

TECHNICAL ANNEX 3 - SCOPE OF WORK

Engineering, Procurement & Construction Contract

Public Company ORLEN Lietuva LPG flare system renovation

Technical Annex No. 3 SCOPE OF WORK

FORBID

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LPG flare system renovation
SCOPE OF WORK

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FOR BID

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1. GENERAL

The aim of Public company "ORLEN Lietuva" (hereinafter - OL) within the scope of the refinery modernization project is to revamp the existing LPG Tank Farm flare system and manage spills in the dikes as well as storm water sewers of LPG Tanks Farms No.1 and No.2 as described in the Design proposals:

OLP01502 '930-03. LPG tank farm flare reconstruction project'

OLP01504 '941-11. Overhaul of storm and industrial sewer in LPG tank farm no.1'

OLP01505 '941-31,32,33,34. Overhaul of storm and industrial sewer in LPG tank farm no.2'.

The CONTRACTOR shall provide the engineering detailed design, procurement, manufacturing and expediting, delivery and installation, COMMISSIONING and START-UP of a new LPG flare system instead of existing system to the OL Refinery in Lithuania.

The equipment shall be installed in OL Refinery located in Mazeikiai, Lithuania.

2. GENERAL DESCRIPTION OF REQUIREMENTS

CONTRACTOR shall, in accordance with the requirements of this CONTRACT, the ANNEXES and the latest editions of all current Lithuanian and European regulations, design, engineer, procure and supply all necessary EQUIPMENT and MATERIALS, perform all shop and field inspection and testing, erect, install, commission, test, start-up, run performance tests and otherwise perform all activities hereinafter called "WORKS".

This Scope of Work may not be complete in every detail but, when taken in conjunction with the Technical Annexes, Engineering Design Data, other OWNER'S standards and other regulations, is deemed to be sufficient to allow the CONTRACTOR to prepare his detailed design and to construct and complete the facility.

Any small works not specified in the CONTRACT and ANNEXES but are required in order to ensure work functionality and completeness shall be considered as included into the CONTRACT price.

In the event of contradictions between different documents or in case technical information is not fully presented in the CONTRACT and ANNEXES, CONTRACTOR shall be obliged to draw the attention of OWNER'S Project Manager to these inaccuracies and follow his instructions.

The WORK generally consists of the following main activities:

- 2.1 Clarification of current situation prior to the start of design work;
- 2.2 Prepare Technical design (Techninis projektas) - 1 stage of detail design and Work design (Darbo projektas) - 2 stage of detail design according to Design Proposals OLP01502, OLP01504, OLP01505
- 2.3 Obtaining Construction permit under the technical design
- 2.4 Design of new flare D-6
- 2.5 Modification of existing flare D-1
- 2.6 Design of new SDP-1 drainage system to flare of existing drums T-1...T-22 and existing pumps drainages S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-10A, S-10B
- 2.7 Design of new underground pumping station
- 2.8 Design of new impoundment area
- 2.9 Design of new SDP-1 block of evaporating
- 2.10 Design of new SDP- 2 drainage system to flare of existing vessels T-52...T-58; T-62; T-63; T-64

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- 2.11 Design the concrete bottom of dikes with slope to underground sewer of the existing SDP-1 drums T-1...T-22 and existing SDP-2 drums T-52...T-64 and design the internal walls of the dikes
- 2.12 Updating and installation of existing LPG control system (PLC);
- 2.13 Arrangement of hazardous areas for the new equipment and instruments
- 2.14 Issue of demolition plan (detailed enough to allow starting of dismantling activities on field) for dismantling of existing facilities;
- 2.15 Provide all necessary materials and install acc. to detail design
- 2.16 Provide all other necessary works to reach the targets set above.

3. BATTERY LIMITS

Battery limits of the scope of work presented in the table:

Item.	Drawing No.	Description of medium	Battery limit description
1.	OLP01502-PS-T-93003-01	Fuel gas to flare stack D-6	Welded connections to pipeline 50-FG-371/b
2.	OLP01502-PS-T-93003-01	Fuel gas to flare stack D-1	Welded connections to pipelines 50-FG-371; 50-FG-371/b
3.	OLP01502-PS-T-93003-01	Nitrogen to flare stack D-6	Welded connection to pipeline 50-N-387
4.	OLP01502-PS-T-93003-01	Nitrogen to flare stack D-1	Welded connection to pipeline 50-N-387
5.	OLP01502-PS-T-93003-02	Steam condensate from D-1	Tie-in from stack D-1 to steam condensate pipeline – "Condensate from SP-1; SP-1/1".
6.	OLP01502-PS-T-93003-02	Steam to D-1	Tie-ins to pipeline G-10
7.	OLP01502-PS-T-93003-02	Instrument Air to D-1	Welded connection to pipeline 1"-IA-397
8.	OLP01502-PS-T-93003-02	Nitrogen to D-1	Welded connection to pipeline 2"-N2-387
9.	OLP01502-PS-T-93003-02	Flare gas measurement on existing flare stack D-1	Welded connections to flare stack D-1 for the level chamber
10.	OLP01502-PS-T-93003-02	New burner of existing flare D-1	Welded connection on existing flare stack D-1 for the new burner installation
11.	OLP01502-PS-T-93003-03	Flare gas to D-6	Welded connection to pipeline 400-FG-394/1÷6
12.	OLP01502-PS-T-93003-03	Flare gas to D-6	Welded connection to pipeline 400-FG-395
13.	OLP01502-PS-T-93003-03	Flare gas jumper	Welded connection between pipeline 400-FG-395 and drum SP-1
14.	OLP01502-PS-T-93003-03	Steam to D-6	Welded connection to pipeline 80-ST-G-10
15.	OLP01502-PS-T-93003-03	Nitrogen to D-6	Welded connection to pipeline 2"-N2-387
16.	OLP01502-PS-T-93003-03	Fire water to D-6	Welded connection to pipeline W-PV-1
17.	OLP01502-PS-T-93003-03	Instrument Air to D-6	Welded connection to

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			pipeline 1"-IA-397
18.	OLP01502, SDP1_30	New check valve	Welded connection to pipeline 100-FG-371/4
19.	OLP01502, SDP1_30	Checking of existing PSV	Flanged connection on pipeline 50-FG-371
20.	OLP01504-PS-T-94111-02	Underground sewerage pipelines	From new traps of LPG-1 drums T-1...T-22 to the new impoundment area
21.	OLP01504-PS-T-94111-02	Above ground drainage pipelines	From LPG-1 existing drums T-1...T-22 and existing pumps drainages S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-10A, S-10B to the new drum T-512
22.	OLP01504-PS-T-94111-06	Fire water to new evaporating block	Welded connection to pipeline FW-(PV-1)
23.	OLP01504-PS-T-94111-06	Drainage to new evaporating block	Connection to existing LPG-1 sewerage system K-3
24.	OLP01504-PS-T-94111-06	Steam to new evaporating block	Welded connection to pipeline 150-SM-(G-10)
25.	OLP01504-PS-T-94111-06	Fuel gas to new evaporating block	Welded connection to pipeline 300-FG-(394/1-6)
26.	OLP01504-PS-T-94111-06	Nitrogen to new evaporating block	Welded connection to pipeline N-(387)
27.	OLP01504-PS-T-94111-07	Condensate from existing drums T-1...T-6	Connection to existing drums valves ½".
28.	OLP01504-PS-T-94111-07	Condensate from new LPG samplings T-1...T-6	Welded connections to pipeline 300-FG-395
29.	OLP01504-PS-T-94111-07	Gas from existing pressure relief valves T-1...T-6	Connections to exhaust of existing pressure relief valves
30.	OLP01504-PS-T-94111-07	Gas from existing pressure relief valves T-1...T-6	Welded connections to pipeline 300-FG-395
31.	OLP01504-PS-T-94111-07	Condensate from existing drums T-7...T-22	Connection to existing drums valves ½".
32.	OLP01504-PS-T-94111-07	Condensate from new LPG samplings T-7...T-22	Welded connections to pipeline 200-FG-395
33.	OLP01504-PS-T-94111-07	Gas from existing pressure relief valves T-7...T-22	Connections to exhaust of existing pressure relief valves
34.	OLP01504-PS-T-94111-07	Gas from existing pressure relief valves T-7...T-22	Welded connections to pipeline 200-FG-395
35.	OLP01504-PS-T-94111-07	Condensate from existing drums T-1...T-22 and existing pumps S-1...S-7; S-10A; S-10B	Connection to existing drums valves ½" and existing drainages of pumps.
36.	OLP01504-PS-T-94111-07	Gas to flare system	Welded connections to

