Odvoz a likvidácia odpadu a. s.

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821 04 Bratislava 2
ČSOB, a. s. IBAN SK37 7500 0000 0000 2533 2773
Zapísaná v Obchodnom registri
Mestského súdu Bratislava III, odd. Sa, vl. č. 482/B

IČO: 00681300
DIČ: 2020318256
IČ DPH: SK2020318256

Annex 4 to the Notice of initiation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

(Unofficial translation)

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

CONTENTS

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

DEFINITIONS AND INTERPRETATION OF TERMS

In the Description of the subject of the contract, words and expressions with an initial capital letter shall have the following meanings:

"The Work"	means the sum total of all performance (including, but not limited to, the supply of Goods and Documentation, the performance of works and services, the granting of rights of use) to be provided, performed or secured by the Contractor (the Bidder) under the terms of the Contract, including the results thereof, which in the aggregate will constitute a complete, operable, safe and reliable waste-to-energy facility (WTEF) that will meet the parameters required by the Contract and serve the purpose stated therein. Further details of the anticipated scope of the Work are described in 2 of this Annex.
"Goods."	means the material equipment, facilities, materials, separate products, supplies of materials of all kinds to be furnished, delivered, installed and tested by the Contractor in accordance with the Contract, excluding installation equipment.
"Contractor"	means a legal entity which, on the basis of the Contract, delivers to the Customer the complete Work within the scope specified in the Contract.
"Customer"	means a legal person referred to in Chapter 1.3 of this Annex.
"Usage rights"	means all rights relating to know-how, engineering, designs, calculations, drawings, software, licenses and any other rights or other intangible supplies necessary for the unrestricted use of the Work.
"Contract"	means the Contract for Work to be concluded between the Client and the Contractor regarding the execution of the Work.

LIST OF ABBREVIATIONS:

Abbreviations/ terms	Abbreviations used in ZD-AJ	Abbreviations used in ZD-SJ	Meaning English	Meaning of Slovak
AMS-E	CEMS	AMS-E	Continuous Emissions Monitoring Systems	Automatic emission monitoring system
ASRTP	ATPCS	ASRTP	Automated Technological Process Control System	Automated technological process control system
ATS	ATS	ATS	Water booster pump station	Automatic pressure station
BAT	BAT	BAT	Best Available Techniques	The best technology available
BEP	BEP	BEP	BIM Execution Plan	BIM Implementation Plan
BIM	BIM	BIM	Building Information Modelling	Building Information Modelling
BREF	BREF	BREF	Reference Document on Best Available Techniques	Reference document on best available techniques
CCR	CCR	CCR	Central control room	Velín (control centre)
CPU	CPU	CPU	Central processing unit	Central processing unit
WWTP	WWTP	WWTP	Waste water treatment plant	Wastewater treatment plant
MSs	MSs	MSs		Sewage pumping station
DCS	DCS	DCS	Distributed Control System	Distributed control system
DeNOx	DeNOx	DeNOx	Removal of oxides of nitrogen	Removal of nitrogen oxides
DG	DG	DG	Diesel generator	Dieselgenerator
DPS	DPS	DPS	Partial process system	Partial operation file
DUR	DUR	DUR	Construction Location Documentation	Documentation for planning permission
ESD	ESD	ESD	Emergency Shutdown System	Emergency shutdown system (boiler)
EU	EU	EU	European Union	European Union
FVZ	PVS	FVZ	Photovoltaic Source of Electricity	Photovoltaic equipment
HRM		HRM		Main disconnection point
HUS	MET	HUS	Main earthing terminal	Main earthing clamp
HVB	HVB	HVB	Main production unit	Main production block
CHUV	CHUV	CHUV	Chemical water treatment / water treatment plant	Chemical treatment/water treatment plant

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

Abbreviations/ terms	**Abbreviations used in ZD-AJ**	**Abbreviations used in ZD-SJ**	**Meaning English**	**Meaning of Slovak**
ACC	ACC	ACC	Kraftwerk-Kennzeichensystem - Power Plant and Energy Coding System	Kraftwerk- Kennzeichensystem - Power and energy coding system
KVET	CHP	KVET	Combined heat and power	Combined production of electricity and heat ZEVO
LUVO	LUVO	LUVO	Primary air heater	Primary air heater
MaE	MaE			Modernisation and greening of the OLO ZEVO
MaR	MaR			Measurement and control
MHTH	MHTH	MHTH		MH Teplárenský holding, a.s., plant Bratislava - operator of SCZT Bratislava - East
NAS	NAS	NAS	Network Attached Storage	Data storage on the network
NN	NN	NN	Low voltage	Low voltage
NP	NP	NP	Aboveground level	Above ground floor
NVR	NVR	NVR	Network Video Recorder	Recorder responsible for receiving, displaying and storing video from IP cameras
OP	OPS	OP	Operator Station	Operator workplace
ENT	ENT	ENT	Oil substance separator	Oil separator
PBS	PBS	PBS	Fire-safety of buildings	Fire safety of buildings
PED	PED	PED	Pressure Equipment Directive	Pressure Equipment Directive
PS	PS	PS	Process system	Operating file
SCADA	SCADA	SCADA	Supervisory control and data acquisition	Dispatch control and data collection
SCR	SCR	SCR	Selective catalytic reduction	Selective catalytic reduction
SCZT	SCZT	SCZT	District heating	Central heat supply
SKR	I&C	SKR	Instrumentation and Control System	Control and management system
SNCR	SNCR	SNCR	Selective non-catalytic reduction	Selective non-catalytic reduction

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

Abbreviations/ terms	**Abbreviations used in ZD-AJ**	**Abbreviations used in ZD-SJ**	**Meaning English**	**Meaning of Slovak**
SO	SO	SO	Building structure	Building object
STN	STN	STN	Slovak technical standard	Slovak technical standard
STL	STL	STL	Medium pressure, medium-pressure	Medium pressure, medium pressure
TG	TG	TG	Turbo Generator	Turbogenerator
TRB	PDP	TRB	Pressure Dew Point	Pressure dew point
VN	HV	VN	High-voltage	High voltage
VS	HES	VS	Heat exchangers station	The exchange station
ZEVO	ZEVO	ZEVO	Waste-to-Energy Plant	Equipment for the energy recovery of waste
OC	OC	OC	Mixed municipal waste	Mixed municipal waste
ZSE	ZSE	ZSE	Západoslovenská energetika, a.s.	Západoslovenská energetika, a.s.
Z.z.		Z.z.		Collection of laws

Note: All pressures given in this document are absolute pressures in Pa.

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

1 General Description Works

1.1 Home

On the territory of the Capital City of the Slovak Republic - Bratislava, one of the two facilities for energy recovery of other waste (non-hazardous waste) within the Slovak Republic is currently operated. Its operator is the joint stock company Odvoz a likvidácia odpadkov a.s. (OLO), whose sole shareholder is the City of Bratislava.

The facility is located in an industrial area in the south-eastern part of Bratislava, adjacent to the wastewater treatment plant of Slovnaft a.s., the area of the MH Teplárenský holding, a.s. - Výhrevňa Juh operation, the R7 motorway bypass and the area of the Danube floodplain forests.

The construction of the plant with three boilers (K1, K2 and K3) was carried out in 1977. In 2000-2002, the plant underwent extensive reconstruction, during which two lines, K1 and K2, were reconstructed and modernised. The third line together with the K3 boiler were dismantled and removed. At present, the Waste to Energy Plant (ZEVO) provides recovery of mainly mixed municipal waste from the Bratislava area in two boilers (lines) K1 and K2. The waste treatment produces steam for energy use, mainly for the production of electricity supplied to the public grid and heat to the central heat supply system (SCZT) of MH Teplárenský holding, a.s. The operation is continuous, 24 hours a day, non-seasonal, with a planned annual working time of both boilers of 7 500 h/year and with a waste treatment of approx. 125 000 t/year. The total currently permitted annual capacity for energy recovery of waste is 163 500 t/year. The lifetime of the WWTP, after extensive reconstruction in 2000-2002, was planned to be 25 years and will be reached in 2027. One or two technological shutdowns of the WWTP are carried out once or twice a year for cleaning, maintenance/repair and adjustment of the operation. Currently, waste is hauled to the landfill during shutdown periods.

The work - Modernization and Greening of the OLO ZEVO (MaE) is intended to ensure an increase in reliability, prolongation of service life and annual operating time, while placing great emphasis on its greening. The aim is to achieve sustainable operation with optimal investment and operating costs and to minimize necessary shutdowns. It is also crucial to increase the heat supply from the ZEVO to the central heat supply system (SCZT) of the city of Bratislava and to increase the electricity production supplied to the public grid.

The work - MaE includes the installation of a new boiler K3, two separate flue gas cleaning systems (one common for boilers K1 and K2 and the other for the new boiler K3), the installation of a new common condensing extraction turbine generator for boilers K2 (K1) and K3, the installation of other auxiliary equipment, as well as the construction of new and modification of the existing Building and Engineering facilities.

After the implementation of the MaE work, the ZEVO will be operated in the mode of operation of a maximum of two combustion lines - boilers at the same time, namely K3 and K2. Boiler K1 will serve only as a "cold reserve" in case of technological shutdown of boiler K2.

The work - MaE will be carried out on the land of OLO a.s., in the area of the existing ZEVO OLO. The works will be carried out during the operation of the existing two lines K1 and K2 with the supply of heat and electricity to the public network. Later, the works will continue during the operation of the new line K3 with heat and electricity supply to the public grid.

During construction, it is required to minimise the disruption to the operation of the OLO ZEVO.

1.2 Purpose Works

The purpose of the Work is:

- Reduction of emissions per tonne of energy recovered
- Increasing the amount of heat supplied in the form of hot water to the central heating supply system (CHPS)
- Increase in electricity production
- Increase energy efficiency
- Energy recovery of waste to the current permitted capacity of 163 500 t/year and an increase of 16 500 t/year to a total capacity of 180 000 t/year

The energy use of waste after the modernisation of the OLO WTP will result in highly efficient combined production of electricity and heat with maximisation of the use of heat produced by incineration of waste for the supply of heat to the SCZT.

1.3 Identification details of the Builder

Builder/Customer:	Waste removal and disposal a.s. (OLO a.s.)
Headquarters:	Ivanská cesta 22, Bratislava 821 04
ID:	00681300
TIN:	2020318256
Name of the building:	Modernization and greening of ZEVO OLO - lines K3 and K2
Place of construction:	Vlčie hrdlo 72, 821 07 Bratislava
Cadastral area:	Ružinov

1.4 Basic data on existing and new facilities

1.4.1 Basic description of existing equipment

Architectural and structural design of the plant

The OLO ZEVO plant is located in an industrial area owned by the Customer, where the Customer has been currently managing waste and recovering waste energetically for several decades. The ZEVO OLO site has existing HV and LV electricity distribution, gas connection, facilities for personal hygiene, i.e. toilets, showers and changing rooms. The area has a drinking and drinking water supply. The ZEVO OLO site and its areas are sewered in accordance with the valid permit. The storm water drainage is discharged into the cooling pond and the sewage drainage is solved by connection to the mechanical-biological wastewater treatment plant of Slovnaft a.s.

The following main objects are located in the ZEVO OLO area:

- a waste storage tank where waste is stored and homogenised prior to energy recovery,

- boiler room of boilers K1, K2 in which own waste incineration takes place and free space for boiler K3,
- engine room of steam condensing turbogenerator with HV substation and HV transformer room,
- the object of the air condenser,
- object of technology of descaling and storage of slag,
- flue gas cleaning facilities and installations, which include an ash management system,
- auxiliary operations - chemical water treatment, LV substation, LV transformer station,
- sewage pumping station,
- administrative / operational and social building.

Other land - consists of areas around the main production block of ZEVO OLO, and these are paved. In the immediate vicinity of the site there is a sorting plant with a sorting line, where the sorting of incoming sorted paper and plastic waste takes place. The sorted non-recyclable residues are transported to the OLO ZEVO for energy recovery. Prior to the commencement of construction work on the adjacent areas of the Sorting Plant, the Sorting Plant building and plant technology will be removed by the Customer.

The detailed situation of the existing layout of buildings and utilities within the ZEVO OLO site is shown on drawing MAE_DUR_AR_SOXX_SIT_01_SIT_KOO_BUR SITUATION_KOORDINACNA-BUR in Annex 8.

Technological part - operational files

The operation of the OLO ZEVO currently consists of the following technological systems and equipment:

- equipment for weighing and receiving waste,
- a waste bin for storage of imported waste, with grab cranes for handling the waste in the waste bin, for homogenising the waste and for loading the waste into the boiler hoppers,
- steam grate boilers K1 and K2 for waste incineration and production of superheated steam,
- SNCR and ammonia water storage facilities,
- equipment for flue gas cleaning lines, for the preparation of lime milk, equipment for the storage and dosing of carbonaceous sorbent for flue gas cleaning,
- facilities for the storage and dispatch of solid waste from flue gas cleaning,
- ash and slag storage facilities, a slag sorting line and the dispatch of slag and materials sorted from slag,
- steam generator for electricity production,
- air-cooled condenser,
- KVET ZEVO OLO equipment - rotary steam reduction with heat exchanger station and mains water circulation pumps,

- HV and LV electrical equipment,
- measurement and control equipment and the higher-level control system,
- Automated Emission Monitoring System - AMS-E (CEMS) equipment,
- device for dispersion of cleaned flue gases - chimney,
- equipment for pumping wastewater from the ZEVO site.

1.4.2 Basic description of the new Work

The work - Modernization and Greening (MaE) of ZEVO will mainly include the construction of a new combustion line K3 with a boiler and flue gas cleaning equipment, a new turbogenerator and air condenser, other related objects and technologies of ZEVO OLO .

The modernisation and greening (MaE) of the ZEVO will also concern the existing combustion lines K1 and K2, while:

- the equipment of the existing flue gas cleaning of boiler K1 will be dismantled without replacement,
- the combustion system of boiler K1 will be modified and boiler K1 will be preserved. It will serve as a cold reserve in case of failure of boiler K2,
- the combustion system of the K2 boiler will be modified and the K2 boiler will be equipped with a new flue gas cleaning plant, the same concept as the flue gas cleaning plant of the K3 boiler.

In case of failure of boiler K2, the decontaminated boiler K1 will be put into operation and the flue gas cleaning line of boiler K2 will be used for flue gas cleaning. The current operation of boilers K1 and K2 will not be possible.

The reason for the modifications (reconstruction) of boilers K1 and K2 are the adaptation of the boiler combustion system to the combustion of waste with a higher nominal calorific value (11.0 MJ/kg) and the extension of the boilers' service life - that is, the replacement or repair of equipment and components of the boilers that are already at the end of their planned service life.

The existing turbine-generator with an electrical output of 6.3 MWe will be dismantled together with the existing air-cooled condenser, the rotary reduction and the heat exchanger station will also be dismantled.

The following new equipment will be installed as replacements:

- steam condensing turbogenerator with steam extractions,
- substation with a capacity of 40 MWt,
- air-cooled condenser,
- power transformer.

The new turbogenerator will be oversized for the maximum amount of steam from boilers K3 and K2 so that it is able to operate even when the steam production is reduced, i.e. even when one of the boilers K3 or K2 is shut down.

The scope of the Work is described in detail in the chapter 2.

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

After the implementation of the MaE project, the capacity of the OLO WPCP will increase from the originally permitted 163 500 t/year under the integrated permit (IPPC) to 180 000 t/year of energy recovered waste. The current actual capacity is approximately 130 000 t/year due to the increase in the nominal calorific value of the waste from 9 MJ/kg to 11 MJ/kg.

New architectural and structural design

The new architectural and structural design of the OLO ZEVO is evident from the attached Architectural Study in Appendix 8. The detailed situation of the new layout of buildings and utilities within the ZEVO OLO site after the implementation of the ZEVO MaE is shown in the drawing MAE_DUR_AR_SOXX_SIT_02_SIT_KOO_NOV SITUATION_KOORDINACNA-NOV in Annex 8.

The following main objects will be located in the area:

- Existing Building object Boiler house building SO 01 - will be modified - enlarged within the MaE in the area of the boiler K3. The architectural expression of the building is designed in accordance with its function. New cladding of the façade will be implemented for the building, a distinctive element for the revival of the façade will be the proposed observation walkway, which will wrap like a ribbon around the façade of the building up to the observation platform (SO 02, SO 22).
- Extended original construction object Waste storage building SO 02 - extension to waste storage SO 22 with viewing platform.
- Existing Building S0 03 - there is no major reconstruction within the MaE. In addition to the increase in the amount of treated slag, the cladding (facade) of the building will be replaced and an external service and escape staircase will be added.
- Existing chimney SO 60 - there is no reconstruction within the MaE. The existing chimney coating will be repaired and colour-coordinated according to the unifying architectural design of the cladding of all ZEVO SOs.
- The new building Turbine Generator Plant TG2 SO 08 - will be located on the area of the dismantled screening plant.
- New Construction Object Air-cooled condenser SO 09 - will be located on the area of the dismantled refining plant.
- New Construction Objects of Economy and Flue Gas Cleaning of Boiler K3 and Boiler K2 (K1) SO 06 and SO 05 - for placement of technologies of flue gas cleaning of line K3 and flue gas cleaning of line K2 (K1).
- Existing building Operational and social building SO 12 - will be modified within the MaE. The architectural solution of the building is based on the realization of a partial 3NP superstructure of the building. From the area of the 3NP superstructure a viewing walkway will provide access to the viewing platform.
- The cladding of the existing and proposed buildings will be unified with pre-assembled galvanized sheet metal. The design of material and colour solution is coordinated according to the unifying architectural solution of cladding of all the ZEVO SO.
- New Construction Objects for Auxiliary Operations:

- Building of auxiliary operations SO 15, where will be located CHÚV, fire pump engine room and fire water tanks, diesel generator station.
- New Building structures of the filling platform SO 24.
- New Hall for crushing oversized waste SO 25.
- New Construction Object Compressor station, DCS substation and secured power supply system SO 04.
- New Construction Object Weighbridge and gatehouse building No.2 SO 07.

