**Scope of Work Lot 3**

Designing, equipment manufacturing and supply, and replacement of control equipment, relay protection, excitation and turbine governor for Pļaviņas HPP Units PHA02 and PHA08

| Item No. | Works to be carried out | Unit | Amount | Responsible | Notes |
| --- | --- | --- | --- | --- | --- |
|  | Technical inspection of the Site – research, etc. Necessary prior to the development of technical solutions for the project, including technical information obtained from Pļaviņas HPP technical archives. Preparation and formatting of the Site survey report. | set | 1 | Contractor | Detailed scopes of the works should be determined during the Site inspection.  The documentation of site inspections carried out earlier to be considered as for information only, the Contractor shall verify and evaluate all available information before development of project technical solutions. |
|  | Development of building design – preparation of set of drawings, technical specifications, work performance program and the list of scope of the works, incl. performing the necessary calculations. Submission and approval of the design in the required scope and structure – in accordance with regulatory provisions. | set | 1 | Contractor | The requirements for quality control and quality assurance during execution of the works shall be included in the design. |
|  | Development of power generation module (PHA02, PHA08) simulation model | set | 1 | Contractor |  |
|  | Development of work performance program (WPP), Employer's approval | set | 2 | Contractor | Detailed WPP, in accordance with AS Latvenergo procedure K233 "The procedure of performance of work carried out by the contractors at the Generation facilities".  The WPP shall include criteria for quality assurance and control during the works. |
|  | Organisational and preparatory activities, admission to work, mobilisation and demobilisation, etc | site | 2 | Contractor,  Employer | In accordance with AS Latvenergo procedure K233 "The procedure of performance of work carried out by the contractors at the Generation facilities".” and Regulations of Latvenergo AS Pass System No. NOP 020. |
|  | Unit control system, turbine governor and excitation factory acceptance tests (FAT). | set | 2 | Contractor,  Employer |  |
|  | **PHA02 equipment** |  |  |  |  |
|  | Unit preparation for maintenance outage | set | 1 | Employer |  |
|  | Turbine equipment |  |  |  |  |
|  | Guide vane shear pin sensor connection to the Unit control system | set | 1 | Contractor |  |
|  | Refurbishment of guide vane locking device - equipment supply and installation | set | 1 | Contractor |  |
|  | Disassembly of the existing unused turbine governor equipment including cubicles, cables, sensors . | set | 1 | Contractor |  |
|  | Replacement of turbine governor electrical part | set | 1 | Contractor |  |
|  | Replacement of rotation speed measuring equipment | set | 1 | Contractor |  |
|  | Preparation of control oil pressure system for repair | set | 1 | Employer |  |
|  | Refurbishment of control oil pressure system mechanical part - equipment supply and installation | set | 1 | Contractor |  |
|  | Refurbishment of control oil pressure system electrical part | set | 1 | Contractor |  |
|  | Preparation for operation of the control oil pressure system | set | 1 | Employer Contractor |  |
|  | Preparation of main oil pressure system for repair | set | 1 | Employer |  |
|  | Refurbishment of main oil pressure system mechanical part | set | 1 | Contractor |  |
|  | Refurbishment of main oil pressure system electrical part | set | 1 | Contractor |  |
|  | Preparation for operation of the main oil pressure system | set | 1 | Employer |  |
|  | Replacement of main distributing valve feedback sensor | pcs. | 1 | Contractor |  |
|  | Replacement of Guide vane feedback sensor– equipment supply and installation | pcs. | 1 | Contractor |  |
|  | Replacement of turbine bearing sensors | set | 1 | Contractor |  |
|  | Replacement of shaft seal sensors, implementation of filter clogging control – equipment supply and installation of electrical part | set | 1 | Contractor |  |
|  | Replacement of turbine cover drainage pump | set | 1 | Contractor |  |
|  | Leakage pump signal connection to the Unit control system | set | 1 | Contractor |  |
|  | Air admission system under the turbine cover for compensator mode -refurbishment of components | set | 1 | Contractor |  |