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			pipeline 400-FG-395
37.	OLP01504-PS-T-94111-07	Steam to drum T-512	Welded connection to pipeline 80-ST-(G-10)
38.	OLP01504-PS-T-94111-07	Fire water to drum T-512	Welded connection to pipeline FW-(PV-1)
39.	OLP01505-PS-T-94131-02	Underground sewerage pipelines	From new traps of LPG-2 drums T-52...T-64 to the new underground pumping station
40.	OLP01505-PS-T-94131-03	Condensate from existing drums T-62...T-64	Connection to existing drums valves 1/2".
41.	OLP01505-PS-T-94131-03	Condensate from new LPG samplings T-62...T-64	Welded connections to pipeline 300-FG-395
42.	OLP01505-PS-T-94131-03	Gas from existing pressure relief valves T-62...T-64	Connections to exhaust of existing pressure relief valves
43.	OLP01505-PS-T-94131-03	Gas from existing pressure relief valves T-62...T-64	Welded connections to pipeline 300-FG-395
44.	OLP01505-PS-T-94131-03	Condensate from existing drums T-52...T-58	Connection to existing drums valves 1/2".
45.	OLP01505-PS-T-94131-03	Condensate from new LPG samplings T-52...T-58	Welded connections to pipeline 200-FG-395
46.	OLP01505-PS-T-94131-03	Gas from existing pressure relief valves T-52...T-58	Connections to exhaust of existing pressure relief valves
47.	OLP01505-PS-T-94131-03	Gas from existing pressure relief valves T-52...T-58	Welded connections to pipeline 200-FG-395

4. BASIC INFORMATION

4.1 Site information

1) Temperature

Winter - Minimum	-36°C
Minimum Design Metal Temperature (MDMT)*	-28°C
Winterizing temperature	-23°C
Coldest average during 5 days	-23°C
Glazed frost	-5°C
Summer - Maximum	+ 33°C
Wet Bulb Temp.	17.0°C
Dry bulb temperature (coolers)	26.8°C (for design of Air coolers)
Average temperature	5.9°C
Relative Humidity (Design): Normal:	63 %
Maximum:	89 %

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Barometric Pressure: Design 760 mmHg

* - use **MDMT -36°C for all steel structures** and piping and equipment, which temperature can be as low as winter minimum (air, nitrogen lines and etc.) during normal operating conditions.

2) Wind

Prevailing Direction: (referring to true north): South-West 22 % of the time (winter), West 23% of the time (summer).

Wind load calculation shall be done according to EN 1991-1-4:2005. This standard shall be used with local Lithuanian wind load map.

3) Rainfall

Annual: 788 mm

Max daily: 103.8 mm

Rainy Season, Months: From March to December

4) Snowfall

Average: 210 mm

Maximum: 720 mm

Snow load calculation shall be done according to EN 1991-1-3. This standard shall be used with local Lithuanian snow load map.

5) Special Precautions

Corrosive (or unusual) atmospheric conditions: None

Other (windstorms, hurricanes, electrical storms, fog, etc.):

Thunderstorm: Quantity by Years: average - 19 day, max. - 42 day

Duration by Day: average - 2.1 hour, max. - 15.8 hour

Average thunderstorm duration: 40-60 minutes

Nearest weather station for which statistics are published: Station Telšiai.

4.2 List of attachments

OWNER shall provide the following documentation relevant to the WORK:

- 4.2.1 Attachment #1_OL specifications for all parts and disciplines.
- 4.2.2 Attachment #2_Process design proposal OLP01502
- 4.2.3 Attachment #3_Process design proposal OLP01504
- 4.2.4 Attachment #4_Process design proposal OLP01505
- 4.2.5 Attachment #5_Documents for engineering of instrumentation part
- 4.2.6 Attachment #6_Documents for engineering of electrical part
- 4.2.7 Attachment #7_Builder's requirements for designing

4.3 Codes and standards

The codes and standards applicable for this job are defined in documents listed in paragraph No. 4.2.

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The EQUIPMENT and MATERIAL shall be strictly in accordance with the requirements imposed by this document and the other documents attached to the scope of work.

In case of conflicting requirements between the different applicable documents, the precedence shall be as follows:

- ⇒ Code/authority regulations;
- ⇒ Industrial standards referred to in above-mentioned documents;
- ⇒ Material requisition, including data sheets.

CONTRACTOR shall report in writing any conflicting requirements to OWNER. It shall be CONTRACTOR's responsibility to acquire possession of all required regulations, codes and standards.

The CONTRACTOR is aware of any legal regulation applicable to the subject EQUIPMENT and is solely responsible for full compliance with such rules, including approvals, tests, certificates and services of a legal inspection body.

5. PARTICULAR REQUIREMENTS

Installation and operating manual shall be in Lithuanian language.

Manufacturing requirements are defined in the documents listed in paragraph No. 4.2.

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6.1 Engineering

CONTRACTOR's design and engineering responsibilities will be to design, purchase, inspections, testing and expediting of the goods required for the packaged unit and its required installations.

6.2 General Requirements and definitions

- 6.2.1 All standards and regulations mentioned in this specification shall be used of newest revision or edition if revision or edition is not specified otherwise.
- 6.2.2 CONTRACTOR shall be legitimated according Lithuanian law requirements and shall have all required permits and certificates according STR 1.02.01 requirements.
- 6.2.3 CONTRACTOR shall appoint SPSC (Statybos produkcijos sertifikavimo centras) certified specialists or acknowledged by SPSC foreign (EU Countries) specialists:
 - Design Manager
 - Design Parts (Sections) Managers (i.e. Civil, Electrical, Instrumentation and etc.)
 - Design and Design Parts (Sections) Supervision Managers
 - Construction Works Manager
 - Construction Works Managers for special parts of construction works (i.e. Civil, Electrical, Instrumentation and etc.)
- 6.2.4 System of measurement shall be in SI system or non-SI units accepted for use with the SI units if measurement units is not specified otherwise in OWNERS Standard technical specifications (further - STS) or annexes of this contract.

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- 6.2.5 All drawings' and documents' shall be printed on ISO paper formats.
- 6.2.6 After construction works will be finished CONTRACTOR shall issue "As Built" Detail Design revision with all design changes included in this revision.
- 6.2.7 Technical requirements for submission of soft copies of design documentation.
- 6.2.8 CONTRACTOR shall submit duly signed, scanned design documentation in PDF files (MTOs and scope sheets shall also be presented in MS Excel files).
- 6.2.9 CONTRACTOR shall present drawings in dwg/dxf file format.
- 6.2.10 Drawings and text documents shall be scanned for minimum 200 dpi resolution.
- 6.2.11 Each drawing shall be presented in a separate PDF file. The name of file shall consist of identification code (number) of drawing and number of revision.
- 6.2.12 Text documents shall be presented in PDF and DOCX file. The name of file shall consist of the name of document or acronym.
- 6.2.13 "Infostatyba" – Online service managed by government dedicated to issue permit for construction and other construction related affairs.

6.3 Detail design

- 6.3.1 Design documentation of a construction works (further - Detail design) - means a set of documents, the composition of which are established by normative technical construction documents, which contain solutions of a construction works conceived by the builder (client) (text, parts of a design documentation, calculations, drawings) and are intended for legalization and carrying-out of construction of a construction works.
- 6.3.2 The Detailed design works has to be made in two stages:
 - Technical design (Techninis projektas) - 1 stage of detail design, Design package required to obtain Permit for Construction
 - Work design (Darbo projektas) - 2 stage of detail design, Complete Design package issued for construction
- 6.3.3 The Detailed Design has to be made according to Best Engineering Practice and shall meet all specifications and technical requirements listed in the Technical Design, in the Annexes and in the OL specifications and other legal acts effective in the Republic of Lithuania.
- 6.3.4 The Detail Design and design composition shall meet STR 1.04.04 requirements

6.4 Construction Permit

- 6.4.1 Procedure of request of permit for construction described in Technical Regulations for Construction STR 1.05.01
- 6.4.2 Contractor shall prepare or obtain from other subjects all documents required to obtain permit for construction.
- 6.4.3 OWNER will issue Power of Attorneys to CONTRACTOR to authorize CONTRACTOR obtain all required documents for permit for construction

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from other subjects and provide all documents for permit for construction over Government Information management system "Infostatyba" on behalf of OWNER.

- 6.4.4 To obtain permit for construction CONTRACTOR shall provide documents specified in paragraph 5 of Article 27 of REPUBLIC OF LITHUANIA LAW ON CONSTRUCTION:
- 6.4.4.1 An application,
 - 6.4.4.2 Technical design documentation, signed by SPSC certified designers,
 - 6.4.4.3 Design examination report with positive conclusion done by SPSC certified experts,
 - 6.4.4.4 Power of Attorney provide documents on behalf of OWNER
 - 6.4.4.5 Land owning documents (OWNER will provide to CONTRACTOR copies of such documents)
 - 6.4.4.6 Environmental Impact Assessment documents approval,
 - 6.4.4.7 Sanitary protection zones plan (drawing),
 - 6.4.4.8 Designer's mandatory insurance document copy,
 - 6.4.4.9 A decision of a competent institution on admissibility of planned economic activities in a chosen locality from the point of view of an impact on the environment (when this is obligatory) in accordance with the Law on the Assessment of an Impact of Planned Economic Activities on the Environment
 - 6.4.4.10 Design documentation handover to OWNER act.
 - 6.4.4.11 Overall process of obtaining permit for construction typically can take about from 25 to 45 working days after all documents will be submitted over "Infostatyba".