- For construction objects that will not be fundamentally reconstructed, such as SO 03, the existing facade will be repaired and unified in colour and appearance with the other ZEVO SOs.

Within the framework of MaE, rooms will be constructed and reconstructed in the construction objects for new technological equipment such as:

- Transformers, HV, LV substations in SO 22, SO 04, SO 27 and SO 08,
- Velín in SO 22 .

1.5 Art enation of the Work

1.5.1 Building objects / Engineering objects

The construction part of THE WORK will be divided into construction objects (SO).

The scope of work includes the following Construction Objects:

SO number	Name	ACC
SO 01	Boiler house building	00UHA
SO 02	Waste storage building	00UEB
SO 03	The building of compensation	00UEW
SO 04	Compressor station, DCS substation and secure power supply system	01UTF 01UAB 01UCB
SO 05	Economy of flue gas cleaning of boiler K2 (K1)	30UVK
SO 06	K3 boiler flue gas cleaning economy	20UVK
SO 07	Weighbridge and gatehouse building No. 2	01UYF
SO 08	TG2 turbine-generator engine room	01UMA 01UBA 01UBF

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

SO number	**Name**	**ACC**
SO 09	Air cooled condenser	01ULC 01ULX
SO 10	Relocation of utility networks	00UNY
SO 11	Communications, Parking, Paved areas, Landscaping	01UZA 01UZD 01UZC 01UZK
SO 12	Operational and social building	00UYA
SO 13	Demolition	00UXX
SO 14	Fencing	01UZJ
SO 15	Building of auxiliary operations	01UBN 01UGC 01USG 00UST
SO 17	Diesel filling station	01UEL
SO 18	Water Supply	01UGG
SO 19	Pipeline bridges	01ULY
SO 20	Outdoor lighting	01UZB
SO 21	Wastewater pumping station	01UGU
SO 22	Extension to the waste bin	01UEB 01UCA 30UCB 30UAB
SO 23	Construction site equipment	00STA
SO 24	Building structures of the tipping platform	01USU
SO 25	Oversized waste shredding hall	01USR
SO 27	400 V substation K2 and K1	20UAB
SO 51	Sewerage of technological wastewater	01GMA
SO 53	Sewage sewerage	01GQA
SO 55	Drainage of precipitation wastewater	01GUA

SO number	**Name**	**ACC**
SO 60	Chimney	00UHN

1.5.2 Operating files

The technological part of the Work will be divided into operational sets (PS).

The scope of the Work includes the following PS:

PS number	Name
PS 51	Boiler K3
PS 52	K2 boiler reconstruction
PS 53	Reconstruction of boiler K1
PS 54	Waste reception technology
PS 55	The ash economy
PS 56	K3 boiler flue gas cleaning technology
PS 57	K2 (K1) boiler flue gas cleaning technology
PS 58	Turbogenerator TG2
PS 59	Chemical water treatment
PS 60	Boiler power supply
PS 61	Air cooled condenser
PS 62	Electrotechnical equipment
PS 63	Part of MaR, ASRTP and EPS
PS 64	Compressor station
PS 65	Stable extinguishing device
PS 66	SCZT substation
PS 67	HVB internal connection pipe
PS 68	External connecting pipes
PS 69	Photovoltaic source of electricity

1.6 Estimated time stages for the implementation of the work

The overall Work will be divided into phases of Work implementation, primarily due to the requirement to maintain the operation of the OLO WPP during the implementation of the MaE - to maintain the energy recovery of the WPP with the least possible restrictions on operation and the supply of heat and electricity to the public grid. During the implementation of the Work, the operation of the existing K1 and K2 lines during the construction of the K3

line, and the operation of the K3 line during the implementation of the reconstruction of the K2 and K1 lines is foreseen.

The following stages of the Work are envisaged:

- **Stage 0** - includes the preparation of the Documentation for the Issuance of a Building Permit, obtaining a Building Permit and the preparation of the Basic Design Project Documentation.
- **Stage 1** - includes mainly the construction of building objects, delivery of technologies and their commissioning related to the new TG2, SCZT substation and CHÚV.
- **Phase 2** - primarily includes demolition and construction work associated with the Waste Storage Building Addition and preparatory work for the modification of the Boiler House Building.
- **Stage 3** - includes mainly construction and modification of construction objects, delivery of technologies and their commissioning related to the new K3 line.
- **Stage 4** - mainly includes the reconstruction of the K2 line and the K1 boiler, including the relevant building structures.
- **Stage 5** - includes mainly additional buildings, structures and technologies and the overall architectural design of the appearance of the ZEVO.

The individual stages of the implementation of the Work will be linked to each other in time and technology. At the same time, however, partial simultaneous implementation of parts of the stages is foreseen.

1.7 Basic requirements for the Work as a whole

The work must be designed in accordance with the requirements of the authorities concerned, with the legal regulations in force in the Slovak Republic, including decrees, regulations, instructions, notices, regulations and publications, information issued by ministries and state administration authorities.

The Contractor shall comply with all requirements and conditions of the Contract and its annexes in the execution of the Work. At the same time, the conditions of the zoning decision,

the Decision issued in the investigation procedure for the Change of the Proposed Activity (EIA) "Modernization and Greening of the OLO WTP - K3 and K2 lines" dated 13.12.2022 and later the Construction Permit or other binding permits/decisions/regulations shall be complied with.
The work will meet in particular but not exclusively:

- requirements for stationary sources of air pollution specified in Decree No.248/2023 Coll,
- requirements on monitoring of emissions from stationary sources of air pollution and air quality in their surroundings listed in Decree 249/2023 Coll,
- Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing conclusions on best available techniques (BAT) for the incineration of waste pursuant to Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions,

- and other legal requirements, directives, decrees and decisions in the areas resulting from its classification of operation, data on the operation, industrial activity, activities carried out and category of air pollution source.

The works shall be designed in accordance with all permits, in particular but not limited to environmental permits, the Directive DIRECTIVE (EU) 2024/1785 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 April 2024 on industrial emissions and in accordance with the latest BREF guidelines, including BAT best available techniques and in accordance with all applicable STN standards.

The design, construction and installation, testing and commissioning of the TG2 Turbogenerator, the new K3 line and the reconstructed K1 and K2 lines must be planned and executed to the maximum extent possible without disrupting the operation of the Customer's existing facilities. The Customer's existing facilities - lines K1 and K2 shall remain in continuous operation during the construction of the TG2 Turbogenerator and line K3. The OLO WWTP will receive and process waste seven days a week throughout the construction of the TG2 Turbogenerator and the K3 Line. During the reconstruction of the K1 and K2 lines, the new TG2 Turbogenerator, the K3 line and the associated auxiliary and other plant/equipment, without which the full operation of the K3 line with the supply of electricity and heat to the public grid could not be guaranteed, will be in continuous operation.

The new concept of the OLO ZEVO is developed with the assumption of the current operation of two waste incineration lines (K3 and K2), the third line (K1) will serve as a cold backup. In spite of this fact, it is required that new and reconstructed buildings, structures and technological equipment are designed and arranged on the ZEVO site in such a way that in the future, if the need arises for the simultaneous operation of all three ZEVO OLO lines, the technological equipment, buildings and structures necessary for the operation of the third line (K1) can be completed or expanded.

It is mainly about preserving or creating space for:

- construction of equipment for flue gas cleaning of the third line (K1),
- completion of the engine room for the installation of the second TG,
- completion or extension of the air-cooled condenser,
- extension of the HV substation for the power output of the second TG.

Proven technological process and proven equipment

The design and sizing of new equipment supplied shall take into account the requirement for operational reliability, ease of service and a service life of at least 25 years or 200 000 operating hours for all non-wear parts.

The Work shall be based on technology whose operational reliability has been verified in continuous operation, and which creates the prerequisites for the fulfilment of the quality and performance guarantees for the Work under the provisions of the Contract. All Goods - machinery, equipment and apparatus shall, unless otherwise specified by other provisions of the Contract, be of proven construction, of first class workmanship, verified and proven by references. Equipment of all types shall be fit for purpose, of high efficiency, reliability, safe, constructed and made in accordance with STN or internationally recognised standards (unless otherwise specified) and made by experienced and reliable manufacturers who have ensured servicing of the equipment supplied in the Slovak Republic. The Customer reserves

the requirement to supply only new and non-refurbished equipment, machines and components. If newly developed technologies, equipment and components are offered, this must be explicitly stated in the Contractor's specification.

Processes and equipment must be designed to operate without

limitations possible over the range of ambient temperatures, relative humidities that occur at the OLO ZEVO site.

BIM and CDE requirements

All drawings shall be generated from BIM design software and the CONTRACTOR shall ensure full conformance with the BIM models. The only exceptions to this requirement will be detail drawings, schematics and coordination situations. BIM models shall be submitted in openBIM formats IFC2x3 and IFC4 (IFC - Industry Foundation Classes), design documentation in .PDF and .DWG formats. Submission will be in multiple project milestones, which will be further specified in the EIR and BEP documents. Geometric detail is assumed to be at LOD300 level as per the BIMFORUM specification (https://bimforum.org/resource/lod-level-of-development-lod-specification/), but will be specified for individual trades, or building objects and operational files in the EIR. The information detail for specific elements and structures of the BIM models will be further specified in the EIR. It is required that the BIM models are continuously coordinated on the CONTRACTOR's side, and records (reports) of this activity are to be maintained and provided. At the same time, there will be multiple checks of the BIM models on the CONTRACTOR's side. Deficiencies will be reported by the CLIENT to the CONTRACTOR in the form of a document and specific issues via the open .BCF (BIM Collaboration Format).

The project collaboration will take place as far as possible in the Common Data Environment (CDE) in all project phases, which respects the principles in STN EN ISO 19650. Project collaboration during the design process means in particular: file sourcing and overall document management (documentation, file upload, document approval, commenting, tasking). The CDE will be used as the main source of information and will also be the centre of collaboration during construction and handover of the WORKS to the OWNER. It will be used mainly for: assignment of tasks, electronic construction log, construction quality control, construction passporting (photographs, 360° photographs, point clouds), OSH inspections, construction document records (delivery notes, tests, certificates, etc.), coordination meeting records, etc.

Anti-corrosion protection

When designing coating systems for the corrosion protection of steel structures, pipelines and process equipment and when carrying out the coatings, it is necessary to follow in particular STN EN ISO 12944 and the following requirements must be taken into account.

Classification of corrosive aggressiveness of the environment:

- Outdoor C5-I Very high (industrial)
- Indoor C5-I Very high (industrial)
- Indoor - office building C2 - Low

Required category of durability of the coating system:

- High - H more than 15 years

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

2 Scope Works

2.1 Subject Works

The subject of the Work is the realization of the construction - Modernization and greening of ZEVO OLO - lines K3 and K2 (K1) in the form of turnkey delivery in accordance with the requirements, conditions, specifications and other data and information specified in the Contract.

Modernization and greening of ZEVO OLO lines K3 and K2 (K1) includes the installation of a new combustion line K3, reconstruction of the existing combustion lines K2 and K1, installation of new equipment for the production and supply of heat and electricity, construction of new and reconstruction of existing construction and engineering facilities and unifying architectural design of the cladding of all ZEVO OLO construction facilities.

The subject of the Work includes and by "turnkey" delivery is meant mainly:

(a) Carrying out an analysis of the existing condition of the OLO ZEVO, verifying and evaluating the existing and carrying out all necessary surveys, documents, information and data necessary for the implementation of the Work.

(b) Preparation of documentation for the issuance of a building permit.

(c) Representation of the Client in communication with authorities, state administration bodies, the city and third parties in the process of obtaining the necessary permits, decisions, applications, certificates, statements, opinions, consents, announcements, expert opinions necessary for obtaining a building permit.

(d) Preparation of the Design Documentation for the implementation of the Work necessary for the proper execution of the Work, in the scope of Basic and Detail Design and under the terms and conditions set forth in the Contract for Work.

(e) Preparation and submission of all other documentation, in accordance with contractual requirements.

(f) Refinement of the existing BEP (BIM Execution Plan) on the basis of EIR (exchange information requirements) for the needs of the implementation of the Work in the digital environment (in the BIM environment). The design of the Works, the creation, sharing, accessing and use of information during the design, construction, commissioning and preparation for operation, service and maintenance of the WEO will be in Building Information Modeling (BIM).

(g) Construction of the site equipment necessary for the execution of the Work in accordance with the Contract and operation of the site during the execution of the Work, and its disposal after the completion of the execution of the Work.

(h) Carrying out the geological investigations necessary for the implementation of Works.

(i) Procuring and arranging for the management and transportation to and from the Site, including unloading, clearance, taxation, insurance, protection and storage of all Goods and items, materials, components, etc. necessary for the execution of the Work.

(j) Demolition and dismantling of existing structures and existing equipment, pipelines, cable routes, which will be replaced by structures built and equipment installed as part of the Work, or will no longer be used after the execution of the Work.

(k) Delivery and execution of the construction part of the Work within the scope and under the conditions agreed in the Contract.

(l) Delivery and installation of the technological part of the Work including the machine technology, control and management system (ASRTP) and electrical equipment system in the scope and under the terms and conditions set out in the Contract.

(m) Connection of the Work to existing building and utility structures and facilities at the connection points defined in the Contract.

(n) Supply of spare and fast wearing parts in scope and under the terms and conditions agreed in the Contract.

(o) Supply of special tools and instrumentation necessary for the maintenance of the Work to the extent and under the conditions agreed in the Contract.

(p) Overall coordination of all delivery of Goods, items, works and services throughout the extent of the Works boundary.

(q) Managing, monitoring, executing, controlling and documenting the preparation and actual execution of the Work, including the supervision of the Designer and the delivery and updating of the execution documentation, updating the schedule for the execution of the Work, to the extent and under the terms and conditions agreed in the Contract.

(r) Maintaining a construction log in accordance with the current Building Act/Construction Act.

(s) Documenting the quality of the Work in accordance with the Quality Plan and the relevant Inspection and Test Plans. Carrying out all inspections and tests to the extent and under the conditions specified in the Inspection and Test Plans and carrying out other inspections and tests agreed in the Contract.

(t) Securing and delivery of all inspection reports, passports, certificates, declarations of conformity, test reports, certificates, attestations, etc. necessary for the approval, operation and use of the Work to the extent and under the conditions required by the Contract.

(u) Provision of the rights of use necessary for the use of the Work, including the relevant documentation, to the extent and under the conditions required by the Contract.

(v) Disposal of all wastes generated during the execution of the Work in accordance with applicable law and under the terms and conditions set out in the Contract.

(w) Training of the Customer's operating and maintenance personnel to the extent and under the terms and conditions set out in the Contract.

(x) Participation of the Contractor's responsible personnel in the negotiation and approval of the Documentation for the Issuance of the Building Permit, the Design Documentation for the Execution of the Work and other documentation specified in the Contract, the Guarantee Measurement, the Testing Operation, under the terms and conditions set out in the Contract.

(y) Commissioning of the Work, including performance of the relevant tests, tests and completion of the Work to the extent and under the conditions set out in the Contract.

(z) Ensuring the conditions for the Guarantee Measurement by an independent company or person and participation in these tests, including securing and supplying the necessary documents.

(aa) Representation of the Client in securing the Permit for Early Use of the Construction for the test operation of the Work, or part of the Work, including securing all necessary consents/statements/decisions of state administration authorities, local administration, affected legal entities, etc. necessary for the issuance of the permit.

(bb) Representation of the Client in the Approval Procedure for obtaining the Approval Decision for the Work, or part of the Work, including securing all necessary approvals/statements/decisions of state authorities, local authorities, affected legal entities, etc. necessary for the issuance of the permit.

(cc) Provision of guarantees for the Works to the extent specified in the Contract and free removal of any defects found during the guarantee period under the terms and conditions specified in the Contract.

(dd) Cooperation and support of the Client in coordination of the Work with follow-up projects carried out by other contractors.

(ee) Co-operation with the "Site Health and Safety Coordinator" and the "Site Fire Protection Coordinator" appointed by the Client and compliance with their suggestions, recommendations and regulations.

2.2 Scope of supply of goods - construction part

The supply of Goods and Items for the construction portion of the Work shall include the supply of Goods and Items necessary for the complete construction of all building and civil engineering structures, for the technical equipment of buildings, and for the construction and installation work that is within the scope of the Work.