|  | Generator |  |  |  |  |
|  | Connection of stator RTD's | set | 1 | Contractor |  |
|  | Preparation of upper guide bearing for repair | set | 1 | Employer |  |
|  | Refurbishment of upper guide bearing components | set | 1 | Contractor |  |
|  | Preparation of upper guide bearing for operation | set | 1 | Employer |  |
|  | Preparation of thrust bearing for repair | set | 1 | Employer |  |
|  | Refurbishment of thrust bearing components | set | 1 | Contractor |  |
|  | Preparation of thrust bearing for operation | set | 1 | Employer |  |
|  | Upper and thrust bearing oil filter system connection to new unit control system | set | 1 | Contractor |  |
|  | Connection of oil mist fan to new unit control system. | pcs. | 1 | Contractor |  |
|  | Refurbishment of braking system components | set | 1 | Contractor |  |
|  | Implementation of cooling system automation in the Unit control system and refurbishment of cooling system equipment | set | 1 | Contractor |  |
|  | Connection of generator fire fighting system to the new Unit control system (refurbishment) | set | 1 | Contractor |  |
|  | Connection of stator heater control signals | set | 1 | Contractor |  |
|  | Excitation system | set | 1 | Contractor |  |
|  | Dismantling of unused existing excitation equipment including cubicles, cables, sensors. | set | 1 | Contractor |  |
|  | Replacement of excitation system | set | 1 | Contractor |  |
|  | Medium voltage equipment | set | 1 | Contractor |  |
|  | Replacement of current transformer commercial metering and cables, if required (if not already done) | pcs. | 3 | Contractor |  |
|  | Replacement of voltage transformer commercial metering and reconstruction of voltage metering, if required (if not already done) | pcs. | 3 | Contractor |  |
|  | Installation of new commercial metering cubicle, if required (if not already done) | set | 1 | Contractor |  |
|  | Connection of circuit breaker control and indication circuits | set | 1 | Contractor |  |
|  | Connection of generator disconnector and earthing switch position control system | set | 1 | Contractor |  |
|  | Low voltage auxiliary equipment |  |  |  |  |
|  | Replacement of Unit auxiliary cubicle, connection of all Unit equipment to the new auxiliary cubicle | set | 1 | Contractor |  |
|  | Unit control system |  |  |  |  |
|  | Dismantling of the existing Unit control system, including cubicles, cables, sensors, that are not used | set | 1 | Contractor | Scope of equipment dismantling to be clarified during designing. |
|  | Replacement of Unit control boards | set | 1 | Contractor |  |
|  | Dismantling of the existing Unit controller board | set | 1 | Contractor |  |
|  | Installation of new Unit controller board | set | 1 | Contractor |  |
|  | Unit controller programming | set | 1 | Contractor |  |
|  | Unit protection system |  |  |  |  |
|  | Dismantling of the Unit protection cubicles | set | 1 | Contractor |  |
|  | Installation of the new protection cubicles | set | 1 | Contractor |  |
|  | Programming of new protection relays | set | 1 | Contractor |  |
|  | Modifications in the power plant distribution control system (DCS) to connect new Unit control system (screen modifications, signal modifications, long term data base modifications, signal modifications for communication with TSO, etc.) | set | 1 | Contractor |  |
|  | Modifications in the DHPP TMS control system to connect new Unit control system (screen modifications, signal modifications, long term data base modifications, etc.) | set | 1 | Contractor |  |
|  | Commissioning, testing |  |  |  |  |
|  | Control system testing (cable connection, functional, signal testing) | set | 1 | Contractor |  |
|  | Relay protection testing | set | 1 | Contractor |  |
|  | Turbine governor testing | set | 1 | Contractor |  |
|  | Excitation system testing | set | 1 | Contractor |  |
|  | Dry tests (equipment connection and signal testing, etc) | set | 1 | Contractor |  |
|  | Wet tests | set | 1 | Contractor |  |
|  | Compliance verification of the new equipment with the Grid code and TSO (frequency control, PSS, verification of simulation model, etc.) | set | 1 | Contractor |  |
|  | Plant control system functional testing | set | 1 | Contractor |  |
|  | Daugava HPP TMS control system functional testing | set | 1 | Contractor |  |