Requirement for designing are defined in attachment 7 listed in paragraph No. 4.2.

6.5 Engineering of instrumentation part

6.5.1 Basic requirement for designing

The designed equipment shall be suitable for the ambient conditions at the installation place. Equipment, steel structures and steel structures holding cables shall be suitable for use in C4 corrosion environment.

Newly designed equipment and materials shall be selected according to OL requirements. Designed equipment shall be selected in consideration of design modifications, type of explosive zone, category of explosive mixture and temperature class.

Control cables for instrumentation loops shall be selected according to OL requirements.

All designed electrical equipment shall be marked according to OL requirements applicable to electrical equipment.

All materials specified in the design shall conform to the applicable legislation and have certificates valid in the Republic of Lithuania.

The existing grounding system shall be used for grounding the designed equipment; new grounding shall be designed where necessary.

Measuring instruments and equipment shall be installed in such a way as to make them and their component parts easy and convenient to maintain, clean, repair and inspect without using any auxiliary devices (scaffolds, ladders, etc.).

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The designer shall verify on site the technical information given in the documents provided by OL such as technical parameters, location, etc. of existing equipment, and use it for design solutions only after making sure such information is accurate.

6.5.2 Scope of design – general information

Detailed scopes specify only preliminary amounts of devices and signals derived from P&ID of design proposals OLP01502; OLP01504; OLP01505. The amounts of devices can change depending on the process, fire safety and civil designs, requirements applicable to selected equipment, etc.

Performing of and reporting on the hazard & operability study (HAZOP) for the to be replaced and newly designed technological process, on safety integrity level (SIL) determination as well as checking of equipment for its compliance with the determined for it SIL according to the OL requirements; Designing of the relevant equipment based on the findings of the technological process risk assessment.

6.5.3 Existing D-1 flare and new D-6 flare (OLP01502-PS-T-93003-02, OLP01502-PS-T-93003-03 P&ID)

It is required to select and design flare ignition and control equipment, including wiring to outdoor cabinets/control stations and junction boxes. It is required to connect temperature, flame control, alarm and control signals as may be required for the ordered equipment. It is required to design the wiring/connecting signals to the LPG Tank Farm DSC system.

It is required to design the hookup of the measuring and control instruments under the piping part as well as wiring/connection of signals to the Tank Farm control system. Below provided preliminary quantities of instruments related D-1 and D-6 flares as indicated in the design proposals. The quantity are indicative only and must be verified by CONTRACTOR during the Engineering phase:

- Pressure (PT) and differential pressure (PDT) transmitters – 6 pcs;
- Level gauge (LT) – 3 pcs;
- Level alarms (LS) – 3 pcs;
- Flow rate meters (FT) – 8 pcs;
- Temperature sensors (TE) – 13 pcs (12 pcs for ignition system);
- Local technical pressure gauges (PI) – 16 pcs;
- Local temperature gauges (TI) – 2 pcs;
- Control valves (FV) – 3 pcs;
- Shut-off valves (XV) – 4 pcs.

PT and PDT transmitters shall be designed to include block & bleed manifolds and shall be installed in electrically heated instrument cabinets with a local heating shut-off switch. Instruments shall be hooked up using heated impulse lines and Swagelok connections. End couplings of impulse lines shall have visual (light) indication. An electric heater with thermostat shall be designed for heating of instrument cabinets. Powering of the electric heating system shall be as required by the electrical design. Transmitter measurement signal 4–20 mA, HART, two-wire, powered from a 24 VD C loop. Intrinsic safety (ATEX) – Exia.

Level instruments – mounted inside the designed new level columns. Measurement signal 4 - 20 mA, HART two-wire, powered from loop. Intrinsic safety – Exia.

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Level alarms - flange, vibrating if suitable for the indicated medium. Discrete output signal NAMUR, powered from the loop, Exia.

Flow rate meters shall be selected based on the measured product. Possible types of meters - mass, thermal mass, volumetric and differential pressure. Flow rate meters shall be finally specified after the preparation of data sheets and meter selection calculations. Output signal 4-20mA, HART two-wire. Intrinsic safety (ATEX) – Exia.

Separator SP-2 temperature sensor PT100 will be mounted in the flanged thermowell with a 4-20mA HART transmitter. Types and installation of other temperature sensors as per requirements of the ignition and control system manufacturer.

It is required to select and design the hookup and, where necessary, electric heating of pressure gauges.

For the operation of control and shut-off valves it is required to design air supply from the nearest air header (extension of the air header if necessary). Swagelok fittings and tubes shall be used to connect to the air header. Valve operation signal 4 - 20 mA, HART protocol, two-wire, 24 VDC power supply, intrinsically safe loop Exia, air filter-reducer.

6.5.4 SDP-1 new underground pump house (OLP01504-PS-T-94111-05)

It is required to design 4 pump operation signals between the power substation (hereinafter – MCC) and the control system of the LPG Tank Farm. Status signals 'Motor ready', 'Running', local/remote control (if any) and control signals 'Start', 'Stop', tripping by low level interlock. Signals – 24 V DC. Electrical design provides for interposing relays for the separation of power and control circuits.

It is required to design temperature, vibration, sealing control devices (if any) and their connection to the control system based on the specifications of selected pumps/motors and recommendations of their manufacturers.

It is required to design the connection of control and status signals of ventilators VI-507 and VI-508 to the LPG Tank Farm DCS system. It is required to design the operation of ventilator triggered by activated gas leak sensors.

It is required to design the connection of Motor Operated Valves (9 pcs) status signals 'Opened', 'Closed', 'Failed', Local/remote, 'Open', 'Close' to the LPG Tank Farm DCS system. Signals – 24 V DC. The signals shall be connected directly from the actuator (Rotork) or from the power substation via interposing relays, depending on the selected type of actuator.

The place of connection of signals of pump motors, ventilators, MOVs and other signals (e.g. failed heating signals) depends on the place of power source of electrical equipment selected in the electrical design. Possible options:

In container-type room nearby the designed pump house (if provided in the electrical design).

- TP-33 substation building.
- TP-75 substation building.

To design the hook up of the pressure gauges (4psc.) and pressure transmitters and connection of 4-20mA Exia signals to the DCS system.

It is required to design the underground pump house tank level instrument to measure the level of water and hydrocarbons (two separate indications). Measurement signals 4 - 20 mA, HART two-wire, powered from the loop. Intrinsic safety – Exia.

It is required to design level switches for tank PRZ-1 and drain pit for issue of level alarms and operation of pumps. Level alarms - vibrating if suitable for the indicated medium. Discrete output signal NAMUR, powered from the loop, Exia.

It is required to install gas leak detectors in the pump house and to connect them to the existing SDP-1 or SPD-2 Det-Tronic fire and gas system. Evaluate which loop is better for connecting the new sensors (SDP-2 loop is preliminary closest). Sensors shall be Ex and suitable for outdoor use and for explosion atmosphere. Output signal – digital, suitable for Det-tronics LON. 24 VDC power supply. It is required to design light and sound alarms and ventilator control in the pump house.

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6.5.5 New evaporation unit (OLP01504-PS-T-94111-06)

To design the hookup of the measuring and control instruments as well as wiring/connection of signals to the Tank Farm control system. Below are the preliminary amounts of instruments derived from P&IDs of design proposals. The quantity are indicative only and must be verified by CONTRACTOR during the Engineering phase:

- Pressure (PT) transmitters – 2 pcs;
- Level gauge (LT) – 2 pcs;
- Level alarms (LS) – 2 pcs;
- Flow rate meters (FT) – 1 pcs;
- Local technical pressure gauges (PI) – 3 pcs;
- Local temperature gauges (TI) – 1 pcs;
- Control valves (PV, FV) – 3 pcs;
- Shut-off valves (XV) – 1 pcs.

Technical requirements applicable to the instruments and hookup are the same as for the flares (provided in Section 6.2.3 hereof).

6.5.6 Sampling and drain system (OLP01504-PS-T-94111-07)

It is required to design the hookup of the measuring and control instruments as well as wiring/connection of signals to SDP-1 control system.

Level instrument – microwave, mounted inside the designed new level column. Measurement signal 4 - 20 mA, HART two-wire, powered from loop. Intrinsic safety – Exia.

Temperature sensor PT100 with 4-20 mA converter. Signal – Exia.

It is required to select and design the hookup and, where necessary, electric heating for pressure gauges.

6.5.7 Cables and cable routes

It is required to design new cable routes and supporting structures (where necessary). The location and length of cable routes depend on the piping design, the location of MCC substation provided in the electric design and the choice of the control system (SDP-1 or DSP-2) for the connection of signals.

It should be taken into account that the layout plan of the design proposals provides for a new pipeline located between the underground pump house and the evaporation tank with new supports, which may be suitable for new cable routing up to the existing structures. If suitable – use the available cable routing structures or cable routes inside the unit. Detailed evaluation must be performed on site.