2.2.1 SO 01 Boiler house building

This SO primarily includes structural modifications associated with the installation of a new K3 boiler with appurtenances, including new steel service platforms and catwalks. The modifications will include the construction of a new K3 boiler supporting steel structure, new supporting cladding structure and reinforcement of the existing foundations. Some of the existing foundations will be overloaded with new columns and new loads, and if the existing foundation is not adequate for the new loads, the foundation will need to be reinforced. It will be necessary to verify the existing foundations with probes as necessary and then assess the foundations (full documentation of the actual design of the foundations is not available).

The reinforced concrete floors at levels +4.50 m and +11.20 m (building structure of the ZEVO boiler house) will be retained in the current extent, including the preservation of the existing mounting openings in the floors +4.50 m, +11.20 m.

On the new OK of the boiler house, at the level of +11,20 m, a new feed tank of the boiler K3 will be installed.

A new electric freight elevator with a minimum capacity of 2000 kg will be built in the modified boiler room of boiler K3. A new steel staircase will be constructed in the boiler room area from ± 0.0 m level to the roof height of the waste storage building with access to each service floor of the boiler room. From this level the boiler house roof will be accessible by ladder.

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

In the boiler room, new steel-concrete foundations for the K3 boiler feed pumps, foundations for new expanders, cinder conveyor, etc. will be built at the level of ± 0.00 m. Part of the external building shell (or vertical VSZ sheets) at the location of boilers K1 and K2 will be replaced with a new facade proposed in sandwich panels. Due to the extent of the modifications to the façade of boiler room K3 - elevation, extension over SO 03 Boiler Building, the entire existing façade of the boiler room in place of boiler K3 will be replaced with a new façade. The design of the material and colour solution will be coordinated according to the unifying architectural design of the cladding of all SO ZEVO.

The roof of the K3 boiler building will be drained to the storm water drainage system. The roof of the boiler house will be designed as lightweight, allowing for the expansion of gases from the explosion in the event of an explosion in the boiler house by its destruction.

Estimated scope of works in SO 01:

- Demolition and dismantling
- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Roof load-bearing structures
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction
- Floors
- Replacement of porosities on the floor ± 0,0m
- Protective coatings and surface treatments of structures
- Waterproofing
- Door structures and ventilation shutters
- Plumbing products
- Locksmith products
- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Heating
- Ventilation
- Storm water drainage
- Technological sewerage

- Technological water distribution
- Fire water distribution

The estimated built-up area of the boiler house will be 1598m^2.

The estimated built-up area of the boiler house will be 52564 m^3.

Dismantling works in the existing boiler house in the area of boiler K3:

- Dismantling of the existing steel support structure for the original boiler K3
- Dismantling of existing steel service platforms and footbridges
- Dismantling of the existing passenger lift and staircase
- Dismantling of the trapezoidal sheet (dividing wall) between boilers K2 -K3 after the construction modifications and installation of boiler K3 and reconstruction of boilers K2 and K1

2.2.2 SO 02 Waste storage building

This SO includes the construction of a new waste storage tank on the site of the demolished part of the existing CHÚV building (SO 04).

The proposed storage tank will be added to the east side of the existing waste storage building. It will measure 14.1m x 15.3m in plan.

Above the floor +20.00 m, the stack space will be extended in the longitudinal direction on both sides by 1.5 m. This extension will allow for the addition of a crane track so that the dredge can handle waste up to the edges of the longitudinal edges of both the existing and the new bin.

The height dimensions of the new storage tank are assumed to be the same as for the existing storage tank.

In the space below the platform of the boiler hoppers + 20.00 m in the hopper and the level ± 0.00 m, between the column rows 4/5 and 3, new spaces will be created, which are described in SO 22 - Extension to the waste hopper.

The MaE ZEVO will include the rehabilitation of the existing supporting steel structures in the waste storage tank, removal of the communication corridor and construction of a new cantilevered corridor with the required minimum width according to the PBS design. The pergola will also be used as part of the visitor circulation path.

An observation deck and a walkway for visitors will be created on the roof of the waste bin.

Estimated scope of works in SO 02:

- Demolition and dismantling
- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Roof load-bearing structures

- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction
- Floors
- Protective coatings and surface treatments of structures
- Waterproofing
- Door structures and ventilation shutters
- Plumbing products
- Locksmith products
- Power distribution
- Lightning rod and earthing
- Storm water drainage
- Fire water distribution
- Corrosion protection and coatings of existing structures belonging to SO 02 in the scope of:
  - complete sandblasting of existing steel structures to quality grade Sa 2,5 according to STN EN ISO 8501-1
  - application of complete corrosion protection in accordance with the coating system

The estimated built-up area of SO02 will be 934m^2.

The estimated built-up area of SO02 will be 43195m^3.

2.2.3 SO 03 Building of compensation

The new boiler room of boiler K3 will be connected to the existing building of the descaling through separate corridors. It is proposed to add an external operating and escape staircase - including galvanized steel cladding, the staircase will be connected to the building SO 03 and to the technological equipment for flue gas cleaning. Furthermore, minor structural repairs and modifications will be carried out. New cladding is proposed for building SO 03.

Estimated scope of works in SO 03:

- Excavations
- Foundation structures for staircases
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure

- Protective coatings and surface treatments of structures
- Door structures and ventilation shutters
- Plumbing products
- Locksmith products
- Lightning rod and earthing
- Storm water drainage
- Technological water distribution
- Fire water distribution
- Corrosion protection and coatings of existing structures belonging to SO 02 in the scope of:
  - complete sandblasting of existing steel structures to quality grade Sa 2,5 according to STN EN ISO 8501-1
  - application of complete corrosion protection in accordance with the coating system

The built-up area of SO03 is 705 m^2.

The built-up area of SO03 is 9790 m^3.

2.2.4 SO 04 Compressor station, DCS substation and secure power supply system

This SO includes the compressor station building (1st floor), DCS substation and secure power supply system (2nd floor), which will be built between the objects of the existing 400V substation, SO22 - the proposed extension of the waste storage tank and the object SO 01-Boiler house building. The building will be designed as a two-storey building. The supporting structure of the building will consist of a steel skeleton sheathed with sandwich panels. The façade will be covered with galvanized sheet piling, which will be anchored to the precast structure. The design of the material and colour solution will be coordinated according to the unifying architectural solution of the cladding of all the ZEVO SOs. The roof structure will consist of the floor of the building SO06 - waterproof plechodoska made of water-resistant concrete.

Estimated scope of works in SO 04:

- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Roof load-bearing structures
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction

- Floors
- Raised floors
- Suspended ceilings
- Protective coatings and surface treatments of structures
- Waterproofing
- Door and window construction and ventilation blinds
- Plumbing products
- Locksmith products
- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Heating
- Ventilation
- Storm water drainage
- Fire water distribution

The estimated built-up area of SO04 will be 167 m^2.

The estimated built-up area of SO04 will be 1841 m^3.

2.2.5 SO 05 Economy of flue gas cleaning of boiler K2 (K1)

This SO includes the construction of a new steel platform at a uniform height of +11.2 m. All technological equipment for flue gas cleaning K2(K1) (PS 57) and possibly in the future also newly installed technological equipment for flue gas cleaning of boiler K1 will be placed on this new steel structure.

Estimated scope of works in SO 05:

- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Platforms
- Pre-set unifying perforated cladding including its supporting structure
- Protective coatings and surface treatments of structures
- Locksmith products
- Power distribution
- Lightning rod and earthing

Built-up area of SO 05 is 1440 m^2

2.2.6 SO 06 Economy of flue gas cleaning of boiler K3

This SO includes the construction of a new steel platform at a height of +11.2 m. All technological equipment for flue gas cleaning K3 (PS 56) will be placed on this new steel structure.

The floor of the platform will be made of galvanized steel porosettes, in the part above the building SO 04 the floor will be made of waterproof plechodoska made of water-resistant concrete, which will serve as a roof structure for the building SO 04.

Part of SO 06 will also be the foundation structures for the silos of ash and solid residues from flue gas cleaning located on the new OK above the mobile paved area.

Estimated scope of works in SO 06:

- Excavations
- Foundation construction
- Foundation structures for OK ash forces
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Platforms in the part designed as a plechodoska of water-concrete
- Pre-set unifying perforated cladding including its supporting structure
- Protective coatings and surface treatments of structures
- Locksmith products
- Power distribution
- Lightning rod and earthing

Built-up area is 645 m^2

Built-up area for silos is 40.5 m^2

2.2.7 SO 07 Weighbridge and gatehouse building No. 2

This SO includes a single-storey detached container building. The building will be located in front of the ZEVO area. Two scales will be installed in the roadway next to the facility (one of the scales is existing, with no other modifications required).

The building will be used during construction for inspection and weighing of trucks. There will be an office and sanitary facilities in the building.

Estimated scope of works in SO 07:

- Excavations
- Foundation construction
- Complete container design of the building
- Pre-set unifying perforated cladding including its supporting structure

- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Heating
- Cooling
- Ventilation
- Storm water drainage
- Drinking water distribution systems
- Wastewater sewerage

Built-up area of the container building SO 07 is 35 m^2.

Built-up space SO 07 is 123 m^3.

2.2.8 SO 08 Turbogenerator engine room TG2

This SO includes a new stand-alone facility, the TG2 Turbine Generator Plant, which will be constructed in the area of the removed screening plant.

The turbine machine room will be a single space, in which the turbine generator TG2 (DPS58.A) will be placed on a steel-concrete structure (turbine bench) with an expected height of +8.0 m.

The turbine hall structures will be reinforced concrete. The cladding will be designed to maximise noise attenuation and to minimise noise propagation beyond the boundaries of the building.

A steel crane track with an overhead crane will be placed on the columns of the turbine engine room. The capacity of the crane will be chosen to allow handling of the heaviest part of TG2 during the overhaul. It is assumed that the crane runway will be located at an elevation of +16.0 m. It is also necessary to ensure a minimum clearance between the roof and the crane, as specified by the crane manufacturer, so that maintenance of the crane can be carried out.

For dismantling of the turbine and/or generator, there will be an area in the turbine hall for storage of TG2 parts during servicing and a 0.0 m floor mounting opening required for handling TG2 parts during overhaul in case of removal of TG2 parts to the manufacturing plants. There will be a gate in the hall envelope for the entry of special trucks required for the removal and delivery of TG2 parts during overhauls or breakdowns. The floor of the turbine hall shall be designed to support the weight of the heaviest part(s) to be disassembled during turbine/generator maintenance. The proposed building SO 08 will have plan dimensions of 24,85m x 30,85m. The building will have 2 storeys. It will be roofed with a flat roof with attics. The height of the attic from the level ±0.0 will be 21.5m.

On the 1st floor it is planned to place transformer stations and on the 2nd floor electrical substation 22 kV, 400 V substation and DCS .

Estimated scope of works in SO 08:

- Excavations
- Foundation construction

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Roof load-bearing structures
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction
- Floors
- Raised floors
- Suspended ceilings
- Protective coatings and surface treatments of structures
- Waterproofing
- Door structures and ventilation shutters
- Plumbing products
- Locksmith products
- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Heating
- Ventilation
- Substation cooling
- Storm water drainage
- Fire water distribution

The estimated built-up area of SO08 will be 767 m^2.

The estimated built-up area of SO08 will be 16482 m^3.

2.2.9 SO 09 Air cooled condenser

This SO includes an air-cooled condenser building, which will consist of a steel frame structure. The proposed building SO 09 will be rectangular in plan, the assumed plan dimensions of the condenser without service bays are 28.3m x 36.3 m. The building will have one storey, the floor of which will be located at an assumed height of +14.2m above the level of the paved area at level 0.0. The height of the top edge of the cladding from the ±0.0 level will be +23.5m.

Estimated scope of work in SO 09:

- Excavations
- Foundation construction

- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Pre-set unifying perforated cladding including its supporting structure
- Floors made of galvanised porous materials
- Protective coatings and surface treatments of structures
- Plumbing products
- Locksmith products
- Power distribution
- Lightning rod and earthing

The built-up area of SO 09 is 1071 m^2.

2.2.10 SO 10 Interconnections of utility networks

In order to avoid collisions with new technological equipment and building objects and structures during the construction of the related MaE ZEVO, the needs for relocations or modifications of existing underground utility lines are determined on the basis of the site's topographic survey.

The relocations will concern:

- the existing STL natural gas distribution system,
- existing sewage sewerage system,
- the existing on-site storm sewer system,
- existing technological sewerage system,
- the existing fire water distribution system,
- drinking water distribution system,
- distribution of area lighting,
- the premises LV lines,
- The HV lines going to the demolished HV substation will be cancelled and redirected to the new HV substation.

The demolished existing concrete settling tank in the scope of SO 13 Demolition will have to be replaced by a temporary settling tank necessary for the operation of lines K1 and K2 during the construction of line K3.

2.2.11 SO 11 Communications, Parking, Paved areas, Landscaping

This SO includes new roads, which will be made both in the ZEVO area and in the area in front of the ZEVO. Inside the site it will be the extension of the drive from the oversized waste crushing plant towards the road leading to the waste reception. Furthermore, the road along the new flue gas cleaning technologies (for boiler K3 and K2) will be widened. Here, the road will be widened by one lane of 3500 mm width to provide a continuous two-lane crossing and

a dedicated lane for supply (total 3 x 3500 mm). The lane will be reserved for the parking of trucks and tankers transporting e.g. operating materials for the flue gas cleaning technology.

With regard to the height conditions, a steel-concrete balancing wall will be built along the road on the side adjacent to the boundary of the site.

Some existing roads in the area will be repaired, which will be affected by the proposed construction or relocation of underground utilities or new underground utilities.

Parking areas for motor vehicles will also be built within SO 11. The parking areas will be seamlessly connected to the road paved areas. A total of 65 perpendicular parking spaces with a width of 2.5 m and a length of 5.3 m are proposed.

Estimated scope of work:

- demolition of existing paved areas
- excavation work
- compaction and adjustment of the subgrade to the required deformation modulus
- implementation of individual layers of paved areas according to the proposed composition of paved areas
- implementation of curbs
- implementation of drainage into the proposed street drains and gutters
- final modifications of the surrounding terrain - cover and grassing
- implementation of temporary and permanent road markings

Surface treatment of paved areas:

- Cement concrete cover CBIII - area roads
- Asphalt concrete AC11 - area roads
- Concrete grassed paving - car park
- Granite cubes - pavement

The subject of orchard landscaping is the solution of areas with planting trees, shrubs, perennial beds and revitalization of lawn areas. The vegetation of the designed areas can be divided into:

- plantings in front of the entrance and around the perimeter of the site,
- plantings that are part of the parking lot and entrance areas,
- planting of greenery in the areas inside the premises,
- implementation of green roofs.

2.2.12 SO 12 Operational and social building

This SO includes a comprehensive reconstruction of the existing operational and social building of the ZEVO. Reconstruction and modification of the internal spaces (paint, sanitary facilities, changing rooms, etc.) and reconstruction of the distribution systems (low-current, high-current, heating, cooling, water, sewerage and air conditioning). As part of the reconstruction of the building, a new information centre will be built on the new 3rd floor.

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

The existing supporting structure of the entrance overlay, including the roof cladding, will be dismantled at the start of the MaE construction and replaced with a new one upon completion of the construction.

In the existing space 1NP will be created a new social and hygienic background for drivers, there will be placed toilets and sinks.

It is proposed to build a 3NP extension over part of the floor plan, where office and sanitary facilities will be located. Prior to the proposed extension, the roof covering layer will be removed down to the supporting panels.

The roof over the 2NP of the operational and social building and the roof of the 3NP superstructure will be made as a vegetation roof.

Estimated scope of works in SO12:

- Demolition and dismantling
- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Roof load-bearing structures
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction
- Floors
- Suspended ceilings
- Protective coatings and surface treatments of structures
- Waterproofing
- Construction of doors, windows and glazed walls and ventilation blinds
- Plumbing products
- Locksmith products
- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Heating
- Ventilation
- Cooling
- Storm water drainage

- Wastewater sewerage
- Drinking water distribution systems
- Fire water distribution

The built-up area of SO 12 is 1354 m^2.

The built-up area of SO 12 is 10895 m^3.

2.2.13 SO 13 Demolition

List of demolished objects:

- Non-ferrous metals warehouse
- Heat and electricity source (CHP) in container design
- Pipe bridge (SO 400)
- Flue gas cleaning UVG (SO 450)
- UVG activated carbon store (SO 450.1)
- Limestone and fly ash management at UVH (SO 472)
- Demolition of the foundations of all technological equipment for flue gas cleaning of boiler K2 and part of the equipment for flue gas cleaning of boiler K1 and the adjacent paved area
- Engine room TG UMA (SO 490)
- UBA substation (SO 490)
- URC air condenser (SO 580)
- URF refrigeration pump engine room (SO 580)
- CHÚV building (SO 590)
- Fire station (SO 704)
- Warehouse (SO 705)
- Underground settling tank
- Concrete cesspool
- Concrete cooling tank
- Underground concrete tank in a situation marked as a concrete hatch

Note: the designation SO is according to the original subdivision of building objects.

Existing buildings on the above list will be completely removed, including their foundation structures. Demolition of the buildings will be carried out by machinery or by hand, removal by blasting is excluded.

