded LNG broken down into particular days, according to the Framework Schedule of Reloading and the Process Storage Program.
2.2) The Terminal User submits the report referred to in item 2.1) to the Operator each Thursday of the week "W-1" until 10:00.
2.3) Operator provides the information about the report approved for the Terminal User until Friday of the week W-1" until 10:00, determining in it time frameworks of each LNG loading to road tankers in individual days and the amount of LNG loaded.
2.4) In case Thursday or Friday fall on public holidays, arrangements as per item 2.2) and 2.3) shall be made on preceding working day and then until 15:00 hrs.

3 Notification of road tanker loading

3.1) The Terminal User shall send notification of LNG loading until 13.00 on the working day preceding the day when the LNG loading to road tankers is to be carried out.
3.2) Notification shall include, acc. to "Checklist of Driver and LNG Road Tanker" (form attachment No. 5), data of the carrier, driver, road tanker, articulated road train and requested amount of LNG to be loaded to the tanker, acc. to the approved weekly plan of LNG loading.
The requested amount of LNG to be loaded to road tankers shall be determined taking into account the permissible degree of road tanker loading and permissible total mass of the road tanker.
3.3) Notifications of loading for articulated road trains or road tankers reported for the first time shall include the following data:
- articulated road train weight,
- weight of empty road tanker,

- gross weight of road tanker filled with LNG up to permitted level.

In case of a new type of road tanker a procedure of its authorization at Terminal LNG loading station should be additionally taken into consideration.

3.4) Notifications of LNG loading with changed time frames, other than in approved weekly loading plan, shall be realized in free time periods, after completion of planned loadings.

1 Correspondence for planning, notification of LNG loading and communications

4.1) Correspondence for planning and notification of LNG loading directed to the Operator shall be sent to the e-mail address: zaladuneklng@polskielng.pl.

4.2) For carrent comunications between drivers of the LNG road tanker and Terminal operator responsible for LNG loading, is mobile phone: **+48723100353.**

Section IX: Road Tanker Filling Procedure

1 Initial activities and checks

Before starting LNG loading, Operators of the LNG road tanker loading installation shall check the loading installations safety and readiness of control systems for the loading operations as well as cool down the LNG skid to temperature below -140°C.

Operations on the road tanker valves shall be carried out by the driver.

Step	Performer	Activity
1	Driver / Security guard	After road tanker arrival to the Terminal (Gate No.1), the driver informs the security guards about the arrival through the gate-phone, the security guards confirm the driver and road tanker data acc. to notification, the security guards give consent to the entrance to the Terminal.
2	Driver / Security guard / loading operator	Driver approaches with the road tanker to the Security Office / Control Room of road tanker loading (Building 8094), where checking is carried out by Security personnel and a Checklist of Driver and Road Tanker is prepared acc. to form PE-OI-30-3-4-F-1 (page 1)
3	Loading operator / driver	Operator introduces loading data from notification into iSupervisor weight system and prints out the introduced data which are confirmed by the driver. Operator issues an electronic identification card of the loading.
4	Driver	The road tanker driver drives to the parking zone before the LNG loading stations, passes the documents to the Operator and awaits the Operator's instruction allowing to enter the designated weighing station.

2 Road tanker parking at loading station

Step	Performer	Activity

Step	Performer	Activity
1	Driver / loading operator	At operator's signal the driver enters the weighbridge and stops the vehicle, at a position on the weighbridge suitable for connecting the loading arms.
2	Driver	Switches off the engine, immobilizes the road tanker at the weight, puts the chocks under the wheels.
3	Loading operator	Connects the road tanker to the grounding control system. Lighting of a green indicating lamp on the grounding control system means that the road tanker is grounded properly.

3 Documenting the course of road tanker filling

LNG loading Operator fills in page 2 of form PE-OI-30-3-4-F-1 "LNG Road Tanker Filling Control Card", according to the course of operation. Filled in form PE-OI-30-3-4-F-1 is the Terminal internal document from the course of filling the LNG road tanker, and it shall be stored by the LNG Terminal Operator.