It is required to design new cable routes and conduits (galvanized, steel) for cable routing through to instrumentation & automation equipment. Cable trays shall be galvanized, corrosion resistant and have covers, minimum thickness – 1.5 mm.

All new cables shall be suitable for outdoor use in -36...+33 C temperatures, resistant to UV and petroleum products. Other requirements are provided in the attached OL technical specifications.

All protective and supporting steel structure of cables shall be connected to the main grounding system..

6.5.8 LPG Tank Farm DCS system

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SDP-1 and SDP-2 have DeltaV (Emerson) DCS systems. Both systems are installed in different control rooms of SDP-1 and SDP-2 but optically interconnected. Control and readings available in one control room can be seen in another control room. See attached structural diagram in Attachment No 5 listed in paragraph No. 4.2.

The existing control systems do not have enough reserve channels and the existing cabinets do not have enough space for the installation of new modules. It is required to design a new cabinet with new modules, barriers, power unit with failure alarm and other equipment required for extension. Possible system extension options:

- SDP-2 system extension (new cabinet)
- SDP-1 system extension (new cabinet)

New cabinet in the new electrical room container if such is to be designed under the electrical part next to the new pump house. In such case it is required to design additional power supply from UPS and optical interconnection with the DCS systems of SDP-1 and SDP-2.

30 AI, 5 AO, 81 DI, 35 DO signals to be connected to DCS system by the preliminary P&ID of the Design proposals.

Readings (visualization), control and alarms of all tags shall be programmed to the both operator rooms SDP-1 and SDP-2 in DCS system.

List of projects executed in past but related with subject of this SOW – might be useful during Engineering phase:

SDP-1 DCS part: MN0477, MN1502, MN1527

SDP-2 DCS part: MN0283, MN0321

SDP-1 GDAS part: OLP00473

SDP-2 GDAS part: MN1140, OLP00523, OLP00833

6.5.9 OTHER REQUIREMENTS

After HAZOP analysis and SIL level assessment (if set) results, perform the selected equipment security level (SIL) verification calculations for the matched SIL. Design additional equipment if it is not enough to reach the set SIL level. Prepare safety requirement specification (SRS) according OL Technical specification OL-TR-IR-012 Rev.01 for the detail design, programming, testing and maintenance safety instrumented system.

Selecting and designing additional new gas leak and fire detection sensors and connection to the existing Det-tronic system if so required in fire safety design, HAZOP analysis or regulatory documents.

In the design shall be indicated quantities of work related to the installation, commissioning and configuration of designed equipment and instruments.

Installation/functional diagrams, basic connection diagrams, installation diagrams, basic measuring diagrams (loop drawings), new equipment selection and intrinsically safe circuit testing calculations, instrument and equipment hookup diagrams, 24 V DC diagrams, cable routes and cable marking drawings, explanatory note, etc.).

The designed instruments shall have appropriate ATEX certificates valid in the European Union.

6.6 Engineering of electrical part

6.6.1 Main requirements

The design shall comply with the „Rules for Installation of Electrical Equipment', standards and technical regulations for construction valid in the Republic of Lithuanian and the Owner's requirements.

The project shall include the electrical part of the designed facility.

TECHNICAL ANNEX 3 - SCOPE OF WORK

The designed equipment shall be suitable for the ambient conditions at the installation place. Cable and steel structures shall be suitable for use in C4 corrosion environment. Required thickness of cable trays – 1.5 mm.

While developing the design, the Designer shall follow the specifications and the scope of work description provided by the Owner. The designer is responsible for the correctness of design solutions and their conformity to the applicable legal requirements. The Owner will provide methodological support by giving access to the existing documentation and consulting on the usage of existing elements.

The Owner will provide hard copies of the initial and subsequent (modified) versions of designs and work related operational diagrams that are available in the Lithuanian or Russian languages. The designer shall perform the on-site verification of the information (technical parameters of the existing equipment, installation location, dimensions) specified in the documents provided by the Owner and, after making sure that it is correct, the designer shall use it for developing the design solutions.

Designed electrical equipment shall be selected in consideration of Ex zone, category of explosive mixture and temperature class. The drawings with displayed layout of designed equipment for explosive atmospheres shall include Ex-zone classification, explosive mixture category and temperature class.

The designed equipment shall be energy-efficient, safe and easy to operate.

Power distribution installations and networks shall be designed with no less than 30% spare power capacity and 20% spare connection capacity.

Designer shall qualify for performing works inside operating electrical facilities up to 1 kV (for evaluation of diagrams, substation equipment).

The design shall specify suitable protections for electrical users, including calculated protection settings.

The design shall include short-circuit current, minimum one-phase short-circuit current and voltage loss calculations, and ensure selective operation of the existing and newly designed protection devices.

The design shall provide for the dismantling of obsolete elements (relays, cables) and equipment as well as specify the scope of dismantling work.

If the design requires connecting a new electrical user to the existing switchgear, power control panel, distribution or power supply cabinet, or replacing the existing user, it is required to develop an updated single-line diagram of the entire cabinet with indicated existing and newly designed users. Operational and initial design diagrams must be used to develop the schematics but it is the designer's responsibility to check during the site visits the accuracy of information provided in the diagrams and to perform voltage, current and power measurements (if necessary) with prior measurement request submitted to the Owner's work supervisor.

Design shall include the documents indicated in Attachment No.6; however, additional documents may be developed to support the design solutions.

Graphical symbols in electrical diagrams must meet the requirements set out in LST EN 60617.

Numbering of electric cable lines shall be based on the coding system provided in Attachment No.6.

Attachment No.6 contains the list of abbreviations used for design, modernization and operational control of electric equipment – these abbreviations must be used by the designer in the design.

Attachment No.6 contains Harmonized Cable Coding Table to be observed in developing the design.

Cables shall be installed in the existing cable trays, with new ones designed where necessary. Cable arrangement in cable units must be consistent with the existing system. Power cables may not be installed in cable trays that contain control & instrumentation or control cables.

TECHNICAL ANNEX 3 - SCOPE OF WORK

The design shall provide for steel or steel-plastic conduits with cable connectors as specified by the conduit manufacturer and where necessary it shall provide for mechanical protections with flexible conduits.

Where necessary, the construction–structural drawings for the installation of new cable trays, control panels and access platforms shall be developed.

The existing grounding systems shall be used for the designed equipment with new grounding devices to be designed only when it is not possible to use the existing devices or when such are not suitable.

The Owner will provide additional information as may be required for the existing power network calculations indicated in the list of information required by the designer. The list of required information and information delivery deadlines will be agreed separately at the time of design.

6.6.2 SCOPE OF DESIGN

- 6.6.2.1 Designing the installation of electrical equipment in accordance with the scopes provided in this task and the general documents of the design task.
- 6.6.2.2 Developing a list of electrical users (voltage, power, current, power coefficient, etc.). Performing calculations of installed, consumed power.
- 6.6.2.3 For the connection of the designed equipment to the existing network, performing analysis of transformer substations TP-33, switchgears TP-75 kV, motor control centers and existing related circuits and check them against the actual scheme.
- 6.6.2.4 Defining the points of connection of electrical users to the external power network and getting them approved by the OWNER. Connection points shall be located at a minimum distance to the power source, ensure nominal voltage and easy access for maintenance.
- 6.6.2.5 Performing calculations (e.g., short circuit currents, voltage losses, etc.) required for the selection of electric equipment, cables, etc.
- 6.6.2.6 Selecting places and, where necessary, structures for the installation of new cable routes.
- 6.6.2.7 Where necessary, designing electrical heat tracing for measuring instruments.
- 6.6.2.8 Where necessary, designing power supply, including installation of UPS, for measuring instruments and DCS equipment.
- 6.6.2.9 Designing power supply for electrical tracing of pipelines, equipment and vessels and, where necessary, designing electrical tracing equipment. Designing temperature control for traced equipment.
- 6.6.2.10 Designing devices against static electricity.
- 6.6.2.11 Designing protection against lightning.
- 6.6.2.12 Designing grounding of designed equipment, structures, and other related equipment.
- 6.6.2.13 Designing proper illumination of the territory, pathways, equipment, instruments, etc. Designed illumination must conform to the local hygiene norms (e.g. pathways - 20lx, equipment and instrument monitoring – 50lx).
- 6.6.2.14 Designing temporary connections of electrical devices (for maintenance) (about 30kW) next to the designed new pump house.

TECHNICAL ANNEX 3 - SCOPE OF WORK

6.6.3 Scope of design work specifics.

Current situation:

6.6.3.1 LPG Tank Farm No.1 electrical equipment are connected to the 0.4 kV switchgears of the substation TP-33 containing 2X1000 kVA 6/0.4 kV transformers. Currently TP-33 has about 600 kW, 0.4 kV power reserve. Single-line diagrams of the main TP-33 switchgears are provided in Attachment No.6. TP-33 equipment layout plan is provided in Attachment No.6.