2.2.14 SO 14 Fencing

This SO includes the proposed fencing of the existing area, which will be designed as follows:

- From the eastern side of the area (front side from Vlčie hrdlo Street) will be implemented new fencing - new foundations, concrete linings, alt. of formwork

blocks, into which steel posts will be fitted. The fencing will be made of galvanized hooks. The design of the material and colour solution will be coordinated according to the unifying architectural design of the cladding of all the ZEVO SOs.

- From the north side of the area will be implemented new fencing - new foundations, retaining wall of reinforced concrete, in the upper part will be mounted steel posts. The fencing will be made of galvanized hooks. The design of material and colour solution will be coordinated according to the unifying architectural solution of the cladding of all the ZEVO SO.
- From the south side - the existing fencing, which consists of concrete blocks will be retained.
- From the southwest and west side - existing fencing - the existing mesh will be dismantled, the existing lining will be cleaned up, steel posts for anchoring will be added/replaced. The fencing panels will be made of galvanised wire. The design of the material and colour solution will be coordinated according to the unifying architectural design of the cladding of all SO ZEVO.

Estimated scope of works in SO 14:

- Demolition and dismantling
- Excavations
- Foundation construction
- Vertical load-bearing structures
- Locksmith products

2.2.15 SO 15 Building of auxiliary operations

This SO includes the existing building SO 15 under the original name ,,Garage,,, which is located under the tipping platform, where the warehouses and spare parts of the ZEVO equipment are currently located.

The subject of the proposal is the reconstruction and rehabilitation of existing structures. New technological equipment will be placed in the designed area - Chemical water treatment, fire water tanks, fire water pumps and diesel generator station building.

As part of the reconstruction of this SO, the steel-concrete beams and steel-concrete columns of the tipping platform and the travelling surface of the tipping platform (under which SO 15 Auxiliary Operations Building is located) will be rehabilitated so that:

- ensure their static function for the next period,
- ensure that rainwater does not penetrate through the construction structure of the tipping ramp into the auxiliary facilities,
- to ensure their resistance to the chemicals used in the operation of the future HPP.

Estimated scope of work in SO 15:

- Demolition and dismantling
- Excavations
- Foundation construction

- Vertical structures
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Insulation
- Floors
- Protective coatings and surface treatments of structures
- Door and window construction and ventilation blinds
- Plumbing products
- Locksmith products
- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Heating
- Ventilation
- Storm water drainage
- Technological sewerage
- Drinking water distribution systems
- Fire water distribution
- Technological water distribution

The built-up area of SO 15 is 2296 m^2.

Built-up area of SO 15 is 15294 m^3.

2.2.16 SO 17 Pumping station diesel station

This SO includes the existing construction object of the diesel filling station (steel shelter of the above-ground tank) and the object of the filling station service.

The subject is the reconstruction of the existing above-ground tank shelter. The existing steel structures will be cleaned, sandblasted and subsequently coated with new paint, reconstruction of the existing plumbing elements will be carried out.

New construction modifications will be implemented for the building of the service station - new floors, new wall finishes, ceilings, replacement of sanitary facilities, replacement of interior hole fillings, replacement of exterior hole fillings, insulation of the facade, etc.

Estimated scope of work in SO17:

- Demolition and dismantling works
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction

- Floors
- Suspended ceilings
- Protective coatings and surface treatments of structures
- Door and window construction and ventilation blinds
- Plumbing products
- Locksmith products
- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Cooling
- Storm water drainage
- Wastewater sewerage

Built-up area SO 17 servicing the petrol station is 25 m^2.

Built-up area SO 17 pumping sledge is 98 m^2.

Built-up area of SO 17 is 515 m^3.

2.2.17 SO 18 Water supply system

Drinking water supply

The existing part of the DN100 water main will be relocated within the site, so that the potable water line is routed in one corridor with the other water mains.

The relocated drinking water supply DN100 will be brought to the building SO12 (as before). A new accumulation, dechlorination and a new ATS will be installed in building SO 12. A central billing water meter will also be installed in this building for the entire site.

New premises wiring for the building SO 07 will be led from the ATS distribution system. Objects SO15, SO 01, SO 22 and SO 03 will be connected from the ATS within the internal wiring. The potable water supply for object SO03 will also be connected to the outdoor eye shower at the ammonia water tank(s). The potable water supply for the objects SO 17 will be connected from the potable water supply of object SO 22.

Existing potable water mains that cease to function will be abandoned. An earth cap will be installed on the drinking water inlet pipe from the Slovnaft site at the boundary of the site.

Drinking water mains that conflict with future construction will be relocated:

- Water supply relocation DN100 HDPE approx. 110m long.
- Area water supply relocation DN80 (dimension unknown) HDPE length approx. 80m.
- Water supply DN25 HDPE approx. 150m long.

Utility water supply

Under the proposed condition, the utility water main will be redistributed to the following mains:

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

- Relocation of the Slovnaft DN250 PN16 utility water main.
- Relocation and completion of the premises fire water pipelines, while the connection of this pipeline will be from the fire pumps engine room.
- Construction of a utility water pipeline from the wells to the objects SO 15 and SO 08.
- Relocation of the Slovnaft utility water pipeline.

As part of the proposed development, this water pipeline will be relocated so that the Slovnaft utility water pipeline route is routed in the same corridor as the other water pipelines. The relocated water main will be brought to building SO 15, where it will be connected to the outlet pipes from the fire pump engine room. This water main will still serve as an alternative in case of e.g. failure of the fire protection pumping technology or in case of failure of the well water supply for the technology. Water pressure regulators need to be fitted at the connection points. A water meter will be installed on the inlet pipe in the building.

Estimated lengths of the Slovnaft HDPE D315 PN16 utility water pipeline relocation dl. approx. 120 m.

Relocation and completion of fire water supply systems

As part of the proposed development, the source for the fire water supply will be modified. The required pressure and flow parameters on the fire water supply will be provided by the fire pump engine room, which will be connected to the fire tank, these will be installed in the building SO 15. Required flow parameters on the fire water supply Q=25 l/s, required pressure 0,5-0,6 MPa.

The proposed branch line for fire water supply DN150 (HDPE D180 PN10), which will be connected to the existing pipeline DN150, will be led from the building SO15. The on-site fire water mains that are in conflict with the future structures will be relocated. The DN150 water pipeline will also have to be re-ground with the same dimension (currently part of the pipelines is re-ground with DN100). Branches will also be planted from the premises fire water mains to connect the internal hose reels within the individual buildings. Overhead hydrants DN150 will be installed on the fire water supply line at a distance of max. 160m. The most unfavourably located hydrant must have a hydrostatic pressure of at least 0.25MPa.

Existing fire water mains that cease to function will be abandoned.

Estimated lengths of the fire water pipeline HDPE DN150 (HDPE D180) PN10 dl. approx. 300 m.

Well water supply

The proposed development will include the construction of a separate well water pipeline from wells RM-718 and HPV-4. The well water will be piped to building SO15 where it will be used to supply water to the fire tanks, and will also be connected to the process water supply. The well water supply will also be piped to building SO 08. The inlet pipes of the well water pipeline will be equipped with secondary water meters at the inlets. The distribution of the well water pipeline will be routed in the same corridor as the other pipelines. The fittings of the process shafts above the boreholes will be reconstructed.

Existing well water mains that cease to function will be abandoned.

Estimated lengths of the on-site well water pipeline HDPE DN150 (HDPE D180) PN10 dl. approx. 100 m.

Estimated water abstraction balances for technological purposes:

- Average hourly flow: Qh-k,tech= 22 m^3 /hr
- Average daily flow of technical water: Qd-k,tech = 552 m^3 /day
- Average annual flow of technical water: Qr-k,tech = 172500 m^3 /year

Estimated scope of works in SO 18:

- Earthworks including:
  - demolition of paved areas
  - excavation work
  - backfill, gravel backfill
  - backfilling in green areas with excavated soil, in paved areas with compacted gravel
  - storage of excavation materials
  - retrofitting of paved areas
- Assembly work including:
  - supply and installation of pipe routes including all necessary parts including pipes, fittings, fittings, supports, manholes, etc.
  - pressure and functional tests, including disinfection of pipelines
  - temporary shutdowns and temporary water supplies
  - dismantling of existing piping, fittings, etc.

2.2.18 SO 19 Pipeline bridges

This SO includes the construction of new pipe bridges such as:

- pipeline bridge between the boiler house building SO 01 and the new turbine-generator plant TG2 SO 08,
- pipe bridge between the new turbine-generator SO 08 and the air-cooled condenser SO 09,
- smaller pipe bridges and supports between the flue gas cleaning and fly ash management technological equipment, if necessary.

New pipe bridges and supports will be built or modified within the construction of the MaE ZEVO so that the clearance height of at least 4.5 m and the clearance distance between each support (including concrete foundations) of at least 4 m is maintained.

Estimated scope of works in SO 19:

- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Pre-set unifying perforated cladding including its supporting structure

- Protective coatings and surface treatments of structures
- Locksmith products
- Lightning rod and earthing

2.2.19 SO 20 Outdoor lighting

The overall condition of the lighting system is fully satisfactory. Most of the lighting system equipment has undergone repairs and reconstruction. To ensure the longevity and trouble-free operation of the capability, it is proposed to repair areas of the poles that are compromised by external corrosion due to peeling of the zinc protection. This damage was found on two poles illuminating the entrance ramp. To simplify lighting control, it is proposed to automate the switching on and off of the lighting based on the external light intensity (photocell).

On demolished buildings and in parts of buildings with new cladding, the dismantling of light sources mounted on the buildings will be carried out. These luminaires will be dismantled and relocated to a more suitable location. Lighting lines and points of light that are in conflict with the new construction will be dismantled. The section in front of the new car park will be dismantled and relocated to the cladding of the service building – SO 12. Inside the site by the new petrol station, the lines will be relocated together with the existing lighting switchboard (RVO). The new RVO will be installed in the new location and the old one will be removed. The outdoor lighting will be further supplemented with new support points and luminaires at locations where the existing lighting is insufficient or where lighting is not designed at all.

2.2.20 SO 21 Waste water pumping station

The subject of reconstruction is the existing building of the waste water pumping station. The existing building has one above-ground floor and one underground floor, where the technological part is located. In plan, the shape of a rectangle with dimensions of 7.0 x 9.6m.

The following building modifications will be carried out in the object in question:

- Rehabilitation and repair of existing floor, wall and ceiling surfaces
- Rehabilitation of existing steel structures
- Repair/replacement of existing plumbing elements
- Rehabilitation of facade finishes
- Replacement of existing steel entrance doors with new aluminium or steel doors

Realization of new cladding of the facade - new pre-set construction on which the cladding will be made of galvanized sheet metal, material and color solution to match according to the unifying architectural solution of the HVB cladding.

Estimated scope of works in SO 21:

- Demolition and dismantling
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Protective coatings and surface treatments of structures

- Door and window construction and ventilation blinds
- Plumbing products
- Locksmith products
- Lightning rod and earthing
- Storm water drainage
- Technological sewerage
- Construction of a new cooling tank

The built-up area of SO 21 is 67 m^2.

The built-up area of SO 21 is 896 m^3.

2.2.21 SO 22 Extension to the waste storage tank

This SO includes the proposed building that will be added to the waste storage building. It will be irregular in plan with maximum dimensions of 13 x 17m. The building will be located in the area of the new waste bin (SO 02) below the boiler hopper platform + 20.00m and level ±0.00m. A new communication core will be constructed in part of the plan, where a staircase forming a protected escape route to the roof of the bin (approx. +33.70 m) and an elevator shaft with an electric goods lift with a capacity of 2000 kg will be located. The individual floors of the building will be accessible from a common staircase.

Level ±0.00m:

The space in question will be maintained as the main communication space at the level of ±0.00 m with a guaranteed clear height of 4.3 m. At the level of 0.00 will be the entrance to the staircase and the elevator.

Floor +4,50 m:

There will be a cable room on the floor in question.

Floor +7,200:

On the floor in question will be located 400V K3 switchgear room and dry transformers.

Floor +11,200:

On the floor in question will be located technical room switchboards PS63.

The space will be equipped with a double floor with an expected thickness (height) of 0.55 m.

Floor +15,05 m:

On the floor in question, a new ZEVO command centre (CCR) will be located with the equipment of PS 63, a day room for employees and sanitary facilities. The following workstations will be located in the ZEVO headquarters area:

- two DCS operators,
- shift foreman with the DCS workplace,
- DCS administrator,
- AMS-E emission computer workstation,

- workstation for remote control of both cranes in the waste bin via the camera screens in the bin,

The command area will be equipped with a double floor with a thickness (height) of 0.55m.

Floors +20,00m and +23,30:

On the floors in question there will be space for the location of the HVAC and refrigeration plant for the building SO 22 and SO 04.

Estimated scope of works in SO 22:

- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Roof load-bearing structures
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction
- Floors
- Double floors
- Suspended ceilings
- Protective coatings and surface treatments of structures
- Waterproofing
- Construction of doors, windows and glazed walls and ventilation blinds
- Plumbing products
- Locksmith products
- Power distribution
- Low-current distribution
- Lightning rod and earthing
- Heating
- Ventilation
- Cooling
- Storm water drainage
- Wastewater sewerage
- Drinking water distribution systems
- Fire water distribution

The built-up area of SO 22 is 189 m^2.

Built-up area of SO 22 is 4365 m^3.

2.2.22 SO 23 Site equipment

This SO includes:

- temporary buildings (construction containers) serving as office space, changing rooms, sanitary facilities, storage space,
- fencing and marking of construction sites,
- drinking water connections,
- connections to the sewage sewerage system,
- connections to the existing LV substation and site switchboards,
- as necessary, modification and reinforcement of areas and roads,
- in case of need more power for the construction and installation of a temporary substation (HV/NV transformer (22,0/0,4 kV), HV switchboard and LV switchboard).

2.2.23 SO 24 Building structures of the filling platform

This SO includes the design of the new roofing of the filling platform. The proposed roofing will be rectangular in plan and will be implemented over the entire area of the existing tipping platform. The building will be single-storey, the facade will be clad on three sides, one side will be without cladding. Photovoltaic panels will be placed on the roof of the canopy. To facilitate access to the roof, an extension of the existing steel staircase to the roof of the tipping platform will be constructed and a balancing staircase and a door opening in the cladding will be added for access to the roof of building SO12. The type of cladding of the façade, attics and colour scheme to be coordinated according to the unifying architectural design of the HVB.

Reconstruction of the mobile area of the filling platform - it follows the reconstruction of the supporting structure SO 15 - Building of auxiliary operations

Estimated scope of work in SO24:

- Demolition and dismantling
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Staircases and footbridges
- Roof load-bearing structures
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction
- Floors
- Protective coatings and surface treatments of structures
- Door construction
- Plumbing products

- Locksmith products
- Power distribution
- Lightning rod and earthing
- Storm water drainage

Built-up area of SO 24 is 1884 m^2.

The built-up area of SO 24 is 8912 m^3.

2.2.24 SO 25 Oversized waste shredding hall

This SO includes a new hall for the crushing of oversized waste. The proposed single-storey building will be rectangular in plan with dimensions of 16.46 x 36.4m. There will be a heated/cooled building at +6.150m level, measuring approx. 6x4m, accessed from SO24 and via a staircase from ±0.0 level. The building will be used as a day room and sanitary facilities for the tipping platform and oversized waste crushing hall workers. The building will be roofed with cladding, and will be attached to SO 15 at the rear. Photovoltaic panels will be placed on the roof of the building. The type of cladding of the facade, attics and the colour scheme to be coordinated according to the unifying architectural design of the HVB.

Estimated scope of works in SO 25:

- Excavations
- Foundation construction
- Vertical load-bearing structures
- Horizontal load-bearing structures
- Roof load-bearing structures
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Roof sheathing construction
- Floors
- Protective coatings and surface treatments of structures
- Waterproofing
- Door structures and ventilation shutters
- Plumbing products
- Locksmith products
- Power distribution
- Lightning rod and earthing
- Storm water drainage
- Wastewater sewerage
- Fire water distribution

- Drinking water distribution systems
- Heating/cooling

The built-up area of SO 25 is 595 m^2.

Built-up area of SO 25 is 9650 m^3.

2.2.25 SO 27 Substation 400 V K2 and K1

This SO includes the existing building of the UAG - 400V substation K2 and K1. The existing building has a rectangular shape in plan with dimensions 13.65 x 17.2m, the building has one underground and one above-ground floor. The load-bearing structure of the building consists of a steel structure, the perimeter cladding is metal insulated, the common wall with the building of the deworming and with the building of the CHÚV is made of bricks of thickness 150mm. The roof is made of trapezoidal sheet with thermal insulation. Partitions are brick. The cable room is of reinforced concrete construction.

The subject of the building modifications are maintenance works and new technical equipment of the building.

The following building modifications will be carried out in the object in question:

- Rehabilitation and repair of existing floor, wall and ceiling surfaces
- Rehabilitation of existing steel structures + new coatings
- Repair/replacement of existing plumbing elements
- Replacement of existing steel entrance doors with new aluminium or steel doors

Implementation of new cladding of the facade - new front structure on which will be cladding of galvanized sheet metal. The design of material and colour solution will be coordinated according to the unifying architectural solution of the cladding of all the ZEVO SO ZEVO.