4 Connection and preparation of arms for loading

Step	Performer	Activity
1	Driver	Confirms closing of valves on LNG and BOG nozzles of the road tanker and a consent to connect the loading arms.
2	Loading operator	Operator connects the BOG return arm to the road tanker. Valve XV-04 on BOG line is opened by the PLC. Operator connects the LNG loading arm to the road tanker.
3	Loading operator	Operator conducts the tightness test of BOG return arm connection to the road tanker. Operator conducts the tightness test of LNG loading arm connection to the road tanker. Working medium – nitrogen from arms installation, pressure min. 3 barg, visual inspection by covering the connections with foam tester.
4	Loading operator / driver	Inerting of arm connections to road tanker – minimum 2 x filling with nitrogen, vent through the road tanker vent system.

5 Checking the temperature in road tanker

The cool down condition of road tanker as well as the atmosphere inside it (only LNG vapours), suitable for filling with LNG, are declared by the driver in the checklist of driver and road tanker acc. to form PE-OI-30-3-4-F-1. Operator does not carry out the operation of cooling down "warm" LNG road tankers.
Operator can check, prior to starting the road tanker filling, if the temperature in the road tanker is suitable for carrying out this operation. Temperature in the road tanker provided for filling with LNG can be determined by measurement of temperature of

LNG vapours received by BOG arm, measured by TT-01 measurement on the skid. This temperature should not be higher than -70°C (temperature is indicative, the actual temperature in road tanker may differ considerably due to BOG heating during flow through the arm).

The course of checking temperature in road tanker (LNG loading arm cooled down previously):

Step	Performer	Activity
1	Driver / loading operator	Driver opens automatic and manual valve on BOG line of road tanker. Operator opens manual valve MV305037 on BOG return arm. BOG from the tanker is received to the pressure level 1,5 barg (setting of valve PCV-02).
2	Driver / loading operator	Driver opens the automatic and manual valve on LNG line of road tanker. Operator opens manual valve MV305017 on LNG arm.
3	Loading operator	Opens valves MV305007, MV305008 on by-pass XV-10 (LNG pipeline). Next opens valve MV305011 on by-pass FV-02 to the LNG flow rate maximum 5m3/h (ca 30 kg/min) – measurement on FE-02. Temperature of BOG from road tanker is indicated by TT-01, it should reach a value below -70°C within a few minutes, which means that the process of LNG loading can be started.
4	Loading operator	Closes the valve MV305011 and closes the valve MV305007.

6 Weighing the road tanker, loading the LNG

(If operations according to item 5 above have been done, the following steps from 3 to be carried out).

Step	Performer	Activity
1	Driver / loading operator	Driver opens automatic and manual valve on BOG line of the road tanker. Operator opens manual valve MV305037 on BOG return arm. BOG from the road tanker is received to the pressure level 1,5 barg (valve PCV-02 setting).
2	Driver / loading operator	Driver opens automatic and manual valve on road tanker LNG line. Operator opens manual valve MV305017 on LNG arm.
3	Loading operator / Driver	Operator approaches the electronic loading identification card to the Accuload card reader and confirms the loading data displayed on the Accuload scales controller screen.
4	Loading operator / Driver	Operator selects the option **"Tare"** in the Accuload, after which measurement of the road tanker tare takes place. Operator confirms, in the presence of driver, the road tanker tare weight displayed on the Accuload scales controller screen. The master (superior) loading control system corrects