6.6.3.2 LPG Tank Farm No.2 electrical equipment are connected to the 0.4 kV switchgears of the substation TP-75 containing 2X630 kVA 6/0.4 kV transformers. Currently TP-75 has about 300 kW, 0.4 kV power reserve. Single-line diagrams of the main TP-75 switchgears are provided in Attachment No.6. TP-75 equipment layout plan is provided in Attachment No. 6.

Powering and control of designed electrical equipment:

6.6.3.3 Attachment No.6 contains layout plans of LPG Tank Farm No.1 and LPG Tank Farm No.2 with indicated substations TP-33, TP-75 and preliminary places of designed equipment.

6.6.3.4 For powering of new designed equipment, it is required to install a new 0.4 kV double busbar switchgear with automatic circuit breaker to be connected with >200kW (consumed power) electrical users. For the connection of major electrical users it is required to install a separate section with two incomers and automatic changeover. Designation to be given to the switchgear – JVS-6. (The designation of the switchgear shall be agreed/specified during its design).

6.6.3.5 The place of switchgear shall be selected in consideration of the location of electrical users, their load center, the existing and new Ex zones defined in the design. The general plan of the existing Ex zones of the LPG Tank Farms is provided in Attachment No.6. Detailed information concerning the existing Ex zones shall be obtained from the Owner's representatives responsible for process safety.

6.6.3.6 Possible sites for the installation of switchgear:

6.6.3.6.1 **Site No.1** Outdoor, nearby the designed pump house, containerized (technically most appropriate place).

- (a) It is required to design an electrical room container (hereinafter - ERC) supported by pile foundation to be used for powering and controlling electric users. Requirements applicable to the installation of container are provided in the Owner's standard specifications and this document.
- (b) Pathways to ERC must be tiled.
- (c) It is required to design proper illumination for ERC, its perimeter and access pathways.
- (d) Civil design shall be developed by a duly qualified designer based on the task prepared by and instructions of the electrical designer; the civil/structural design and the design solutions shall be agreed with appropriate specialists of the Owner.

TECHNICAL ANNEX 3 - SCOPE OF WORK

- (e) It is required to develop an ERC HVAC design that would ensure ventilation, heating and maintaining the temperature at the level of +20°C.
- (f) ERC HVAC design shall be developed by a duly qualified designer based on the task prepared by and instructions of the electrical designer; the civil/structural design and the design solutions shall be agreed with appropriate specialists of the Owner.

6.6.3.6.2 **Site No.2.** TP-75 substation building (cons: long power/control cable lines, large cross-section cables to electrical users, limited space in the substation TP-75).

6.6.3.6.3 **Site No.3.** A new switchgear can be installed and fed in substation TP-33, however, according to preliminary data a distance between TP-33 and the load center of designed equipment is substantially longer than that from TP-75 (pros: higher power reserve).

6.6.3.7 TP-75 switchgear KTP shall provide power to JVS-6 incomers.

6.6.3.8 If power provided by TP-75 transformers and switchgear KTP is not enough to connect the designed new electrical equipment (1.05 higher overload determined for transformers T-1 and T-2 in post-emergency mode when power is supplied via one incoming cable) it is required to replace the transformers and switchgear KTP with more powerful equipment with 20% power reserve.

6.6.3.9 If designed equipment are installed nearby existing switchgears (also distribution cabinets, lighting panels, heat tracing power cabinets, etc.) located in LPG Tank Farms, they can be powered from the existing switchgears upon performing appropriate power calculations and subject to the Owner's approval.

6.6.3.10 If connection of a new user to the existing switchgears (also distribution cabinets, lighting panels, heat tracing power cabinets, etc.) requires installing a new or replacing the existing circuit breaker (cubicle) and circuit breakers of required type are no longer manufactured and it is not possible to install a retrofit (new type or another manufacturer's circuit breaker), it is required to design the replacement of the entire switchgear.

6.6.4 General requirements for powering and controlling electrical equipment.

Electric motors:

6.6.4.1 Cubicles feeding motors shall have motor protection and control equipment: power circuit breaker, contactor, thermal relay, ammeters, control circuit MCB, terminal boxes. Power circuit breaker shall be used for the protection of motors and shall provide protection against overload and short circuit. Motor cubicles shall have 'control' position enabling testing of control circuit without energizing power circuits.

6.6.4.2 Motor control stations shall be installed outside next to equipment and have rain protection roofs. Emergency trip button of motor control stations shall be protected against accidental operation.

TECHNICAL ANNEX 3 - SCOPE OF WORK

- 6.6.4.3 Outdoor motors shall have heaters (to protect against condensation). Heaters shall be operating when motors are down. Heaters shall be powered via a 30 mA current leakage protection device.
- 6.6.4.4 It is required to design properly sized seals for cable connection to motors, blind plugs for reserve cable entries.

Motor Operated Valves (MOV) actuators:

- 6.6.4.5 Cubicles providing power to actuators shall have blocks of visible breaking contacts. Circuit breakers shall be molded case, their breaking capacity shall be Icu-25kA. Circuit breakers shall be used for the protection of motors and shall provide protection against overload and short circuit.
- 6.6.4.6 Automatic circuit breaker protection settings must be selected in consideration of motor rated, average and blocked rotor current (in accordance with the manufacturer's recommendations).
- 6.6.4.7 Power circuit breakers shall be installed next to MOV actuators to cut off power supply. It is required to design a flexible copper-core cable of sufficient length between the circuit breaker and the actuator to enable actuator demounting without removing the cable.
- 6.6.4.8 It is required to design properly sized actuator seals for cable connection to the actuator, blind plugs for reserve cable entries.
- 6.6.4.9 Actuator control to be provided in the process control and automation design.

Electrical equipment control signals to/from DCS:

- 6.6.4.10 230V AC auxiliary relays shall be designed in separate cabinets (separated from power circuits) for the transmission of 230V AC electrical signals ('Motor ready', 'Running', etc.) to DCS.
- 6.6.4.11 24 V DC relays are required in the cabinets for accepting 24V DC signals ('Start', 'Stop', etc.) from ACS.
- 6.6.4.12 All relays shall have a status indicator.
- 6.6.4.13 230 V AC relay spools shall have interface with leakage current and interference voltage suppression.
- 6.6.4.14 Trip relays shall conform to the safety integrity level requirements.
- 6.6.4.15 Insulated partition shall be installed between each relay (relays must be separated to ensure their cooling).
- 6.6.4.16 It is required to install separate 230V AC and 24 V DC cable/wire channels in the auxiliary relay compartments.
- 6.6.4.17 Cabinets shall have door activated lighting, induced ventilation.
- 6.6.4.18 30% of spare space shall be provided in the auxiliary relay cabinets.

Electric heat tracing of process pipelines and other equipment

- 6.6.4.19 It is required to design a distribution/control cabinet for the powering of heat tracers, power distribution and heating temperature control. The cabinet shall have two incoming cables from different sections of the switchgear. A manual 3-position changeover switch shall be installed in the cabinet for switching between power sources.

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- 6.6.4.20 Circuit breakers installed in the cabinet shall have 30 mA current leakage protection and additional QF+SD contacts.
- 6.6.4.21 It is required to design the transmission of heat tracing failure signal (one common signal delivered from the cabinet) to DCS in case of tripping at least one circuit breaker feeding the heating cables. The signal shall be transmitted via 230V auxiliary relay. Signals to DCS shall be agreed with the process control and automation designer.
- 6.6.4.22 The design shall include the calculations of selected heat trace cables, heat trace isometric drawings for pipelines, layout plan of heat trace cable connection/distribution boxes, layout plans and cross sections of power cables.
- 6.6.4.23 Heating cable ends shall have visual (light) indications.
- 6.6.4.24 Thermostats regulating the temperature of pipelines and installed on pipelines shall have local temperature indicators. The need of display (visualization) of the installation points of thermostats, operation/failure signals of heat tracers (temperature indications where necessary) in operator work stations shall be agreed with process designers and Owner's representatives responsible for the process part of the project.

Powering of electrical heat tracers of measuring instruments

- 6.6.4.25 Heat tracers of measuring instruments shall be powered from the above mentioned cabinet indented for the heating of process pipelines.
- 6.6.4.26 For the heating of instruments it is required to install separate (other than for the heating of process pipelines) circuit breakers with 30 mA current leakage protection and additional QF+SD contacts. SD contacts shall be connected to the common failure signal in the cabinet.
- 6.6.4.27 Position numbers, quantities and locations of heat traced instruments shall be agreed with the process control and automation designer at the time of design.
- 6.6.4.28 Design battery limit for the electrical part – inlet terminals of the distribution box of the measuring instrument cabinet.

Installation of lighting

- 6.6.4.29 It is required to design lighting for the designed equipment (new pumps, valves, measuring instruments, etc.).
- 6.6.4.30 Lighting of designed equipment shall conform to applicable hygiene norms.
- 6.6.4.31 Basic lighting requirements of the Owner:
- 6.6.4.32 For moving outdoors and in working areas 20 lx (around vessels, pumps, heat-exchangers, boilers, air coolers).
- 6.6.4.33 For movement zones, visual observations or short visits 50 lx (stairs, platforms, around control stations (outdoor) of pumps/compressors, around control and measuring instruments).
- 6.6.4.34 It is required to design routine and emergency lighting.
- 6.6.4.35 Power cables coming from different lighting cabinets (routine and emergency) shall be laid in separate cable trays (allowed in one cable tray if separated with a non-flammable partition).