Estimated scope of works in SO 27:

- Demolition and dismantling
- Perimeter casing
- Pre-set unifying perforated cladding including its supporting structure
- Protective coatings and surface treatments of structures
- Door structures and ventilation shutters
- Plumbing products
- Locksmith products
- Lightning rod and earthing
- Storm water drainage

The built-up area of SO 27 is 230 m^2.

The built-up area of SO 27 is 2084 m^3.

2.2.26 SO 51 Sewerage of technological wastewater

Under the proposed condition, there will be a redistribution of process and wastewater. It is necessary that only the technological water from the objects is discharged into the technological sewerage system, sewage and rainwater must be separated from this sewerage system.

For the needs of technological water drainage, a technological sewerage system will be built and connected to the cooling tank and then to the existing accumulation of technological water. From the process water accumulation, water will be pumped through the existing pumping station and discharge pipe to the Slovnaft premises. The existing pumping station also contains a waste water quantity meter.

Existing process sewers that cease to perform their function will be closed.

The technological gravity sewer consists of a DN300 pipe. On the route of the sewerage there will be installed inspection sewer manholes. From the main sewerage drains there will be planted branches for individual objects. Sewer manholes will be installed on the branch lines. The material of the gravity part of the sewer must be suitable for the temperature of the waste water from the technologies.

Gravity part of technological sewer DN200-DN400 dl. approx. 220m.

Cooling tank 1 pcs.

2.2.27 SO 53 Sewage sewerage

Under the proposed condition, there will be a redistribution of process and wastewater. In the designed area will be built area sewage sewerage which will be connected with the existing sewage sewerage outlets from the building SO 12 and with the proposed sewage sewerage outlets from the buildings SO 07 and SO 22.

The existing pumping station SO 21 will be used for pumping only process water.

The sewage water from the building SO 07 will first be discharged to the pumping station (CSs2) and then pumped through the pressure sewer to the gravity part. The sewage from the construction site will also be discharged into this on-site pumping station (CSs2). The sewage sewer will be connected to the new sewage pumping station (CSs1). From this pumping station, the proposed discharge pipe will be connected to the existing discharge pipe leading to the Slovnaft site. A metering shaft with a billing meter will be installed between the pumping station and the discharge pipe. A storage tank will be installed upstream of the pumping station on the gravity section of the pipeline to accumulate sewage in the event of a failure of this main sewage pumping station.

Only sewage will be discharged into the sewage system.

Existing sewage sewer lines that cease to serve their function will be abandoned.

The sewage gravity sewer will be made of DN300 pipe. On the route of the sewerage there will be installed inspection sewer manholes. From the main sewerage drains there will be planted branches for individual objects. Sewer manholes will be installed on the branch lines. The pressurised sewage sewerage system will consist of HDPE pressure pipes.

The pumping stations will be equipped with 1+1 pumps, with one pump in operation and the other as a 100% reserve in case of failure of the first pump.

Gravity part of sewage sewer DN300, DN200 dl. approx. 200m.

Area pressure sewage sewer HDPE D63,90 dl. approx. 220m.

Sewage pumping station CSs - 3pcs.

Accumulation tank in front of CSs1 volume min.14m^3.

Measuring shaft - 1pc.

2.2.28 SO 55 Sewerage of precipitation wastewater

Within the proposed solution will come to the direction of storm water drainage so that within the premises will be built new storm sewers which will be connected through retention to the seepage pits installed on the land of the Customer. Stormwater from the roofs of the new (reconstructed) buildings and stormwater from the reconstructed paved areas will be discharged into this proposed storm sewer. Stormwater from existing drainage areas or areas from which it would be difficult to relocate the new drainage will be retained with connection to the existing sewer.

The existing ORL will be refurbished to a flow rate of 250l/s.

Part of the proposed solution is the construction of new storm sewer drains connected to the soakage pits (boreholes).

The area storm sewer will be designed from PP (PVC) pipes SN8,SN10,SN16.

The estimated length of the newly proposed DN200-DN400 storm sewer is approximately 700 m.

Newly proposed oil separators approx. 2 pcs.

Retention volume min. 252 m^3.

Wide profile seepage wells 7 pcs.

2.2.29 SO 60 Chimney

The existing chimney coating will be repaired and colour-coordinated according to the unifying architectural design of the cladding of all ZEVO SO ZEVO.

2.3 Scope of supply of Goods - Machinery technology a, electrical equipment and ASRTP

The supply of Goods and Items for the mechanical, electrical and ASRTP part of the Works shall include the supply of Goods and Items required for the complete process systems and installation works of the individual interconnecting sets of operations which are within the scope of the Works.

2.3.1 PS 51Kotol K3

The delivery of the PS 51 Boiler K3 operating set will include complete and fully functional equipment consisting of:

- Waste dosing equipment:
  - ZKO hopper
  - Hydraulically operated shut-off flap
  - Shaft for ZKO supply
  - Hydraulic waste feeder
  - Cooling of the waste shaft

- Equipment for vault disturbance in the hopper and waste shaft
- Measurement of ZKO level in the hopper
- Temperature measurement in the waste shaft

- By arranging the grate:
  - Grating system (complete sliding combustion grate with hydraulic drive)
  - Transportation of the forfeited material from the grate
  - Hydraulic station and hydraulic oil piping
  - Automatic lubrication system
- Combustion air system**:**
  - Primary air fan
  - Primary air heater (LUVO)
  - Secondary air fan
  - Air ducts, shut-off and control dampers
  - Thermal or noise insulation
- Combustion control and regulation system including necessary measurements
- Combustion area:
  - Combustion space of 1 boiler stroke formed by the evaporator heating surfaces
  - Protection of heating surfaces (lining, Inconel - cladding)
- Steam boiler with accessories (range in accordance with STN EN 12952):
  - Three vertical strokes formed by membrane walls and one horizontal stroke with convection surfaces (evaporator coils, superheaters, economizers)
  - One boiler body with built-in
  - Ash dumps
  - Protection of heating surfaces (lining, Inconel - cladding)
  - Necessary measurements for control, management and regulation of the steam boiler
  - All necessary piping, fittings (control, shut-off and fuse)
  - Injection valves for steam temperature control
  - Silencer (behind the boiler safety valve and start-up valve)
  - Boiler and pipe supports and hangers
  - Boiler safety protection system (ESD)
- Cleaning the boiler heating surfaces:
  - Tapping device for convection surfaces in horizontal draft
  - Spraying system for vertical boiler strokes

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

- Gas burners for start-up, stabilization and shutdown:
  - Two burners with accessories
  - Combustion and cooling air fans
  - Air piping including filters and silencers
  - Internal gas distribution (from the connection point), including necessary fittings, measurements, etc.
  - Control and regulation system of gas burners
- The boiler's coarse fittings:
  - Access door to the grate
  - Access door to the boiler
  - Observation windows (with cleaning and stuffing air)
  - Cleaning holes
  - Cameras for monitoring the entire grid area
- Sampling and sampling panel:
  - Analyzers for feedwater, boiler leakage, saturated steam, superheated steam and condensate
  - Sampling pipe
  - Adjustment of samples
  - Cooling water inlet and outlet
- Control and management system:
  - Cabling and cable routes for field instrumentation of the new technological equipment delivered, up to the pooling boxes in the boiler room of boiler K3
  - Signal combiner boxes
- Operational power distribution:
  - Interconnection cabling (cable routes, power cables) from switchboard R1 to appliances in the PS 51 range
  - Frequency converters for power supply and control of combustion air fans, hydraulic pumps or other appliances.
- Boiler and pipe insulation and plating
- Transporting cinder from the grating to the deslagging building (SO 03):
  - Wet cinder ejector
  - Extraction of breed vapours from the slag extractor
  - Vibrating or belt conveyor
- Transport of ash from the boiler to the ash and reaction residue silo (PS 55):

- Mechanical transport - conveyors (screw, chain), rotary feeders, plate caps, compensators, ash chutes and ash crusher
- Pneumatic conveying - ash intermediate hopper, conveying pressure vessel, conveying pipeline, pressure air pipeline, fittings and other equipment
- Insulation and sheathing

- Boiler support structure, service platforms and staircases
- Lifting mechanisms:
  - Groove and electric hoist with a capacity of 2.0 t placed in the mounting hole in the boiler room section of boiler K3 from the level ±0.0 up to the top floor of the boiler room (SO 01)
  - Manual hoists for servicing and maintenance (e.g. fans, LUVO bundles, conveyors, relief valve, etc.)

Specific requirements for the design, dimensioning and supply of PS 51

Boiler K3 will be designed as a high-pressure steam boiler designed for combustion of solid waste with nominal average calorific value of 11MJ/kg. It will consist of four flue gas streams. The first three strokes of the boiler will be vertical, the fourth, convection stroke will be horizontal.

Fuel - WCO will be loaded into the boiler hopper from the waste bin. Continuous combustion of waste in the boiler K3 will take place on an inclined sliding (reciprocating) grate, which will ensure the quality of waste combustion and ensure the required by the legislation burning of waste - carbon content in solid residues after waste combustion.

The design of the boiler combustion chamber and the layout of the individual combustion air inlets must ensure the requirement for the combustion of other waste - a minimum combustion temperature of 850°C and a flue gas residence time of 2 seconds within this temperature range.

Solid residues from waste incineration - cinders, ash trapped in the boiler and flue gases will be continuously discharged from the boiler.

In the pressurized water-steam system of boiler K3, superheated steam with parameters 400°C and 4.0 MPa will be produced from the degassed feedwater (mixture of condensates from the ZEVO OLO water-steam circuit and replenished demineralized water).

The grate will be designed as an air-cooled grate and hydraulically driven. Basic design parameters:

- Continuous heat input of the firebox 45,8 MWt
- Minimum stable heat input of the firebox ≤ 32,1 MWt
- Nominal permanent waste incineration rate 15,0 t/h
- Maximum permanent waste incineration rate 18.3 t/h
- Minimum permanent waste incineration rate 11 t/h

Boiler

The actual boiler K3 must be of the water-tube type, designed for natural circulation, with an integrated boiler drum (boiler body) and structurally suitable for combustion of WCO. The boiler shall comply with the requirements of the Pressure Equipment Directive (PED) and shall be constructed and supplied in accordance with the standard for water-tube boilers STN EN 12952.

The boiler will achieve superheated steam parameters of 400°C and 4.0 MPa in the thermal output range:

- 70%-100% without the use of stabilising gas burners
- 45%-70% using stabilising gas burners

Cleaning of boiler heating surfaces

As part of the delivery of the K3 boiler, systems for cleaning the external surfaces of the individual heat exchange surfaces of the boiler in contact with the flue gases must be supplied and installed - removal of ash and fly ash deposits from the surfaces in question.

In the 2nd and 3rd radiation stroke of the boiler it is foreseen to install a stable automatic cleaning system of the membrane wall surface by water spraying.

Cleaning of the heating surfaces of the evaporator coils, superheaters and economizer in the horizontal draft is assumed to be done by means of a peeling device with individual pneumatic cylinders. The pneumatic cylinders will be located on the left and right side of the lower chambers of the bundles.

Protection of heating surfaces

Part of the combustion chamber diaphragm walls of the boiler shall be protected by a refractory lining to such an extent as to ensure that the requirement for a flue gas residence time of 2 seconds at 850°C with the boiler clean and dirty at any operating point within the combustion power diagram is met. The surfaces of the evaporator diaphragm walls in the combustion chamber - 1st stroke of the boiler, 2nd stroke of the boiler, partly in the 3rd stroke (up to the entrance to the 4th stroke) of the boiler shall be coated with a high strength, heat resistant and corrosion resistant nickel-chromium based alloy with a guaranteed minimum thickness of 2,0 mm (e.g. INCONEL 625). The extent and technical solution for the protection of superheater tubes and evaporator bundles located in the horizontal draft of the boiler shall be decided by the Contractor based on technical design and experience.

2.3.2 PS 52Reconstruction of boiler K2

The delivery of PS 52 Boiler K2 operating set will include the replacement and overhaul of the K2 boiler combustion equipment in order to extend its service life, to enable the combustion of waste with a higher calorific value and to increase the permanent heat input of the firebox to the value of 27.5 MWt. Estimated scope of supply:

- Analysis of the overall existing condition of the combustion plant
- Complete overhaul or replacement of the rotary grate with accessories
- Sealing between grate and combustion chamber as required, including compensator and lining
- If necessary, any modifications to the pressure parts of the boiler, lining, etc. related to the increase of the heat input of the firebox

Annex 4 to the Notice of initation of the PMC

DESCRIPTION OF THE SUBJECT OF THE PLANNED CONTRACT

- Combustion air system:
  - Primary air fan
  - Primary air heater (LUVO)
  - Secondary air fan
  - Air ducts, shut-off and control dampers
  - Thermal or noise insulation
- Combustion control and regulation system including necessary measurements
- Boiler safety protection system (ESD)
- Replacement of all remote and local measuring instruments
- Control and management system:
  - Cabling and cable routes for field instrumentation of the new technological equipment delivered, up to the pooling boxes in the boiler room of the K2 boiler
  - Cabling and cable routes of the field instrumentation of the supplied replaced remote measuring instruments to the pooling boxes in the boiler room of the K2 boiler
  - Signal combiner boxes
- Sampling and sampling panel:
  - Analyzers for feedwater, boiler leakage, saturated steam, superheated steam and condensate
  - Sampling pipe
  - Adjustment of samples
  - Cooling water inlet and outlet
- Operational power distribution:
  - Interconnection cabling (cable routes, power cables) from switchboard R4 from section R4.2 to new and also to existing appliances in the range of PS 52
  - Frequency converters for power supply and control of combustion air fans, hydraulic pumps or other appliances
  - Disassembly of all existing cabling
  - Replacement of cable routes as required
- Cleaning of boiler heating surfaces:
  - Spraying system for vertical boiler strokes (2nd and 3rd stroke)
  - Additional cleaning system for convection surfaces in horizontal draft
- Gas burners for start-up, stabilization and shutdown:
  - Two burners with accessories
  - Combustion and cooling air fans

- Air piping including filters and silencers
- Internal gas distribution, including necessary fittings, measurements, etc.
- Control and regulation system of gas burners

- Equipment, piping, fittings, etc. required for boiler preservation:
  - Preservation of the K2 boiler pressure unit
  - Preservation of the flue gas space of the K2 boiler
- Dismantling of existing SNCR technology, including necessary modifications
- Repair of coatings of existing equipment and technological steel structures

Parameters of the existing boiler K2

Parameter	Unit	Value
Nominal permanent incineration of waste	t/h	10,9
Design calorific value of waste	MJ/kg	8,25
Annual operating fund	h/year	7 500
Total annual capacity	t/year	81 750
Steam power	t/h	27,7
Steam temperature	^{0}C	400
Steam pressure	MPa	4,0
Length of the combustion grate	m	approx. 7.5
Width of the combustion grate	m	4,16
Heating surface	m^2	3430
Nominal boiler heat output	MW	20,5
Steam heat at the boiler outlet	MW	25

Specific requirements for the design, dimensioning and supply of PS 52

The main objective of the reconstruction of the K2 boiler is to extend its service life and to adapt the combustion plant to the combustion of waste with a higher nominal calorific value of 11.0 MJ/kg.

Basic design parameters:

- Nominal average calorific value of waste 11MJ/kg
- Continuous heat input of the firebox 27,5 MWt
- Minimum stable heat input of the firebox ≤ 19,25 MWt
- Nominal permanent incineration of waste 9,0 t/h
- Maximum permanent incineration of waste 11,0 t/h
- Minimum permanent incineration of waste 6,6 t/h

- Steam output of the boiler — approx. 31,0 t/h
- Superheated steam temperature — 400 °C
- Superheated steam pressure — 4.0 MPa

Boiler preservation

The long-term preservation will consist of the preservation of the boiler pressure vessel and the preservation of the boiler flue gas space.

There are several options for the preservation of the boiler pressure unit, e.g.:

- By drying and subsequent filling with nitrogen
- The entire space (including the steam room) filled with feed water, anti-corrosion additives will be dosed into the water

There are several options for the preservation of the boiler flue gas space, e.g.:

- Surfaces will be sandblasted and then dusted with slaked lime or sprayed with lime milk
- Hot air will be blown into the boiler by a fan and keep the relative humidity below 20%

After preservation, under no circumstances and at any temperature changes may a condensation process (resulting in wetting of the heat exchange surfaces) occur on any part of the heat exchange surfaces of the boiler (membrane walls, superheaters, evaporator, ECO) in the flue gas space of the boiler during the entire preservation period.

The Contractor shall decide on the basis of experience and submit the optimum preservation option (quality, time and economic criteria) with a detailed description of the boiler preservation and decontamination procedure to the Customer for approval.