Step	Performer	Activity
		automatically the requested LNG quantity by the difference between the road tanker Tare weight, declared when entering the data to the system, and the road tanker Tare weighed by the scales.
5	Loading operator	Operator selects the mode of loading from among the available options of Accuload system „Press 1 to Load with Weighbridge" or „Press Start to load with Massmeter" .
6	PLC and Accuload system	Shall carry out the automatic loading process: - PLC will cause opening of XV-10. - The weighbridge controller sends a signal to PLC controlling the opening of FV-02, in order to start filling in a low flow rate mode, increases the flow rate, and then reduces the flow rate and stops filling after loading a set amount of LNG. - After loading of a pre-determined amount of LNG valves FV-02, XV-10 are automatically closed, and on Accuload system display a message „Loading Complete" will appear. Accuload system is ready for measurement of road tanker gross weight after loading.
7	Loading operator	Monitors the loading process to be ready for an intervention in case of incorrect operation of the installation, checking: - correctness of opening the cut-off valves XV-10 and XV-04 at the beginning of loading, - LNG and BOG pressures - information regarding loading given on Accuload system display: flow rate, temperature, density, - correctness of closing the cut-off valve XV-10 at the end of loading, - LNG or BOG leakages, - not exceeding the permissible degree of filling of the road tanker, indicated by the road tanker level gauge.
8	Loading operator / Driver	Operator confirms correctness of closing the cut-off valve XV-10 ("closed" indicator on the valve drive and red indicating lamp on LCP) and closes the valve MV305017 on LNG arm. Driver closes the automatic valves of road tanker on LNG line and BOG line.
9	Loading operator	Opens the draining valve MV305018, by draining LNG from LNG arm coupling.

7 Disconnection of LNG and BOG arms from the road tanker

On completion of LNG loading and draining from the connection between arm and road tanker:

Step	Performer	Activity
1	Driver / loading operator	Driver opens the by-pass valve on connection of LNG and BOG line of road tanker, for connection of BOG and LNG arms couplings. Valve MV305037on BOG arm remains open until the complete draining of LNG from LNG arm coupling, after which the Operator closes the valve MV305037. Operator opens the nitrogen injection valve MV305036 on BOG arm coupling, in order to empty and purge the BOG and LNG arms couplings to DTR line through the valve MV305018 and warm up the arms connections with the road tanker to temperature enabling their disconnection.
2	Loading operator / driver	Operator closes the drain valve MV305018, opens the nitrogen injection valve MV30519. Driver opens vent valves from LNG and BOG couplings on road tanker, closes manual valves on LNG and BOG lines and LNG/BOG by-pass on road tanker.
3	Loading operator	Closes the nitrogen injection valves MV305036 and MV30519 Disconnects LNG and BOG arms from road tanker and parks them in rest position on the skid.
4	Driver / loading operator	Performs the operations of checking and securing the loading installation on road tanker. Operator disconnects the grounding from road tanker. Driver removes the chocks from under the wheels of road tanker.
5	Driver	Drives up the road tanker to the control room and security office building 8094, in order to receive the documentation from the loading.

Operations in steps 1, 2, 3 are typical for tankers CRYOLOR, GOFA. Other tankers can have different configuration of LNG and BOG connection system, then the operations of draining, inerting and coupling warming up should be adequately modified.

8 LNG quality certificate

LNG quality certificate, acc. to attachment 8 (Form PE-OI-30-3-4-F-4), is attached to the documentation of each LNG loading. LNG quality certificate is prepared based on the analysis of the composition of LNG delivered to LNG road tanker loading installation, made on a process chromatograph. The issued LNG quality certificate is valid for the next 3 days of LNG loading to road tankers. In case of changing the LNG tank from which LNG is taken or a new LNG delivery, a new LNG quality certificate is issued.

9 Final (ending) operations after filling the LNG road tanker

Step	Performer	Activity
1	Loading operator	Prints the weight receipt from the weighing system. Based on the weight receipt and LNG quality certificate, prepares a Report of LNG loading – form PE-OI-30-3-4-F-2 in 3 copies: 2 copies are received by the driver (1 copy for the Carrier, 1 copy for the LNG Receiver), 1 copy for the files.
2	Driver	Driver confirms by a signature and receives: 2 copies of Report of LNG loading, Weight receipt and Quality certificate of LNG loaded. Road tanker leaves the LNG Terminal area.

Section X: Reporting of loading, invoicing additional service

Reporting of Additional Service of LNG reloading to road tankers, agreeing reports and invoicing is carried out acc. to Operating Instructions for LNG Terminal. Provisions given below are for information purposes only.

1 Reporting

1.1) Within 2 days after the Settlement Period the Operator prepares and delivers to the Terminal User a Commercial Regasification Report concerning Regasification Services and Additional Service carried out in the Settlement Period, in which there are specified, particularly for Additional Service:
- LNG amounts reloaded to road tankers,
- list of road tanker loadings.