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- 6.6.4.36 Lighting power shall be distributed via distribution boxes (illuminators shall not be connected in series, i.e. from illuminator to illuminator).
- 6.6.4.37 Illuminators and junction boxes shall be installed in accessible places. It is required to develop installation drawings for Illuminators.
- 6.6.4.38 Illuminators and junction boxes shall be numbered. Markings (numbers) shall be resistant to atmospheric and chemical agents.
- 6.6.4.39 If additional illuminators are powered from the existing lighting network, it is required to evaluate the network power reserve is sufficient to accommodate new equipment. Points of connection to the existing lighting network shall be additionally agreed with the Owner.
- 6.6.4.40 LED lights shall be used for the illumination of equipment. Main requirements for illuminators are provided in Attachment No.6.

Grounding of electrical equipment and process pipelines

- 6.6.4.41 For the grounding of designed electrical equipment and process pipelines, the existing grounding devices shall be used to the maximum extent. If the existing grounding devices cannot be used or they are not suitable, new devices shall be designed. Designed new grounding loop shall be connected to the existing grounding loop in at least two places.
- 6.6.4.42 The necessity for grounding of process equipment and pipelines, grounding method (grounding points) shall be consistent with the process design solutions and agreed with the structural (pipelines, process equipment) designer.

Other requirements

- 6.6.4.43 Power and control cables shall be installed in separate cable trays. 230 V AC and 24 V DC control cables shall also be installed in separate cable trays.
- 6.6.4.44 Cables of mutually redundant electrical equipment (switchgear incomers, motors, ventilators, etc.) shall be installed in separate trays with >600 mm distance between them. In exceptional cases (if otherwise not technically possible) cables of mutually redundant electrical equipment can be installed in separate compartments of trays and racks that have continuous partitions made of class A1 materials and exhibiting EI 15 fire resistance.
- 6.6.4.45 >500 mm distance shall be maintained between cable trays and parallel pipelines containing flammable products.
- 6.6.4.46 Outdoor equipment (control stations, boxes, cabinets, lights, etc.), cables shall be suitable for -40 – + 50°C temperatures and their housings shall be UV resistant.
- 6.6.4.47 Outdoor cabinets shall be UV resistant, IP 65, with housing made from glass fiber reinforced polyester or stainless steel, installed on special foundation/structure elevated at least 30 cm above the ground. Cabinets shall have an additional roof to protect maintenance staff from rain and a local light switch. Cabinets and equipment mounted inside the cabinets shall be designed for outdoor operation in corrosive environment at -40÷ +50°C temperature. If the distance between

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explosive equipment and Ex zones is <60 m, cabinets shall be of special design with 'E' type housing protected against explosion.

- 6.6.4.48 All distribution/connection boxes (for connection of lighting, heat tracing, and power equipment) located within Ex zones shall be of special design with 'E' type housing protected against explosion.
- 6.6.4.49 Wires of power and control circuits in cabinets shall be numbered and tagged at both ends. Wire address shall include the address of wire connection point (terminal) and the address of the other wire end connection. All information shall be provided on one tag.
- 6.6.4.50 Circuit breakers shall be used to protect auxiliary circuits.
- 6.6.4.51 Soft starters shall be used to reduce the cross section of power cables and to ensure the nominal voltage at the start of powerful motors requiring long power cable lines. Requirements for soft starter are provided in Attachment No.6.
- 6.6.4.52 Overvoltage protection shall be designed for the switchgear sections to protect electrical users from voltage buildup (atmospheric, commutation, transitional period overvoltage).
- 6.6.4.53 If power supply is required for any other equipment not indicated in the task but necessary to attain the project goals (e.g., as a result of changes made to solutions provided in other designs or due to other circumstances), the required connections shall be agreed with the Owner during the development of the design.

6.7 Project Management and site supervision

CONTRACTOR shall provide the following services:

- 6.7.1 Overall project management including planning, procurement, expediting, cost control, QA/QC and the like;
- 6.7.2 Sufficient personnel for the supervision of the execution of the WORK including construction management, field supervision, safety management, QA/QC (at site) and the like;
- 6.7.3 Approvals of Notified Bodies governing the fabrication for the CE Mark
- 6.7.4 Fabrication supervisor and/or technical specialist witnessing the fabrication process;
- 6.7.5 Quality control program and documentary support of manufacturing of goods;
- 6.7.6 QA/QC over all welding activities;
- 6.7.7 QA/QC over the applied application of refractory, insulation, paint and coatings;
- 6.7.8 Site technical services for supervision and quality control over the erection;
- 6.7.9 Site technical services for PRE-COMMISSIONING and PERFORMANCE TEST;
- 6.7.10 Site technical services for COMMISSIONING, START-UP, training, dry-out and any other required operational support to assure safe and effective START-UP.

6.8 Dismantling/demolition works

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CONTRACTOR shall carry all the dismantling and/or demolition activities required according to the demolition plan issued by CONTRACTOR and confirmed by OWNER.

CONTRACTOR shall install and later remove all necessary temporary facilities, construction tools and equipment, scaffolding and the like relevant dismantling activities.

6.9 Material Supply

CONTRACTOR shall supply and transport at site of all necessary EQUIPMENT and MATERIALS required for prefabrication, installation, testing, COMMISSIONING and START-UP activities

6.10 Erection/installation

CONTRACTOR shall provide the necessary activities, facilities and tools for the erection of all the work listed in this CONTRACT and ANNEXES.

7. TEMPORARY CONSTRUCTION FACILITIES AND UTILITIES

7.1 Provided by OWNER

OWNER shall furnish, or cause to be furnished, free of charge to CONTRACTOR the following items and/or services for or in connection with performance of the WORK:

- 7.1.1 Refinery local work permits and authority applications (where necessary);
- 7.1.2 Utilities for CONTRACTOR's temporary facility area (where possible) and for the execution of the WORK;
- 7.1.3 Space for CONTRACTOR's supplied temporary facilities. Any upgrading/paving required for CONTRACTOR's temporary facilities and working area are for CONTRACTOR's account;
- 7.1.4 Supply of electrical power for temporary facility needs within approximately 100 meters of CONTRACTOR's temporary facility area;
- 7.1.5 Supply of sufficient electrical power near construction work areas from distribution panels provided by OWNER;
- 7.1.6 Construction and untreated hydrostatic test water, plant air and nitrogen from sources located within approximately 100 meters of the Battery Limits of the WORK. (Connections to and disconnection's from the water sources and all distribution piping and equipment including removal shall be by CONTRACTOR);
- 7.1.7 Trash containers for solid waste only, and removal of containers from WORK site;

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- 7.1.8 Employee identification (I.D.) badges, site access control and vehicle passes. Vehicle passes will be limited to those required for construction activities;
- 7.1.9 Off-site parking facilities;
- 7.1.10 The power supply can be started only after the CONTRACTOR will accomplish the local safety regulation and the deed of responsibility will be signed between OWNER and CONTRACTOR.

7.2 Provided by CONTRACTOR

All construction temporary facilities, utilities, construction equipment and tools, temporary construction materials, consumables, expendables, supplies, fuels, lubricants and any other item(s), necessary for the complete performance of the WORK and not listed in Article 7.1 of this scope of WORK shall be supplied, installed and properly maintained by CONTRACTOR as part of its scope of WORK.

The type of facilities, move-in and move-out dates and locations on the WORK SITE shall be subject to and in accordance with the review and approval of OWNER. Further they shall be in a condition safe and suitable for the intended purpose and in compliance with OWNER's requirements, the applicable rules and regulations for the WORK SITE.

OWNER shall have the right to inspect, test and reject any or all temporary facilities and utilities. Rejected temporary facilities and/or utilities shall promptly be removed by CONTRACTOR and replaced with temporary facilities and utilities acceptable to OWNER at CONTRACTOR's cost, and at no cost to OWNER, and without causing delay to the WORK.

8. SCHEDULING AND REPORTING

CONTRACTOR is responsible for scheduling, reporting, forecasting and controlling its own activities and CONTRACTOR shall plan and adequately staff the Project to ensure that the WORK is completed in accordance with the specific milestones and scheduling requirements listed below:

- Engineering deliverables by discipline;
- Mobilization time for manpower and equipment;
- Start and completion dates of different segments of WORK (early and late starts);
- Any qualifying conditions of OWNER;
- Other as necessary.

OWNER's normal working hours are forty (40) hours per week, eight (8) hours per day, five (5) days per week (Monday through Friday), between the hours of 8:00 a.m. and 5:00 p.m. CONTRACTOR shall submit its schedule of working hours and manpower loading for review and approval by OWNER.