|  | Preparation and submission of As-built documents to the Employer. | set | 1 | Contractor | In accordance with AS „Latvenergo” procedure K162 „ Procedure for the formatting, submission and use of technical documentation in the technical archive of HPP Technical management”. |
|  | Unit Trial run | set | 1 | Contractor /  Employer | In accordance with LVS 1082-1:2024 Clause 5. terms of binding sub-paragraphs |
|  | Unit Taking Over. | set | 1 | Contractor /  Employer |  |
|  | **PHA02 equipment** |  |  |  |  |
|  | Unit preparation for maintenance outage | set | 1 | Employer |  |
|  | Turbine equipment |  |  |  |  |
|  | Guide vane shear pin sensor connection to the Unit control system | set | 1 | Contractor |  |
|  | Refurbishment of guide vane locking device - equipment supply and installation | set | 1 | Contractor |  |
|  | Disassembly of the existing unused turbine governor equipment including cubicles, cables, sensors . | set | 1 | Contractor |  |
|  | Replacement of turbine governor electrical part | set | 1 | Contractor |  |
|  | Replacement of rotation speed measuring equipment | set | 1 | Contractor |  |
|  | Preparation of control oil pressure system for repair | set | 1 | Employer |  |
|  | Refurbishment of control oil pressure system mechanical part - equipment supply and installation | set | 1 | Contractor |  |
|  | Refurbishment of control oil pressure system electrical part | set | 1 | Contractor |  |
|  | Preparation for operation of the control oil pressure system | set | 1 | Employer Contractor |  |
|  | Preparation of main oil pressure system for repair | set | 1 | Employer |  |
|  | Refurbishment of main oil pressure system mechanical part | set | 1 | Contractor |  |
|  | Refurbishment of main oil pressure system electrical part | set | 1 | Contractor |  |
|  | Preparation for operation of the main oil pressure system | set | 1 | Employer |  |
|  | Replacement of main distributing valve feedback sensor | pcs. | 1 | Contractor |  |
|  | Replacement of Guide vane feedback sensor– equipment supply and installation | pcs. | 1 | Contractor |  |
|  | Replacement of turbine bearing sensors | set | 1 | Contractor |  |
|  | Replacement of shaft seal sensors, implementation of filter clogging control – equipment supply and installation of electrical part | set | 1 | Contractor |  |
|  | Replacement of turbine cover drainage pump | set | 1 | Contractor |  |
|  | Leakage pump signal connection to the Unit control system | set | 1 | Contractor |  |
|  | Air admission system under the turbine cover for compensator mode -refurbishment of components | set | 1 | Contractor |  |
|  | Generator |  |  |  |  |
|  | Connection of stator RTD's | set | 1 | Contractor |  |
|  | Preparation of upper guide bearing for repair | set | 1 | Employer |  |
|  | Refurbishment of upper guide bearing components | set | 1 | Contractor |  |
|  | Preparation of upper guide bearing for operation | set | 1 | Employer |  |
|  | Preparation of thrust bearing for repair | set | 1 | Employer |  |
|  | Refurbishment of thrust bearing components | set | 1 | Contractor |  |
|  | Preparation of thrust bearing for operation | set | 1 | Employer |  |
|  | Upper and thrust bearing oil filter system connection to new unit control system | set | 1 | Contractor |  |
|  | Connection of oil mist fan to new unit control system. | pcs. | 1 | Contractor |  |
|  | Refurbishment of braking system components | set | 1 | Contractor |  |
|  | Implementation of cooling system automation in the Unit control system and refurbishment of cooling system equipment | set | 1 | Contractor |  |
|  | Connection of generator fire fighting system to the new Unit control system (refurbishment) | set | 1 | Contractor |  |
|  | Connection of stator heater control signals | set | 1 | Contractor |  |
|  | Excitation system | set | 1 | Contractor |  |
|  | Dismantling of unused existing excitation equipment including cubicles, cables, sensors. | set | 1 | Contractor |  |
|  | Replacement of excitation system | set | 1 | Contractor |  |
|  | Medium voltage equipment | set | 1 | Contractor |  |
|  | Replacement of current transformer commercial metering and cables, if required (if not already done) | pcs. | 3 | Contractor |  |
|  | Replacement of voltage transformer commercial metering and reconstruction of voltage metering, if required (if not already done) | pcs. | 3 | Contractor |  |