Corrosion protection and coatings (existing structures)

For existing structural and process steel structures, piping and other non-insulated parts of the OLO ZEVO, which are expected to be reused within the construction of the MaE ZEVO. It is required to carry out:

- for existing structures belonging to SO 01 - space K1 and K2 to a height of +4.5 m:
  - complete sandblasting of existing steel structures to quality grade Sa 2,5 according to STN EN ISO 8501-1
  - application of complete corrosion protection in accordance with the coating system
- for existing structures belonging to SO 01 - space K1 and K2 above the height of +4.5 m:
  - cleaning and surface preparation of existing steel structures
  - repair of damaged surfaces
  - application of the top coat of paint on existing steel structures

2.3.3 PS 53 Reconstruction of boiler K1

The delivery of the operating set PS 53 Boiler K1 will include the replacement and overhaul of the combustion equipment of Boiler K1 in order to extend its service life, to enable the

combustion of waste with a higher calorific value and to increase the permanent heat input of the firebox to the value of 27.5 MWt. Estimated scope of supply:

- Analysis of the overall existing condition of the combustion plant
- Complete overhaul or replacement of the rotary grate with accessories
- Sealing between grate and combustion chamber as required, including compensator and lining
- If necessary, any modifications to the pressure parts of the boiler, lining, etc. related to the increase of the heat input of the firebox
- Combustion air system:
    - Primary air fan
    - Primary air heater (LUVO)
    - Secondary air fan
    - Air ducts, shut-off and control dampers
    - Thermal or noise insulation
- Combustion control and regulation system including necessary measurements
- Boiler safety protection system (ESD)
- Replacement of all remote and local measuring instruments
- Control and management system:
    - Cabling and cable routes for field instrumentation of the new technological equipment delivered, up to the pooling boxes in the boiler room of boiler K1
    - Cabling and cable routes of field instrumentation of the supplied replaced remote measuring instruments to the pooling boxes in the boiler room of boiler K1
    - Signal combiner boxes
- Sampling and sampling panel:
    - Analyzers for feedwater, boiler leakage, saturated steam, superheated steam and condensate
    - Sampling pipe
    - Adjustment of samples
    - Cooling water inlet and outlet
- Operational power distribution:
    - Interconnection cabling (cable routes, power cables) from switchboard R4 from section R4.1 to new and also to existing appliances in the PS 53 range
    - Frequency converters for power supply and control of combustion air fans, hydraulic pumps or other appliances.
    - Dismantling of all existing cabling

- Replacement of cable routes as required

- Cleaning of boiler heating surfaces:
  - Spraying system for vertical boiler strokes (2nd and 3rd stroke)
  - Additional cleaning system for convection surfaces in horizontal draft
- Gas burners for start-up, stabilization and shutdown:
  - Two burners with accessories
  - Combustion and cooling air fans
  - Air piping including filters and silencers
  - Internal gas distribution, including necessary fittings, measurements, etc.
  - Control and regulation system of gas burners
- Equipment, piping, fittings, etc. required for boiler preservation:
  - Preservation of the K1 boiler pressure unit
  - Preservation of the flue gas space of boiler K1
- Dismantling of existing SNCR technology, including necessary modifications
- Repair of coatings of existing equipment and technological steel structures.

Parameters of the existing boiler K1

They are the same as for the K2 boiler - chapter 2.3.2

Specific requirements for the design, dimensioning and supply of PS 53

They are the same as for the K2 boiler (PS52) - chapter 2.3.2

2.3.4 PS 54 Waste reception technology

The delivery of the PS 54 Waste Receiving Technology Operating Package will include the partial replacement, modification and retrofitting of existing equipment. The waste reception process equipment will be common to all boilers K1, K2 and K3. Estimated scope of supply:

- Road scales
- Barriers for entry to road weighbridges
- Detection system for the identification of radioactive materials
- Traffic lights at the entrance and exit
- Large waste shredder
- Belt conveyor for transporting crushed material
- Extension of existing crane runways
- Overhaul of cranes for the OCU (2 pcs) and retrofitting of cranes
  - devices to enable automatic operation of cranes
  - thermal / infrared cameras
  - automatic waste weighing system

  - suitable electro-hydraulic grabs (2 pcs) for removing the vault in the boiler hoppers, grabs will be placed on the auxiliary lift of the cranes
  - controlling the cranes from both crane operator cabins and also from a separate workstation in the control room
- Hydraulic grapples for handling ZKO (4 pcs)
- Technological steel structures and access platforms, stairs and ladders
- Automatic crane operator cab glass cleaning machine
- Control and management system
  - Cabling and cable routes of field instrumentation of the new technological equipment delivered, up to the pooling cabinets
  - Cabling and cable routing of field instrumentation of the supplied replaced and original remote measuring instruments to the pooling cabinets
  - Signal combiner boxes
- Equipment and apparatus necessary for the automatic unattended operation of cranes
- Operational power distribution
  - Secondary switchboard
  - Interconnecting cabling (cable routes, power cables, for selected electrical equipment with fire resistance) from the branch switchboard to new and also to existing appliances in the range of PS 54
  - Interconnection cabling (cable route, power cables) from the main switchboard to the secondary switchboard
  - Disassembly of all existing cabling
  - Replacement of cable routes as required
- Repair of coatings of existing equipment and technological steel structures

Specific requirements for the design, dimensioning and supply of PS 54

Required crusher parameters

• Annual operating time	approx. 1 500 h/year
• Permanent crusher performance	15 t/h
• Estimated annual output of the shredder	approx. 15 000 t/year
• Maximum size of crushed piece	1000x1000x2200
• Maximum output waste size	100x100x500

Cranes

The current number of cranes will be maintained - 2 (one crane as a backup).

The existing crane tracks of the cranes in the MSW bin will be reconstructed or modified (lengthened) so that the existing cranes can remove waste at all locations in the MSW bin, including the new portion of the MSW bin, without using the prohibited inclined draft.

The aim of the overhaul of the cranes and the modernisation of their technical equipment is:

- extending their service life
- removal of any obsolete or obsolete technological solutions or crane equipment
- possibility of automatic operation of cranes

Automatic crane operation means automation cycles:

- Boiler hopper filling (batching) - the batching cycle is used to fill the boiler hopper from the ZKO hopper "from the boiler batching area".
- Stacking / Waste Receiving - The stacking cycle is used to clear the bin area below the discharge gates (to keep them empty and clear for the next WPC).
- Mixing - The mixing cycle is used to mix the waste in the bunker area.

2.3.5 PS 55 Ash management

The delivery of the PS 55 Ash Management Plant will include complete and fully functional facilities for the transport and storage of ash and flue gas cleaning products from the K3 and K2 boilers. Two separate independent conveying systems will be supplied - each flue gas cleaning plant will have its own conveying system consisting of:

- Mechanical transport - conveyors (screw, chain), rotary feeders, plate caps, compensators, ash chutes, ash crusher and other equipment
- Pneumatic transport - intermediate ash storage tanks, transport pressure vessels, transport pipelines, pressure air pipelines, fittings and other equipment
- Emergency emptying into container or big-bags
- Two common forces
    - with filters
    - with load cells
    - with electric trace heating
    - with a device for preventing and removing the vault
    - with silo emptying device
- Electric trace heating of equipment and components
- Insulation and sheathing
- Support structures, service platforms, staircases, ladders for silos and mechanical and pneumatic transport equipment
- Lifting mechanisms required
- Control and management system
    - Cabling and cable routes of field instrumentation of the new technological equipment delivered, up to the pooling cabinets

- Signal combiner boxes

- of the operating power distribution system
  - Secondary switchboard
  - Interconnecting cabling (cable routes, power cables) from the branch switchboard to the appliances in the PS 55 range
  - Interconnection cabling (cable route, power cables) from the main switchboard to the secondary switchboard

Specific requirements for the design, dimensioning and supply of PS 55

The sum of the usable capacities (volumes) of the forces will be minimal:

- 380 m^3, or
- for 6 days of nominal operation

The higher value of usable capacities applies.

2.3.6 PS 56 K3 boiler flue gas cleaning technology

The delivery of the PS 56 flue gas cleaning unit for the K3 boiler will include a complete and fully functional unit consisting of:

- Spray cooler
  - with flue gas distributor
  - with dual nozzles with temperature control
  - with evaporating part
  - with emergency ash discharge
- Reactor
  - with dosage of Calcium Hydroxide $Ca(OH)_2$ and adsorbent
  - with recirculation dosing
  - with reaction part
  - with emergency ash discharge
- Fabric filter
  - with raw flue gas distributor with dampers
  - with filter chambers and hoppers
  - with filter sleeves and baskets
  - with pressure air cleaning system
  - with cleaned flue gas chamber with plate valves
  - with closing cover
  - with ash discharge
  - with water or steam reactivation of the recirculation
- DeNOx devices

- with flue gas/combustion exchanger
- with steam/alcohol heater
- with ammonia water dosing and mixing part
- with catalytic converter housing and catalytic converters
- with flue gas cooler

- Exhaust fan
- Flue gas cleaning control and regulation system including necessary measurements
- Calcium Hydroxide Ca (OH) storage and transport system$_2$
  - with filling station and control box
  - with force and support structure
  - with filter force
  - with silo equipment (pumping equipment, pressure monitoring, discharge)
  - with dosing device
  - with pneumatic transport of calcium hydroxide into the reactor
- Adsorbent storage and transport system
  - with filling station and control box
  - with force and support structure
  - with filter force
  - with silo equipment (pumping equipment, pressure monitoring, discharge)
  - with dosing device
  - with pneumatic transport of adsorbent into the reactor
  - with inertial equipment
- Storage and dosing of ammonia water
  - with pumping station with control cabinet
  - with tank and sump (it is assumed that the existing tank and sump will be used)
  - with safety equipment (flood extinguishing system, etc.)
  - with dosing pumps
  - with piping
  - with dosing station
- Storage and dosage of sodium hydroxide
  - with filling station and control box
  - with tank and catch basin
  - with dosing pumps
  - with piping to appliances

- Measurement of flue gases
  - raw flue gas measurements
  - measurements of clean flue gas
- Water and pressurised air connection pipes, including fittings and fittings from the connection points to the individual appliances of the flue gas cleaning system
- Control and management system
  - Cabling and cable routes of field instrumentation of the new technological equipment supplied, up to the pooling cabinets
  - Signal combiner boxes
- of the operating power distribution system
  - Secondary switchboard
  - Interconnecting cabling (cable routes, power cables) from the branch switchboard to the appliances in the PS 56 range
  - Interconnection cabling (cable route, power cables) from the main switchboard to the secondary switchboard
  - Frequency converter for power supply and control of the exhaust fan or other appliances
- Insulation, sheathing, as required for heating equipment, storage tanks, pipes and ducts
- Supporting structures of equipment and storage tanks and technological service platforms and staircases
- Lifting mechanisms at all locations where parts of 0.5 - 10.0 t will be handled.

Specific requirements for the design, dimensioning and supply of PS 56

The flue gas cleaning system must ensure continuous cleaning of the flue gases from the combustion of waste in the K3 boiler in such a way as to guarantee compliance with all legally prescribed and guaranteed emission limits for air pollutants during the normal operation of the K3 boiler throughout the entire range of its combustion power diagram, with the exception of the operating conditions during start-up and shutdown of the boiler.

Assumed minimum design values for flue gas cleaning of boiler K3

SYSTEM Flue gas data for maximum continuous load at the boiler outlet	**VALUE**	**UNITS**
Quantity of flue gases	90 000	Nm^3 / h f.
O_2	5-9	Volume % wet
CO_2	9-10	Volume % wet
H O_2	12-18	Volume % wet

NOx Raw flue gases	400	mg/m³(n) tr.; 11%O_2
SO_2 Raw flue gas	800	mg/m³(n) tr.; 11%O_2
HCl	1500	mg/m³(n) tr.; 11%O_2
HF	15	mg/m³(n) tr.; 11%O_2
Hg	0,5	mg/m³(n) tr.; 11%O_2

Fabric filter:

The fabric filter will consist of a minimum of 4 chambers. During normal operation all 4 chambers are in operation. The design of the filter shall be such that the filter can process at 100% of rated flue gas flow at maximum continuous load, even when one chamber is shut down. For the required filter area, the larger number z applies:

- The minimum load on the filter area is 0.8 operating cubic metres/m² per minute when all chambers are in operation
- The minimum load on the filtration area is 1.0 operating cubic meter/m² per minute in case of closed chamber operation.

In both cases, this is operation at 100% of rated flue gas flow at maximum continuous load.

In the event of a system malfunction, it must be possible to bypass the fabric filter by means of a by-pass (bypass).

SCR reactor

Each module will be designed as a steel frame and will contain the individual catalyst elements that will be housed within the module. The catalyst elements should preferably be honeycomb shaped (base material titanium dioxide with tungsten oxide and vanadium oxide as active components). Due to the low dust content, a smaller mm pitch may be chosen.

The cross section of the reactor is completely filled with catalyst modules, which together form a layer. In addition to the necessary layers, a reserve layer must also be provided. For each catalyst layer and for all heat exchangers, a continuous measurement of the pressure drop shall be ensured.

The SCR reactor will operate at a temperature of at least 230 °C. The temperature must be adjusted to prevent the deposition of ammonium salts which could foul the catalyst so that regeneration of the catalyst is not necessary.

A temperature gauge (2 of 3) will be installed before and after the catalyst layers to release the ammonia water dosing.

A removable element shall be provided in each catalyst module that can be removed during shutdowns for analytical sampling.

Flue gas heat recovery plant

An additional flue gas cooler will need to be installed downstream of the flue gas/combustion heat exchanger of the SCR plant to cool the flue gas temperature to approximately 115-120 °C before entering the stack. Hot water at a temperature of approximately 60-80 °C will be used as the cooling medium, which must be heated by approximately 30-50 °C. The heat

exchanger must be designed to resist corrosion if the temperature drops below the dew point of the acid. The estimated heat gain from cooling the flue gas of boiler K3 from an assumed flue gas temperature of approximately 150-160 °C downstream of the SCR to a flue gas temperature upstream of the stack inlet of 115-120 °C is approximately 1 200-1 400 kW.

The heat produced can be optionally and combined for the following heating systems under the condition of heat extraction throughout the year:

- primary air preheating
- condensate preheating to the feed tank
- preheating of the mains water entering the ZEVO substation

2.3.7 PS 57 K2 (K1) boiler flue gas cleaning technology

The delivery of the flue gas cleaning unit PS 57 for boiler K2(K1) will include a complete and fully functional unit consisting of:

- Spray cooler
  - with flue gas distributor
  - with dual nozzles with temperature control
  - with evaporating part
  - with emergency ash discharge
- Reactor
  - with dosage of Calcium Hydroxide $Ca(OH)_2$ and adsorbent
  - with recirculation dosing
  - with reaction part
  - with emergency ash discharge
- Fabric filter
  - with raw flue gas distributor with dampers
  - with filter chambers and hoppers
  - with filter sleeves and baskets
  - with pressure air cleaning system
  - with cleaned flue gas chamber with plate valves
  - with closing cover
  - with ash discharge
  - with water or steam reactivation of the recirculation
- DeNOx devices
  - with flue gas/combustion exchanger
  - with steam/alcohol heater
  - with ammonia water dosing and mixing part

- with catalytic converter housing and catalytic converters
- with flue gas cooler

- Exhaust fan
- Flue gas cleaning control and regulation system including necessary measurements
- Calcium Hydroxide $Ca(OH)_2$ storage and transport system
  - with filling station and control box
  - with force and support structure
  - with filter force
  - with silo equipment (pumping equipment, pressure monitoring, discharge)
  - with dosing device
  - with pneumatic transport of calcium hydroxide into the reactor
- Adsorbent storage and transport system
  - with filling station and control box
  - with force and support structure
  - with filter force
  - with silo equipment (pumping equipment, pressure monitoring, discharge)
  - with dosing device
  - with pneumatic transport of adsorbent into the reactor
  - with inertial equipment
- Ammonia water dosage
  - with piping
  - with dosing station
- Dosages of sodium hydroxide
  - with piping to appliances
- Measurement of flue gases
  - raw flue gas measurements
  - measurements of clean flue gas
- Water and pressurised air connection pipes, including fittings and fittings from the connection points to the individual appliances of the flue gas cleaning system
- Connecting part of flue gas duct with shut-off valves for connection of flue gas from boiler K2 and K1 to flue gas cleaning line K2
- Control and management system
  - Cabling and cable routes of field instrumentation of the new technological equipment delivered, up to the pooling cabinets

- Signal combiner boxes

- of the operating power distribution system
  - Secondary switchboard
  - Interconnecting cabling (cable routes, power cables) from the branch switchboard to the appliances in the PS 57 range
  - Interconnection cabling (cable route, power cables) from the main switchboard to the secondary switchboard
  - Frequency converter for power supply and control of the exhaust fan or other appliances
- Insulation, sheathing, as required for heating equipment, storage tanks, pipes and ducts
- Supporting structures of equipment and storage tanks and technological service platforms and staircases
- Lifting mechanisms at all locations where parts of 0.5 - 10.0 t will be handled.

Specific requirements for the design, dimensioning and supply of PS 57

The flue gas cleaning system must ensure continuous cleaning of the flue gases from the combustion of waste in boiler K2(K1) so as to guarantee compliance with all legally prescribed and guaranteed emission limits for air pollutants during the normal operation of boiler K2(K1) throughout the entire range of its combustion power diagram, with the exception of the operating conditions during start-up and shut-down of the boiler.