8.1 Reporting

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CONTRACTOR shall promptly submit the schedules and reports set forth below and, in addition, those schedules and reports that are requested by OWNER.

- 8.1.1 A Master Bar Chart Schedule based on the critical path as specified by OWNER.
- 8.1.2 The activity listing shall show the following information for the main activities shown on the Schedule:
 - i) Identification by code numbers and description
 - ii) Duration
 - iii) Discipline and/or craft
 - iv) Early start and finish dates
 - v) Latest start and finish dates
 - vi) Total float time and free float time
- 8.1.3 A detailed work schedule, updated weekly of day-to-day operations showing planned manpower loadings for major activities at site.
- 8.1.4 Major construction equipment correlated to the above detailed work schedule.
- 8.1.5 Safety Status Report with statistics issued monthly by the 5th day of each month.
- 8.1.6 Procurement schedule for the procurement and receipt of materials, equipment and subcontract services by CONTRACTOR and a monthly status report of all such procurement, MATERIALS and EQUIPMENT.
- 8.1.7 During the latter stages of accomplishing WORK, and prior to delivering notice of completion of the WORK, CONTRACTOR shall submit its plans for demobilization at the WORK SITE to OWNER for approval and shall comply with such demobilization plan as approved by OWNER.

8.2 Weekly coordination Meetings – Construction Phase

- 8.2.1 A weekly written report showing actual activities completed versus planned and scheduled progress versus actual progress. In addition to giving details of WORK completed in relation to the approved schedule, a two week “look ahead” showing details of how the WORK will be accomplished in the coming period. Report shall also identify remaining WORK and estimated hours required to complete such WORK. This report shall be submitted to coincide with a mutually scheduled weekly progress meeting. An updated schedule shall be submitted in the event of an agreed schedule change. Should the CONTRACTOR report on a basis other than man-hours and tonnage, a complete description of the method of reporting and actual numbers must be submitted.
- 8.2.2 CONTRACTOR shall attend a weekly safety coordination meeting together with various contractors at the WORK site.

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8.2.3 The person or persons designated by CONTRACTOR to attend the meetings shall have all the required authority to make decisions and commit CONTRACTOR to solutions agreed upon during any coordination meetings.

8.3 Other Meetings

CONTRACTOR participation in certain other activities will be required – they will be coordinated on demand. These activities will include, but not be limited to:

- ⇒ Project coordination and design review meetings;
- ⇒ Weekly tool-box safety meetings (during construction phase at site) organized and conducted by CONTRACTOR and attended by all of CONTRACTOR's craft employees. CONTRACTOR shall be responsible for arranging and conducting these meetings with its craft employees.

9. CONTRACTOR's Data

CONTRACTOR shall submit the following data to OWNER as part of the scope of WORK:

- 9.3.1 Two (2) final copies of all technical documentation (drawings, specifications and the like prepared by CONTRACTOR during the execution of the WORK);
- 9.3.2 Two (2) final copies of all quality control turnover packages;
- 9.3.3 Two (2) final copies of all test reports and test certificates;
- 9.3.4 Two (2) final copies of mill certificates for all supplied MATERIALS (e.g. rebar, plate steel, nozzles and the like);
- 9.3.5 Two (2) final copies of all piping NDE tests;
- 9.3.6 Two (2) final copies of all welding folders;
- 9.3.7 Two (2) final copies of all welding X-ray reports;
- 9.3.8 Two (2) final copies of all stress relieving reports;
- 9.3.9 Two (2) final copies of all pressure testing documentation;
- 9.3.10 One (1) final reproducible or one (1) electronic file and one (1) set of prints of all "as-built" drawings;
- 9.3.11 Welding procedures for OWNER's approval, submitted fifteen (15) working days prior to commencing welding. Alternatively, CONTRACTOR may submit its pre-approved welding procedures for project record purposes to OWNER prior to commencing welding;
- 9.3.12 Quality Control Program for review and approval prior to commencement of WORK;
- 9.3.13 All necessary QA/QC turnover documentation as WORK or portion thereof is completed;
- 9.3.14 At completion of WORK, a complete report of all tests and all reports required by standards and specifications;
- 9.3.15 All lifting and rigging procedures for review and approval prior to lifting or erecting equipment;
- 9.3.16 Any and all other data requirements to comply with Lithuanian governmental regulatory agencies;

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- 9.3.17 CONTRACTOR shall submit all engineering data, (herein called "data") to OWNER and OWNER designated representatives for review. OWNER shall return data submitted by CONTRACTOR within seven (7) working days from transmittal date. No data is to be issued without a transmittal signed by CONTRACTOR or its representative.
- 9.3.18 CONTRACTOR shall furnish to OWNER reproducible drawings revised by CONTRACTOR to show "as-built" information. CONTRACTOR's revisions will show details of those locations where the WORK performed by CONTRACTOR was at variance with the details shown on the drawings (either furnished by OWNER, or furnished by CONTRACTOR and reviewed by OWNER). CONTRACTOR's submittal to OWNER of such "As-Built" drawings shall be made on a continuous basis as the WORK proceeds but in all cases prior to the date of Notice of Acceptance;
- 9.3.19 OWNER reserves the right to review certified material test reports for all materials of construction at any time during field erection. CONTRACTOR shall maintain these documents readily available for such review and shall submit all documents to OWNER upon completion of the WORK;
- 9.3.20 CONTRACTOR shall maintain at the WORK SITE up-to-date copies of all drawings, specifications, and other documents and supplementary data, complete with latest revisions thereto. In addition, CONTRACTOR shall maintain a continuous record of all field changes on the "As Built" drawings and other engineering data and shall submit the required number of copies thereof to OWNER;
- 9.3.21 CONTRACTOR shall show the OWNER CONTRACT number and identifying item numbers, if applicable, on all data submitted pursuant to this Article 8.0.

10. CLEANUP, SAFETY, WORK RULES AND REGULATIONS

10.1. Cleanup

CONTRACTOR shall at all times keep its work area in a neat, clean and safe condition and remove from the OWNER's premises and the vicinity thereof and properly dispose of all debris and rubbish caused by CONTRACTOR's operations. Upon completion of the WORK, CONTRACTOR shall promptly return unused materials furnished by OWNER and remove from OWNER's premise all of CONTRACTOR's equipment, material, scaffolding and like items, leaving OWNER's premises and the vicinity clean, safe and ready for use

In the event CONTRACTOR shall fail to maintain its WORK area as described above and in a manner satisfactory to OWNER, or to effect such cleanup or removal immediately after receipt of written notice to do so, OWNER shall have the right without further notice to CONTRACTOR to perform such cleanup and remove such items on behalf of, at the risk of and at the expense of CONTRACTOR. OWNER may store items removed at a place of its choosing on behalf of CONTRACTOR and at CONTRACTOR's risk and expense. OWNER will promptly notify CONTRACTOR of such place of storage. CONTRACTOR shall promptly reimburse OWNER for the costs of such cleanup, removal and storage.

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10.2. Safety

Safety is of prime importance. All CONTRACTORS and SUBCONTRACTORS working on the Project shall have in effect a Safety Plan and shall designate a Safety Representative in accordance of OWNER requirements set forth in CONTRACT GENERAL CONDITION ANNEX 2. The attachment provided on the website <http://www.orlenlietuva.lt/EN/ForBusiness/DocumentsForContractors/Pages/default.aspx>

CONTRACTOR's Safety Representative shall be responsible for implementing the CONTRACTOR's Safety Plan as reviewed by OWNER's Safety, Health and Environmental (SHE) Manager. CONTRACTOR's Safety Representative shall ensure that WORK site safety requirements and procedures are being adhered to, conduct safety inspections of work being performed, conduct weekly safety meetings with craft employees and submit a weekly report to OWNER documenting safety activities. The Safety Representative shall also be responsible for a continuing survey of CONTRACTOR's operations, to ensure that the probable causes of injury or accident are controlled and corrected and that operating equipment, tools and facilities are used, inspected and maintained as required by applicable safety and health regulations. Technical Product Data Sheets or Material Safety Data Sheets which include health, environmental and safety data or alternatively separate product safety data sheets as issued by the applicable Manufacturer for each product, are to be in the possession of CONTRACTOR and to be kept available at all times during the execution of the WORK at the WORK SITE.

SHE Managers, their designated representatives and OWNER shall have the right to stop WORK whenever safety violations are observed which could jeopardize the well-being of personnel and equipment. The expense of any such WORK stoppage and resultant standby time shall be to CONTRACTOR's account. The failure or refusal of CONTRACTOR to correct the observed violation may result in the termination of the Contract, and/or the dismissal from the WORK SITE of those responsible for such failure or refusal.

CONTRACTOR shall provide to OWNER's SHE Manager a copy of all reports made to government agencies or insurance companies relating to any WORK SITE accident or injury during CONTRACTOR's performance of the WORK.