1.2) The Terminal User may, within 1 day from the date of receiving the Commercial Regasification and Additional Service Report, raise objections to its content. Parties shall strive to agreeing the Commercial Regasification Report within 4 days after finishing the Settlement Period. If Parties fail to agree the Commercial Regasification Report, the Terminal User has a right to make a claim.

2 Invoicing

2.1) Initial invoice – a pro-forma invoice, issued by the Operator for rendering, in a given Settlement Period, the Regasification Services based on allocated Contractual Power and a volume of Loadings which should be delivered to the Terminal pursuant to the Ship Calls (Arrivals) Schedule or Regasification Order for Regasification Services of spot type as well as predicted for a given month execution of Regasification Service, and for rendering the Additional Service based on the allocated annual volume of LNG loading to Road Tanker,

2.2) Basic invoice – issued by the Operator for Regasification Services and Additional Services provided in the Settlement Period based on Commercial Regasification Report,

2.3) Within a period until 7th day after the Settlement Period, the Operator issues a basic invoice for Regasification Services and Additional Service, rendered in Settlement Period, based on Commercial Regasification and Additional Service Report.

Section XI: Supervision and updating of the manual

1) Supervising of compliance with the Manual regulations, supervising the validity of the Manual, reviews and making necessary modifications, and implementation of modifications is within the competences of the substantive owner of the Manual.
2) Reviews of the Manual are made acc. to the Integrated Management System (IMS) documentation.

Section XII: Attachments

Attachments included in the Manual:
1. Program of Carrier's personnel training in scope of LNG loading at LNG Terminal
2. Plan of road tanker loading area at LNG Terminal

Attachments appended to the Manual:
3. 87094 - Layout and working area of LNG loading stations
4. PE-OI-30-3-4-Sch-1 Technological diagram of the installation for filling the road tankers with LNG
5. Form PE-OI-30-3-4-F-1-str.1 Checklist of Driver and Road Tanker for LNG Filling
6. Form PE-OI-30-3-4-F-2 Report of LNG Road Tanker Filling
7. Form PE-OI-30-3-4-F-3 Pattern of Weight Receipt – print-out from Accuload system
8. Form PE-OI-30-3-4-F-4 Pattern of LNG Quality Certificate
9. Form List of persons familiar with the document – PE-AP-F-1

Attachment 1 Program of Carrier's personnel training in scope of LNG loading at LNG Terminal

The Carrier's personnel – drivers and other persons participating in the operation of LNG road tanker filling at the Terminal are subject to the training.

1. Training on the process safety and rules of handling the LNG loading.
Training is valid for 3 years. The period of validity can be shortened in case of modifications of technical equipment of LNG road tanker loading stations or organizational changes and changes in the LNG Terminal Operator's internal regulations, affecting the LNG road tanker loading operations.

Item	Training subjects	Time min	Trainer
1	General information on LNG Terminal – Upper Tier Establishment (with a high risk of occurrence of a major industrial failure). LNG and natural gas - properties, hazards, rescue	15	
2	LNG road tanker loading area – safety rules, fixed hazard detection systems, hazard alarm systems, fixed rescue and fire-fighting systems. Proceeding in the event of occurrence of hazard or announcement of evacuation alarm for LNG road tanker loading area.	15	
3	Discussing the rules of servicing the LNG loading according to Operating Manual PE-OI-30-3-4-2, division of Operator's and Carrier's competences and responsibility. Plan of ensuring LNG carriage safety acc. to PE-BI-00-7 – responsibility of the Filling Contractor and Carrier acc. to ADR.	10	
4	Instruction in the course of loading the LNG road tanker at LNG Terminal installation	10	
5	Protection of LNG Terminal – authorities of security service personnel, regulations in scope of movement of people and materials	5	
6	Summary of training Test of knowledge	5	
	Total	1 hour	

2. General Training on HSE rules valid at LNG road tanker loading area at LNG Terminal is valid for 1 year.

Attachment 2 Plan of tank truck loading area at LNG Terminal