Assumed minimum design values for flue gas cleaning of boiler K2(K1)

SYSTEM	**VALUE**	**UNITS**
Flue gas data for maximum continuous load at the boiler outlet		
Quantity of flue gases	55 000	Nm^3 / h f.
O_2	5-9	Volume % wet
CO_2	9-10	Volume % wet
H O_2	12-18	Volume % wet
NOx Raw flue gases	400	mg/m^3(n) tr.; 11%O_2
SO_2 Raw flue gases	800	mg/m^3(n) tr.; 11%O_2
HCl	1500	mg/m^3(n) tr.; 11%O_2
HF	15	mg/m^3(n) tr.; 11%O_2
Hg	0,5	mg/m^3(n) tr.; 11%O_2

For the flue gas cleaning technology of the boiler K2 (K1) PS 57, the requirements for the technical design given in chapter 2.3.6 - PS 56 Boiler K3 flue gas cleaning technology

Flue gas heat recovery plant

The requirements for the technical design in chapter 2.3.6 - PS 56 Boiler flue gas cleaning technology K3 apply accordingly

The estimated heat gain from cooling the flue gas of boiler K2 (K1) from an assumed flue gas temperature of approximately 150-160 °C downstream of the SCR (DPS 57.A) to a flue gas temperature upstream of the stack inlet of 115-120 °C is approximately 720-840 kW.

2.3.8 PS 58 Turbogenerator TG2

The subject of delivery of this operating set will be the equipment for cogeneration of electricity and heat, which will consist mainly of the following equipment and components:

- Steam condensing take-off turbine
- Gearboxes
- Electric Generator
- Turning equipment
- Lubricating oil system
- High-pressure hydraulic system
- Quick-closing valve and control valves
- Steam turbine bypass
- TG2 equipment cooling system
- TG2 plant cooling heat recovery system
- Low pressure heater
- Steam seal system
- Turbine drainage system
- Necessary pipe joints, expanders, fittings, piping layers, pipe insulation, etc.
- Noise insulation of the turbine
- TG2 control system
- Turbine protection
- Generator protection
- Necessary field instrumentation
- Cabling and cable routes from field instrumentation to pooling cabinets, signal pooling cabinets
- Operating power distribution - secondary switchboard, interconnecting cabling (cable routes, power cables) from the secondary switchboard to the appliances in the range of PS 58, interconnecting cabling (cable route, power cables) from the main switchboard to the secondary switchboard
- Overhead crane for maintenance and repair of TG2 and other necessary lifting equipment

Specific requirements for the design, dimensioning and supply of PS 58

The entire operating set PS 58 Turbogenerator TG2 will be designed and oversized for maximum steam supply from boilers K3 and K2 (K1) with the expected nominal steam parameters - pressure 4.0 MPa and temperature 400°C.

The TG2 steam turbine will be an axial, single-bladed, multi-stage, high-speed condensing turbine with one regulated steam extraction and one or more unregulated extractions for heat supply to the SCZT heat exchanger station and regenerative heating of condensate, feedwater or combustion air. The turbine will be equipped with all safety, control and other equipment for long-term safe operation. The turbine will be equipped with a start-up dewatering system and an operational dewatering system with a dewatering header.

TG2 must be designed for a smooth transition to islanded operation of the ZEVO in the event of a breakdown of the external grid and must be equipped with facilities to enable such islanded operation as part of the supply - ensuring the production of electricity only for self-consumption in the ZEVO.

The turbine bypass (reducing and cooling station) will be oversized for maximum steam supply from boilers K3 and K2 (K1).

2.3.9 PS 59 Chemical water treatment

The new CHP technology will be located in the reconstructed SO 15 Auxiliary Plant Building. The WTP will provide production and supply of both types of process water - raw filtered water and demineralised water. Raw filtered water will be used for technology and also as fire water. The main source of raw water for the ZEVO site after the implementation of the MaE ZEVO will continue to be the existing wells in the ZEVO OLO site.

- Technological equipment for raw water filtration
- Technological lines for the production of demineralised water
- Storage tank/filtered water tank
- Demineralised water storage tanks
- Chemical storage tanks
- All necessary conveying and dosing pumps
- Complete dosing stations including connecting pipes for dosing chemicals for boilers K3, K2, K1
- Connecting pipes, including fittings, fittings, heating, insulation, pipe plating, etc.
- Field instrumentation required
- Cabling and cable routes from field instrumentation to pooling cabinets, signal pooling cabinets
- Operational power distribution
    - Secondary switchboard, interconnecting cabling (cable routes, power cables) from the secondary switchboard to the appliances in the PS 59 range, interconnecting cabling (cable route, power cables) from the main switchboard to the secondary switchboard

- Frequency converters for power supply and control of selected pump drives

Specific requirements for the design, dimensioning and supply of PS 59

The WWTP will be designed (sized) and prepared for simultaneous operation of all three ZEVO lines (for line K1 consider the same consumption of raw filtered and demineralized water as for line K2 after the implementation of MaE)

The connection of raw water filtration facilities will be 2x100% (1+1) and the expected capacity will be 2 x 25 m^3/h.

Ion exchange technology or reverse osmosis and electrodeionisation technology can be used to produce demineralised water. The capacity of the process lines will be 2x100% (1+1, 2+0 in the short term) and the expected capacity will be 2 x 5 m^3/h.

The feed water and boiler water parameters will be in accordance with STN EN 12952-12.

The usable capacity of the demineralised water storage tanks will be a total of 100 m^3.

Usable capacity of filtered water storage tanks 12 hours of operation for technology needs.

2.3.10 PS 60 Boiler power supply

The delivery of the PS 60 Boiler Power Supply Operating Package will include equipment for the K3 boiler and also equipment for the K2 (K1) boiler and is expected to be as follows:

- Feed tank (min. 40 m^3) and degasser for boiler K3
- Two feed pumps (2x100%) with electric drive for boiler K3
- Two feed pumps (2x100%) with electric drive for boiler K2 (K1)
- Emergency feed pump for boiler K3
- Emergency feed pump for boiler K2
- Common leakage expander for boilers K3, K2, K1
- Common start-up expander for boilers K3, K2, K1
- Common operating expander for boilers K3, K2, K1
- Replacement of all remote and local measuring instruments
- Control and management system
  - Cabling and cable routes of field instrumentation of the new technological equipment delivered to the pooling cabinets
  - Cabling and cable routing of field instrumentation of the supplied replaced and original remote measuring instruments to the pooling boxes
  - Signal combiner boxes
- Operational power distribution
  - Interconnection cabling (cable routes, power cables) from switchboard R1 to appliances in the PS 60 range
  - Interconnection cabling (cable routes, power cables) from switchboard R4 to new and existing appliances in the PS 60 range

  - Disassembly of all existing cabling
  - Replacement of cable routes as required
  - Frequency converters for power supply and control of feed pump drives
- Insulation and sheathing
- Supporting structure, technological service platforms, staircases and ladders
- Lifting mechanisms - manual hoists for pump handling

Specific requirements for the design, dimensioning and supply of PS 60

The boiler feed water supply process equipment will be divided into a separate feed water system for boiler K3 and a separate feed water system for boilers K2 and K1.

In addition, the two feed tanks or piping systems on the suction side of the feed pumps will be connected by piping and separated by sectional shut-off valves during normal operation. In the event of a failure of one of the feed systems, boilers K3 and K2 (K1) will be fed from a common functional feed system.

For boiler K2 (K1) the existing feedwater tank with a volume of 32 m^3, a feedwater temperature of 130°C and a pressure of 0,27MPa (a) will be used.

For boiler K3, a new feed tank with degasser will be delivered, which will be located in SO 01 Boiler house building at a height of approx. +11.20 m. The usable volume of the feed tank will be a minimum of 40 m^3 and the water temperature in the feed tank is expected to be 130°C.

2.3.11 PS 61 Air-cooled condenser

The delivery of the PS 61 Air Cooled Condenser operating set will include a complete and fully functional plant consisting of:

- Air-cooled condenser
- By fans
- Condensate tank(s)
- Main condensate pumps (3x60%; 2+1)
- Condensate booster pumps (2x100%; 1+1)
- Momentum ejector
- Vapour jet pumps (2x100%)
- Automatic condenser tube cleaning device
- Pipes, fittings, expansion joints, hinges, supports, etc.
- Insulation and plating of pipes, tanks and other equipment
- Field instrumentation of equipment, cabling and cable routes to junction boxes
- Control and management system
  - Cabling and cable routes of field instrumentation of the supplied technological equipment, up to the pooling cabinets

- Signal combiner boxes

- Operational power distribution
  - Secondary switchboard
  - Interconnection cabling (cable routes, power cables) from the branch switchboard to the appliances in the PS 61 range
  - Interconnection cabling (cable route, power cables) from the main switchboard to the secondary switchboard
  - Frequency converters for power supply and control of fans and selected pump drives

- Supporting structure of the condenser and other equipment, service platforms and staircases

- Necessary lifting mechanisms

Specific requirements for the design, dimensioning and supply of PS 61

Design parameter requirements for capacitor:

- Ambient design temperature 26°C

- Pressure at turbine outlet flange 10 kPa (a)

- The sound pressure level of the air-cooled condenser shall not exceed 80 dB(A) 1,5 m above the roof, 1 m from the contour

The air-cooled condenser will be designed for the operating conditions TG2 and for the condition without TG operation, when the condenser will be able to condense the maximum amount of steam (full output of boilers K3 + K2) after the turbine bypass.

It is required to equip the condenser with an anti-freeze safety device.

Part of the air-cooled condenser is located above the internal ZEVO campus road, for this reason the minimum clearance height of the traffic area of 6.0 m and the minimum clearance distance between individual supports (including concrete foundations) of 10.0 m must be maintained at the point of the road.

2.3.12 PS 62 Electrical equipment

The delivery of the PS 62 Electrical equipment operating set will include complete and fully functional HV and LV equipment consisting of:

- 22kV substation - single-system gas-insulated with vacuum switches, 3 sections (1. section - power supply from ZSE distribution distribution lines, 2. section - outlets to VS transformers, 3. section - for EE source connections - TG2 and power output to the ZSE Distribúcia master system), U_n =24kV, I_k =20-25kA (1s), I_p =50-63kA, control and protection 220V DC

- Elements of the new G2 22MVA generator (excitation, protection, earthing node)

- 6.3 (11.5) kV/22kV oil block transformer with switchable taps ±5%/2x2.5% with grounded node on the secondary side including encapsulated conductors between transformer and generator

- Self-consumption transformers 22/0,4kV, IP21

- Appropriate cabling for interconnection of self-consumption transformers and main LV switchboards 0,4kV
- Main LV switchboards 0,4kV for VS connection, I_n =2500-3000A, I_p =50kA/1s, IP30, voltage system 3PEN 400V 50Hz network TN-C-S,
- One 0.4kV AC diesel generator for technology connection, including its own autonomous control system for automatic DG start, with fuel management and fuel supply for 8 hours of operation
- One 0.4kV AC diesel generator for fire system connection, including its own autonomous control system for automatic DG start, with fuel management and fuel supply for 6 hours of operation
- Switchboard for emergency power supply 0,4kV AC from diesel generators I_n =2500, I_p =50kA/1s, IP30, voltage system 3PEN 400V 50Hz network TN-C-S
- Secured 220V DC power supply system consisting of a rectifier, 220V DC battery, 220DC/230VAC inverter
- 24V DC secure power supply system consisting of rectifier, 24V DC battery
- 230VAC (I_n =200A), 220V DC (I_n =600A, IT) switchgear, with appropriate cabling
- Earthing of equipment and functional units of technology to pre-prepared outlets and HUS earthing network
- External HV and LV cabling between construction objects cable routes (booms, cable trays, cable trays) on pipeline (technological) bridges
- Cable routes and cable distribution within PS62

Specific requirements for the design, dimensioning and supply of PS 62

The overall concept of power supply and power derivation is indicated in the SINGLE LINE DIAGRAM (SLD) drawing MAE_DSP62_05_PS62_ES1_01_SCH_SLD in Annex 8.

From the 22kV substation distribution and power supply structure, the following operating conditions will be possible:

- Standard operation - ZEVO in operation, TG2 in operation and connected to the 22 kV distribution network by one feeder. Parallel connection of own consumption from TG2 and external network. This should be the basic operating condition. All non-consumed energy will be fed into the distribution network via line 710.
- Standard operation - ZEVO in operation, TG2 in operation and connected to the 22 kV distribution network. However, TG2 operates only until power is output via line 710, separate from the self-consumption supply. Self-consumption fed only from the external grid by one feeder. Such a situation will be possible to set up at the substation if it is economically advantageous for the operator.
- Status of the ZEVO power supply from the distribution network, by one of the mentioned feeders, without power generation - ZEVO in operation.
- Status of ZEVO island operation - ZEVO in operation, TG2 in operation, disconnected from 22 kV distribution network.

- Emergency state of ZEVO power supply - ZEVO in limited operation, TG2 shut down, ZEVO disconnected from the 22 kV distribution network. Self-consumption power supply from own diesel generators. During the start-up period of DG (approx. 6-10s) the control systems PLC, DCS, SCADA, control of substations and some valves remain continuously connected from accumulator batteries. Such operation will be with constraints, safe break-in and uninterrupted control of process equipment.

2.3.13 PS 63 Part MaR, ASRTP and EPS

The delivery of the PS 63 operational file of the MaR, ASRTP and EPS parts will include:

- Cabling and cable routes for field instrumentation of the supplied process equipment, from the junction boxes to the individual devices supplied with the DCS
- ASRTP ZEVO OLO
    - Operator workstations (OP) located in the shaft at approx. +15.05 m
    - Computers for the OP and process servers, which will be located in a separate server room (IT/OT server room) under the +11.2 m
    - Process level, i.e. the CPU itself, which will be located in a separate room +7.85 m above the cable room in separate racks
    - Engineering workstation to be located in the IT/OT server room below the command center. The programmer's workstation will be in the command area.
    - Data archiving level - i.e. archiving and information servers, which will be located in the IT/OT server room under the control room in a separate switchboard
    - Elements for the creation of the IT/OT network infrastructure, which will be located in a separate switchboard in the IT/OT server room
    - Distributed input/output switchboards (signal concentrators) themselves, which will be located in a separate room (ASRTP substation) +7.85 m
    - Communication network - (PROFINET, OPC-UA..)
- Process-information system
- ASRTP outdoor cabling
    - External cabling for data transmission of process variables (pressure, temperature, flow rate ...) from the pooling cabinets to the ASRTP distributed input/output switchboards (signal concentrators)
    - Data bus - redundant, outside switchboards routed through optical cables
    - External cabling for control of individual technological units and their parts from the combiner boxes
    - External wiring for stand-alone ESD system
- Automatic Monitoring System for Emissions (AMS-E)
    - For boiler K2 (K1) one common system,
    - For the new K3 boiler separate system,

- Backup system for both boiler systems K2 (K1) and K3

- Camera system
  - Extension of the existing CCTV system with technological cameras and cameras for object protection
  - Network Attached Storage (NAS)
  - Means for switching and controlling cameras (NVR)
  - Large screens on the control room for operators

- Electrical fire alarm

  in accordance with the project documentation of the Fire Safety of Buildings (PBS), all ZEVO OLO buildings will be equipped with a new electronic fire alarm system, which will consist of:

  - EPS control panel, which will be mounted in a 19" rack cabinet height 32U, 600x800mm located in the LV substation with its own spare backup power supply (AKU batteries) - 1pc
  - control panels of the control panel, which will be placed in the room of permanent service - in the control room and in the porter's lodge - 2 pcs.
  - superstructure graphic system
  - automatic detectors:
    - Optical-Smoke
    - Combined
    - heat detectors
  - special detectors
    - suction smoke detectors
    - linear smoke detectors
    - flame detector
    - linear heat detector
  - push-button detectors
  - input/output modules
  - Video fire detection according to ISO 7240-29 certified for both fire type A (smoke detection) and type B (flame detection)
  - optical and acoustic fire alarm devices
  - power supply
  - cable distribution internal and external
  - cable distribution systems with and without fire resistance
  - audible fire alarm devices

Specific requirements for the design, dimensioning and supply of PS 63

The principle diagram of the DCS design is in the overview diagram drawing number MAE_TD_02_PS63_MAR_01_SCH_NOV in Annex 8.

The design of the process control system shall be such that failure of any component of the system has minimal impact on the process. The components shall have proven high integrity and be robust and physically compact.

The process control system must be designed to be available with up to 99% availability by incorporating built-in system-supported redundancy for both hardware and software and communications. The required level of redundancy is R2 i.e. each device on the network must be accessible from both CPUs.

This includes redundant control processors, redundant I/O cards for selected signals, redundant data buses, and redundant power supplies with automatic switchover to a backup power unit when a fault or failure of the operating unit is detected.

Each device in a redundant configuration must communicate with both data buses.

At the operator level, redundancy is handled by redundant process servers. Operator stations are designed as universal with display/control of any part of ZEVO technology.

Redundancy is also needed for the archiving database or DB servers.

All computers and servers, switches must be equipped with redundant power supplies.

All devices containing hard disks (PCs, servers) must be in a minimum RAID1 connection.