10.3. WORK Rules and Regulations

CONTRACTOR shall comply with all WORK rules and regulations set forth in CONTRACT GENERAL CONDITION ANNEX 2. (*Local General Requirements of Public Company ORLEN LIETUVA (Requirements for Contractors Performing Maintenance-Installation of Process Units at Public Company ORLEN Lietuva. The attachment provided on the website <http://www.orlenlietuva.lt/EN/ForBusiness/DocumentsForContractors/Pages/default.aspx>.*

Prior to work commencement, CONTRACTOR shall develop its Waste Management Plan and get it approved by Project Manager, head of the (sub)division/department/unit where the works are to be performed, and Environmental Department. CONTRACTOR shall clean the work site at the end of each shift, sort the waste generated during the works and remove it to the location indicated by OWNER. In doing this, it shall observe Public Company ORLEN Lietuva Rules on Waste Management.

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10.4. Hazardous Substances

CONTRACTOR shall comply with applicable hazardous substance disclosure requirements set forth in CONTRACT GENERAL CONDITION ANNEX 2. The attachment provided on the website

<http://www.orldenlietuva.lt/EN/ForBusiness/DocumentsForContractors/Pages/default.aspx>

11. QUALITY PROGRAM REQUIREMENTS

11.1. CONTRACTOR's Quality Plan

CONTRACTOR shall be responsible for the performance of all activities affecting quality including those of its SUBCONTRACTORS and VENDORS. CONTRACTOR's Quality Plan and Inspection and Test Procedures shall be submitted for review and authorization to proceed within forty five (45) days of CONTRACT EFFECTIVE DATE, but not later than fourteen (14) days prior to placement of each main sub-order. The Plan shall specify the controls and documentation procedures that will be employed to assure and document that the CONTRACT requirements are being achieved. Minimum requirements for the quality control effort shall be:

- The performance of all procedures, checks, inspections, tests, reviews, certifications and other requirements called for in the scope of WORK, including Specifications, Drawings, Attachments, pertinent codes and other CONTRACT Documents;
- The preparation of documentation that provides objective evidence of compliance to requirements and the actual performance, in a timely manner, of tests, reviews, certifications, checks, inspections and other verification activities. CONTRACTOR's standard forms may be used in lieu of the documentation forms provided, if agreed by OWNER.

11.2. Drawing and Specification Control

CONTRACTOR shall establish a system for the control of design and construction drawings, installation instructions, specifications and other documents used to perform the WORK. CONTRACTOR shall assign responsibility to guarantee current drawings and documents and changes thereto are available to user(s) and that obsolete documents are retrieved and controlled.

11.3. Inspection and Test Status Control

CONTRACTOR shall establish and maintain a system to identify inspection and test status to ensure all inspections, tests and other requirements are accomplished.

11.4. Documents & Record Control

CONTRACTOR shall provide and maintain a Document Control System for records of quality control actions of both CONTRACTOR and its subcontractors and vendors. Ensure timely publication and retrieval of all quality records including, but not limited to:

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- i) Evidence of inspection to assure adherence to applicable drawings, specifications and changes thereto;
- ii) Test data records of all tests performed. Test data records shall be traceable to acceptably tested material;
- iii) Non-conformance and corrective action records;
- iv) Material testing and equipment calibration records and logs;
- v) Maintain quality control records ready for OWNER inspection;
- vi) Submit originals of all quality inspection and test documentation as WORK progresses;
- vii) All construction quality related activities and procedures.

12. CONSTRUCTION

CONTRACTOR shall provide, institute, and /or implement the following:

12.1. Security Program

CONTRACTOR shall be responsible for the security of its workers, tools, materials and equipment on (and in transit to and from) the WORK site. All small tools and construction equipment belonging to CONTRACTOR shall be clearly identified as such. Tools including personal tools are subject to inspection at the security gate on arrival and departure.

12.2. Joint Occupancy

The roads to the WORK SITE on the refinery will be used jointly by OWNER and other contractors.

12.3. Construction Area Limits

OWNER will designate the boundary limits of access roads, parking areas, storage areas, and construction areas. CONTRACTOR shall not trespass in or on areas not so designated. CONTRACTOR shall be responsible for keeping all of its personnel out of areas not designated for CONTRACTOR's use. In the case of isolated WORK located within such areas, OWNER will issue permits to specific CONTRACTOR personnel to enter and perform the WORK.

12.4. Temporary Plant Roads Within CONTRACTOR's Area

The construction area will be constructed and maintained by CONTRACTOR. All roads constructed by CONTRACTOR shall be adequate for applied traffic loads and to prevent damage to underground facilities. All temporary roads are to be removed prior to completion, unless OWNER directs them to be retained.

12.5. Restricted Roads Adjacent to CONTRACTOR's Area

Roads other than those mentioned above are restricted for reasons of safety. CONTRACTOR shall not be permitted access or use of these roads. Restricted roads will be defined when construction arrangements are finalized.

12.6. Fence

CONTRACTOR shall install temporary fence 15 meters from the operating zone around CONTRACTOR's construction area (where applicable).

12.7. CONTRACTOR's Office at Site of WORK

During the performance of this CONTRACT, CONTRACTOR shall maintain a suitable office at or near the site of the WORK which shall be the headquarters of a representative authorized to receive drawings, instructions, or other communication or articles. Any communication given to the said representative, or delivered at

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CONTRACTOR's office at the site of the WORK in his absence, shall be deemed to have been delivered to CONTRACTOR.

12.8. CONTRACTOR's Temporary Buildings

All temporary construction buildings provided by CONTRACTOR shall be fire retardant. The location size(s), quantity and types(s) of temporary buildings shall be subject to OWNER's review and approval.

12.9. Clean up

CONTRACTOR shall at all times keep its WORK area and plant roads in a neat, clean, open and safe condition and remove from the OWNER's premises and the vicinity thereof and properly dispose of all debris and rubbish caused by CONTRACTOR's operations.

12.10. Radios on Site

Hand held radios sufficient for communications and emergency response may be permitted. Approval for use of radio shall be obtained through OWNER. CONTRACTOR shall obtain any necessary licenses to operate radios on the WORK SITE. Any such radios shall operate on frequencies authorized by OWNER.

12.11. Personnel identification

OWNER will provide ID badges to all CONTRACTOR's employees working either directly or indirectly under its supervision. Badges must be worn conspicuously by these employees at all times.

12.12. No Smoking

No smoking will be allowed in the work area(s) or outside of the designated smoking areas.

12.13. Personnel Clothing and Equipment

CONTRACTOR's personnel must wear hard hats clearly marked with employee name, and Company logo. CONTRACTOR shall equip its employees with safety boots, safety glasses and all other safety equipment as required under Lithuanian law and/or by OWNER and such clothing including long sleeved shirts, coveralls, long pants, etc.

12.14. Dust Control

CONTRACTOR shall, for the duration of the Contract, maintain all excavation, embankments, haul roads, plant sites, waste disposal areas, borrow areas, and all other WORK areas free from dust, as determined by OWNER. Industry-accepted methods of dust control suitable for the area involved, such as sprinkling, chemical treatment, light bituminous treatment or similar methods, will be permitted. No separate payment will be made for dust control.

12.15. Water Pollution

CONTRACTOR shall, at its expense, provide suitable facilities to prevent the introduction of any substances or materials into any sewer, stream, lake or other body of water which may pollute the water or constitute substances or materials deleterious to fish and wildlife.

12.16. Air Pollution

CONTRACTOR shall so perform the WORK as not to discharge into the atmosphere from any source whatsoever smoke, dust, or other air contaminants in violation of the laws, rules and regulations of the governmental entities having jurisdiction.

12.17. Ventilation

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- CONTRACTOR shall prevent hazardous accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction.
- CONTRACTOR shall provide local ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- CONTRACTOR shall dispose of materials in a manner that will not result in harmful exposure to persons or disrupt or otherwise effect operation of existing facilities.
- CONTRACTOR shall ventilate storage spaces containing hazardous, volatile or high temperature sensitive materials.

12.18. SITE Signs

Identification signboards and notices for safety or instruction are permitted on site only after approval of OWNER for format, location and quantity.

12.19. Drainage

CONTRACTOR shall provide proper and adequate drainage for its construction, storage, parking and fabrication areas including the necessary piping for disposal to OWNER ditches, or sewers. Temporary drainage facilities shall be removed upon completion of WORK unless OWNER directs to have the facilities left in place. CONTRACTOR shall be responsible for providing and operating any temporary pumps for keeping its area drained. CONTRACTOR shall furnish and place any necessary surfacing material to avoid loss of time due to muddy conditions.

12.20. Lunch Facilities

CONTRACTOR shall provide any necessary lunch facilities for their forces.

12.21. Removal of Equipment Materials from WORK SITE

All equipment, materials, supplies and tools leaving the premises are to be accompanied by a gate pass issued by OWNER.

12.22. Review by OWNER

Review and approval by OWNER of CONTRACTOR's rigging, scaffolding and other construction plans shall not constitute, or be construed as, an assumption of CONTRACTOR's responsibility or liability for scaffolding or safety under the Contract or at law and does not relieve CONTRACTOR from full compliance with its legal and contractual obligations.