|  | Installation of new commercial metering cubicle, if required (if not already done) | set | 1 | Contractor |  |
|  | Connection of circuit breaker control and indication circuits | set | 1 | Contractor |  |
|  | Connection of generator disconnector and earthing switch position control system | set | 1 | Contractor |  |
|  | Low voltage auxiliary equipment |  |  |  |  |
|  | Replacement of Unit auxiliary cubicle, connection of all Unit equipment to the new auxiliary cubicle | set | 1 | Contractor |  |
|  | Unit control system |  |  |  |  |
|  | Dismantling of the existing Unit control system, including cubicles, cables, sensors, that are not used | set | 1 | Contractor | Scope of equipment dismantling to be clarified during designing. |
|  | Replacement of Unit control boards | set | 1 | Contractor |  |
|  | Dismantling of the existing Unit controller board | set | 1 | Contractor |  |
|  | Installation of new Unit controller board | set | 1 | Contractor |  |
|  | Unit controller programming | set | 1 | Contractor |  |
|  | Unit protection system |  |  |  |  |
|  | Dismantling of the Unit protection cubicles | set | 1 | Contractor |  |
|  | Installation of the new protection cubicles | set | 1 | Contractor |  |
|  | Programming of new protection relays | set | 1 | Contractor |  |
|  | Modifications in the power plant distribution control system (DCS) to connect new Unit control system (screen modifications, signal modifications, long term data base modifications, signal modifications for communication with TSO, etc.) | set | 1 | Contractor |  |
|  | Modifications in the DHPP TMS control system to connect new Unit control system (screen modifications, signal modifications, long term data base modifications, etc.) | set | 1 | Contractor |  |
|  | Commissioning, testing |  |  |  |  |
|  | Control system testing (cable connection, functional, signal testing) | set | 1 | Contractor |  |
|  | Relay protection testing | set | 1 | Contractor |  |
|  | Turbine governor testing | set | 1 | Contractor |  |
|  | Excitation system testing | set | 1 | Contractor |  |
|  | Dry tests (equipment connection and signal testing, etc) | set | 1 | Contractor |  |
|  | Wet tests | set | 1 | Contractor |  |
|  | Compliance verification of the new equipment with the Grid code and TSO (frequency control, PSS, verification of simulation model, etc.) | set | 1 | Contractor |  |
|  | Plant control system functional testing | set | 1 | Contractor |  |
|  | Daugava HPP TMS control system functional testing | set | 1 | Contractor |  |
|  | Preparation and submission of As-built documents to the Employer. | set | 1 | Contractor | In accordance with AS „Latvenergo” procedure K162 „ Procedure for the formatting, submission and use of technical documentation in the technical archive of HPP Technical management”. |
|  | Unit Trial run | set | 1 | Contractor /  Employer | In accordance with LVS 1082-1:2024 Clause 5. terms of binding sub-paragraphs |
|  | Unit Taking Over. | set | 1 | Contractor /  Employer |  |
|  | **Spare part supply** | set | 1 | Contractor |  |
|  | **Personnel training** |  |  |  |  |
|  | Training on Site for operational staff | set | 2 | Contractor | Before Unit Trial run |
|  | Training for maintenance personnel on Unit control system, turbine governor and excitation | set | 1 | Contractor | Before Unit Trial run |
|  | Taking Over of the works | set | 1 | Contractor /  Employer |  |

* The scope of works also includes all works without which the main works could not be carried out in full and technologically correct, qualitative manner and compliant to the valid regulations.
* The Contractor must dismantle all existing equipment that will not be used. This applies to cubicles, components and equipment, cables, their fasteners and protection elements.
* After installation the damaged surfaces must be restored, holes in the areas where the existing equipment has been dismantled must be closed.
* Prior to commencement of the works, all measures must be taken to protect and avoid damage to nearby utilities, facilities and installations. In the event of damage, the Contractor shall remedy defects to structures and machinery/equipment resulting from execution of the works. Defects to structures must be eliminated taking into consideration the surrounding structures (material, paint, etc.), but damaged machinery/equipment must be repaired or replaced with equivalent, subject to Employer's approval.