Online changes

The system must support the following changes online without interrupting service:

- Changing I/O channel parameters
- Adding or removing an I/O module
- Adding or removing an I/O rack
- Adding or removing a distributed peripheral
- Adding or removing field equipment (sensors, actuators...)
- Adding new connections to industrial Ethernet networks
- Adjusting the analog input range
- Modifying process graphics
- Adding a new variable to the archive database
- Adding a new controller to the configuration
- Adding a new operator station (OS)

Process-information system

The ASRTP delivery will also include a process-information system accessible via mobile devices with functions (minimum):

- Recording / database of all equipment installed in ZEVO based on the marking of equipment by KKS and with a focus on recording of hours worked, recording of faults,

regular maintenance, scheduled diagnostics, mandatory inspections and scheduled repairs of individual equipment with the possibility of adding additional equipment.

- The system will be capable of generating daily, weekly and monthly or even annual work orders and schedules for the execution of individual activities.
- The database of registered ZEVO equipment must have a link to the drawing documentation (electronic - schematics and layouts of the ZEVO), supplier and operational documentation of the individual equipment installed in the ZEVO, based on the KKS, QR or barcode labels of the equipment in the ZEVO operation.
- The system must be able to retrieve information about the equipment, its status, location parameters, etc.
- Inventory / database of spare parts of all equipment installed in the ZEVO based on the KKS equipment markings with the possibility of further additions.
- The system will be able to generate lists to replenish consumed spare parts.
- Recording / database, archiving and management of all ZEVO drawing / design documentation and contractor and operational documentation of individual equipment installed in the ZEVO, in electronic form (schematics, layouts, lists and specifications, etc.), stored in a centralized repository / archive of ZEVO documentation with tracking of the history of documentation, its changes and revisions, etc. with the possibility of adding additional documentation.

ASRTP cabling

All cable trays and cable trays of ASRTP routes and DCS data routes within the scope of the Works shall be designed and installed with a 30% clearance margin for the eventual placement of additional MaR cable routes and DCS data routes.

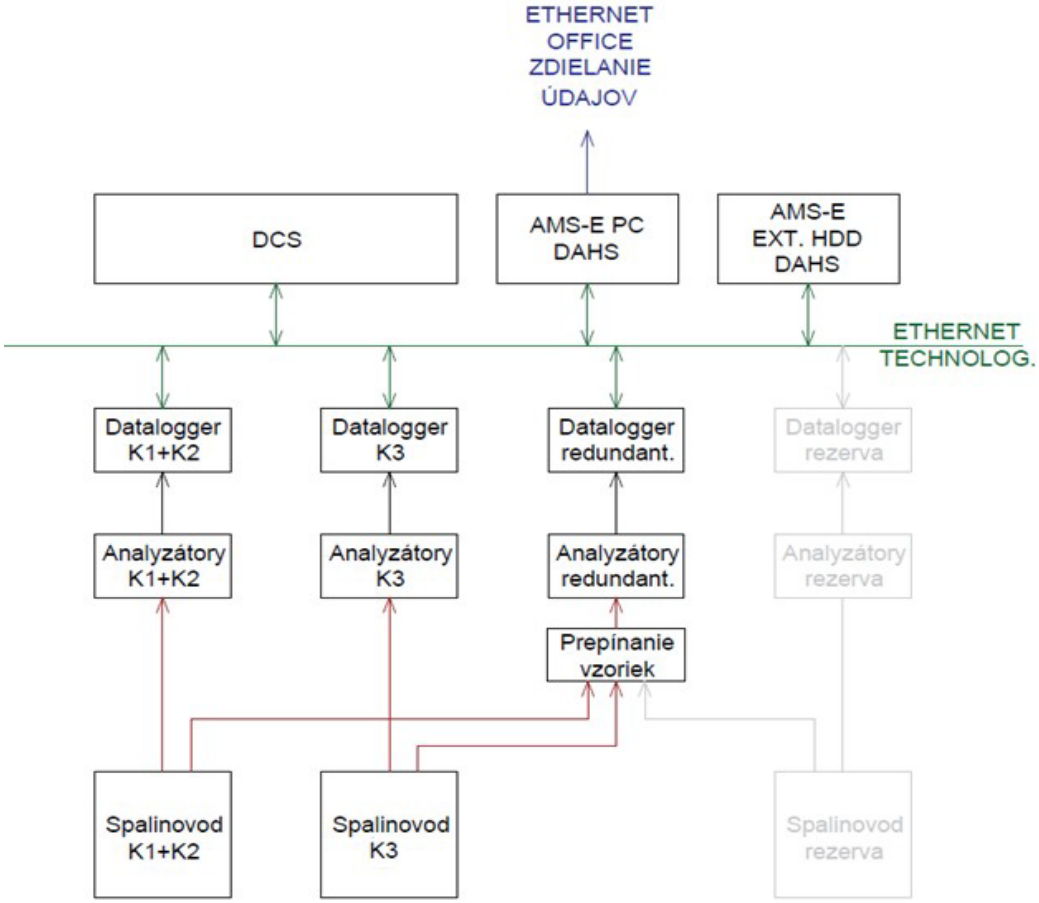
ASRTP - DCS data cables and MaR signal cables must be designated for important signals, the functionality of which must be maintained in the event of a fire.

Data and signal cables shall be halogen-free, flame-retardant insulation with low heat release, low smoke density and low corrosivity and conductivity of fumes in the event of fire, and with preservation of cabling functionality in the event of fire.

Automatic monitoring system

A new AMS-E will be built for the newly constructed pollution source boiler (line) K3 as well as for the reconstructed boilers (lines) K2 and K1. There will be one common system for boiler (line) K2 and boiler K1, another separate system for the new boiler (line) K3, and a third system will be built to act as a backup system for both boiler (line) K2 (K1) and K3.

Block diagram of AMS-E:



The PZL and mercury analysers will be housed in an analyser container with anticipated dimensions of 10.5 m x 4 m. The analyser container will contain an analyser room and a room for the storage of calibration bottles. The analyser room will be air-conditioned. If the PBS design designates the space as a separate fire compartment or specifies fire resistance requirements, it will be necessary to ensure that the structure, doors and cable penetrations are resistant in accordance with the PBS design requirements.

2.3.14 PS 64 Compressor station

This operational file will contain in particular the following sections:

- Screw compressors (1+1 2x100% or 2+1 3x50%)
- Two condensing air dryers (dew point +3 °C)
- Two adsorption air dryers (dew point -40 °C)
- Filters needed to achieve the desired air quality
- Two pressure air ducts
- Condensate drainage device
- Compressed air piping (dew point +3 °C)
- Compressed air piping (dew point -40 °C)
- Equipment for the recovery of heat from compressor cooling

- Lifting mechanisms required
- Operational power distribution
    - Secondary switchboard
    - Interconnecting cabling (cable routes, power cables) from the branch switchboard to the appliances in the PS 64 range
    - Interconnection cabling (cable route, power cables) from the main switchboard to the secondary switchboard
    - Frequency converters for power supply and control of compressors
- PLC for compressor and dryer control
- Control and management system
    - Cabling and cable routes of field instrumentation of the new technological equipment delivered, up to the pooling cabinets
    - Signal combiner boxes

Specific requirements for the design, dimensioning and supply of PS 64

The compressor station will produce the compressed air required for the operation and maintenance of the ZEVO, which will be produced in two quality levels:

- Compressed air working p = 0.70 MPa abs, TRB +3°C, ISO 8573.1-2.4.2
- Compressed air instrument air p = 0.70 MPa abs, TRB -40°C, ISO 8573.1-1.2.1

The compressor station will be designed (sized) and prepared for simultaneous operation of all three ZEVO lines (for line K1 consider the same compressed air consumption as for line K2 after the implementation of MaE)

The compressor station will be designed and supplied so that at least one compressor will be as a reserve, the Customer accepts the wiring:

- 1+1 (2x100%)
- 2+1 (3x50%)

All compressors will be equipped with frequency converters.

Required wiring of other compressor station equipment:

- Condensing air dryers 1+1 (2x100%)
- Adsorption air dryers 1+1 (2x100%)
- Filters needed to achieve the required air quality (1+1) (2x100%)

Equipment for waste heat recovery from compressor cooling

The overall design and supply concept of the equipment for the use of waste heat from compressor cooling will respect the requirement for year-round use of this waste heat.

The waste heat will be used e.g. for heating of network water in the SCZT system, heating of condensate, heating of demineralised water, or heating and hot water for ZEVO objects. The heating can be direct or by means of a heat pump.

2.3.15 PS 65 Stable extinguishing system

The Stable Fire Extinguishing Plant (SFEP) will be supplied new for the entire OLO ZEVO, including piping, storage tanks and all necessary equipment.

The scope of supply will include Stable Fire Extinguishing Equipment (SFE) to protect the following objects/rooms/facilities:

- SO 02 Waste storage building - foam monitor SHZ, three monitors with the possibility of rotation in vertical and horizontal direction, remote control and own control and management system
- SO 02 Boiler waste hoppers - one foam monitor for each hopper, the monitor will be stationary, stably directed into the hopper area, remote control and its own control and management system
- SO08 Opinion of Block Oil Transformer - Water Sprinkler SHZ - Drainage System
- SO 15 Diesel generator station - water sprinkler SHZ - drainage system
- SO 15 Engine room SHZ - water sprinkler SHZ - wet system
- SO 25 Oversized waste crushing hall - water sprinkler - dry system
- SO 04 Secure Power Supply System - Gas Inert SHZ (detection and mechanical part)
- SO 22 Room for transformers and switchgear 400 V - Gas inert SHZ (detection and mechanical part)
- SO 22 Technical room PS 63 - Gas inert SHZ (detection and mechanical part)
- SO 22 Velín and crane operator's workplace - Gas inert SHZ (detection and mechanical part)
- SO 08 22 kV substation - Gas inert SHZ (detection and mechanical part)
- SO 08 Substation 400V and DCS - Gas inert SHZ (detection and mechanical part)

The following equipment and tanks belonging to the scope of supply of PS 65 will be located in SO 15:

- Engine room of a stable fire extinguishing system
  - main fire pump
  - two back-up fire pumps
  - refill pump
  - valve station,
  - tray with pencil
  - other equipment necessary for the proper functioning of the SHZ system
- Fire water tanks with complete equipment, the minimum total capacity of the tanks will be 430 m^3
- Fire cell for gas cylinders and pipe manifold in SO 22
- Field instrumentation of equipment, cabling and cable routes to junction boxes

- SHZ control and management system
- Operational power distribution
    - Secondary switchboard
    - Interconnecting cabling (cable routes, power cables) from the branch switchboard to the appliances in the PS 65 range
    - Interconnection cabling (cable route, power cables) from the main switchboard to the secondary switchboard

2.3.16 PS 66 Exchange station SCZT

In SO 08 Turbogenerator TG2 engine room will be installed a heat exchanger station (VS) for heating of network water to SCZT Bratislava-east belonging to MHTH. The scope of supply of PS 66 Exchanger station of SCZT will include:

- Network water piping DN 400 from the VS to the connection point in SO 01 Boiler house building
- Steam-water exchangers
    - High-end heater
    - Basic heater
    - Condensate cooler
- Steam reduction and cooling stations
- Mains water circulation pumps 2x100 (1+1)
- VS condensate collection tank
- Condensate pumps from VS 3x60 (2+1) or 2x100 (1+1)
- Exchanger station for central heating of all building objects and for preparation of domestic hot water
- All necessary connecting pipes, shut-off and control fittings, safety fittings, pipe fits, etc.
- Insulation and cladding of exchangers, tanks and pipelines
- Field instrumentation required
- Cabling and cable routing from field instrumentation to pooling cabinets, signal pooling cabinets
- Operational power distribution
    - secondary switchboard, interconnecting cabling (cable routes, power cables) from the secondary switchboard to the appliances in the range of PS 66, interconnecting cabling (cable route, power cables) from the main switchboard to the secondary switchboard
    - frequency converters for power supply and control of mains water circulators and condensate pumps
- Lifting mechanisms required

Specific requirements for the design, dimensioning and supply of PS 66

The ZEVO substation and its equipment shall be designed for a maximum heat supply of 40 MW at a maximum mains water temperature gradient of 105 / 50 °C during the heating period.

The exchanger station will be designed from two parallel branches of exchangers, each branch will have a maximum capacity of 20 MWt.

Network water parameters:

- Temperature gradient:
  - Heating period: 105 / 50 °C
  - Outside the heating period: 70 / 50°C
- Operating pressure: 2.0 MPa
- Design pressure: 2.5 MPa.

The heat output supplied to the SCZT network will be regulated equithermally.

The primary medium will be steam, which will be extracted:

(a) from the steam turbine take-offs

(b) from steam reduction stations, during turbine shutdown.

The installation of plate steam-water exchangers is foreseen.

Expected operating parameters VS SCZT:

Operational status	**LP1**	**LP2**	**LP3**
The side of the primary medium - steam:			
Steam flow through the SST $m_{šO}$ [t/h]	0,706	3,54	18,07
Steam pressure to the SST $p_{šO}$ [MPa]	0,526	0,526	0,403
Steam temperature to the SST $t_{šO}$ [°C]	196,6	196,6	169,5
Steam flow through ZO m_{ZO} [t/h]	2,42	12,10	44,62
Steam pressure to ZO p_{ZO} [MPa]	0,121	0,121	0,121
Steam temperature to ZO t_{ZO} [°C]	105,1	105,1	105,1
Secondary medium side - mains water:			
Power Q [MW]	2,0	10,0	40,0
Temperature. gradient VS Δt_{VS} [°C]	115 / 50	115 / 50	120 / 50
Network water flow through the VS m_{VS} [t/h]	26,4	131,8	489,0
Temperature. gradient in the SCZT network Δt_S [°C]	70 / 50	70 / 50	105 / 50
Network water flow through SCZT m_S [t/h]	86,0	430,0	623,6
Water velocity in the SCZT network w_S [m/s] (2xDN400)	0,210	1,049	1,537
Flow through bypass pipe m_O [t/h]	59,6	298,3	134,6

2.3.17 PS 67 Inner HVB connection pipe

The scope of delivery consists of:

- All internal connection pipelines within the HVB ZEVO that are not directly within the scope of the above operating files.
- Main steam distributor (collector) 4,0 MPa and 400°C - connection of the outlet steam pipelines of boilers K1, K2, K3 and common steam pipeline to TG2 including fittings, drainage, measurements, storage, etc.
- Medium pressure steam distributor for steam appliances in the boiler room including fittings, drainage, measurements, storage, etc.
- If required, condensate collection tank (volume 8-10m^3) and pumps (2x100%; 1+1) for pumping condensate to feed tanks

2.3.18 PS 68 Outer connecting pipes

The scope of supply consists of all external connection pipes connected to the internal connection pipes of the individual PS. The boundary of the external connection pipe is at a distance of 1 m from the outer surface of the building façade.

2.3.19 PS 69 Photovoltaic source of electricity

The delivery of equipment for the construction of a local source for the production of electricity from photovoltaic panels located on the new roof of the building SO 24 Building structures of the tipping platform and on the new roof of the building SO 25 Hall for the crushing of oversized waste ZEVO will consist of:

- photovoltaic monocrystalline panels
- optimizers
- fixing certified structures on the roof
- DC disconnectors
- DC surge protectors
- DC substation
- Alternators
- AC switchboard (RFV-AC)
- HRM-main disconnection point of the FVZ
- HMR-main monitoring relay
- DC cabling/ DC wiring
- AC cabling/ AC wiring
- Smart meter, power meter
- connection to the SCADA control system
- connection to the central distribution control of the DCS building

Specific requirements for the design, dimensioning and supply of PS 66

The power output of the PV plant (photovoltaic equipment - equipment for the production of electricity for own consumption) of at least 210kW will be from the RFV-AC switchboard within the power distribution lines of the PS62 operating set to the OOAJC switchboard.

The control and management of photovoltaic generation will be through the main monitoring relay-HMR, inverter and smart meter.

The FVZ must meet the integration with the ZEVO security systems (e.g. SCADA and EPS).

A main disconnection point-HRM is a switching point with the function of disconnecting or disconnecting for the purpose of visibly disconnecting a source from the distribution system. The HRM shall provide galvanic isolation of the source in all three phases, mainly for the response of the network protection.

2.3.20 Dismantling

The scope of dismantling will consist of:

- Dismantling of all equipment, pipes, fittings, steel structures, cabling, cable routes, transformers, switchboards, ASRTP parts, etc., which will be replaced or replaced with new ones within the scope of reconstruction and modernization of existing equipment belonging to the operating sets PS 52, PS 53, PS 54, PS 60, PS 62, PS 63 and PS 65.
- Dismantling of all technological equipment that will be unusable or unsuitable for further use after completion of the MaE, such as:
    - Existing technological equipment for flue gas cleaning of boilers K1 and K2
    - Existing technological equipment for mechanical transport of products
    - from flue gas cleaning of boilers K1 and K2
    - Existing technological equipment of the compressor station
    - Existing technological equipment of lime management
    - Existing condensing TG, including piping and other accessories
    - Existing air-cooled condenser with accessories
    - Existing SPA facilities
    - Pipe bridge, including pipes
    - Existing control system, switchgear and other equipment
    - Existing substation transformer, 22 kV substation equipment, 400 V substation equipment including cabling and cable routes
    - CHP process equipment, including mains water pipes to the connection point
    - Existing equipment for the preparation of domestic hot water and for the central heating of existing SO ZEVO