CONSTRUCTION SUPERVISION

Rehabilitation of Maritsa East 2 TPP
CONSTRUCTION OF THE DESULPHURIZATION PLANTS FOR UNITS 1, 2, 3 AND 4; UPGRADING THE UNITS 5 AND 6 POWER CAPACITY

STAGES OF THE CONSTRUCTION WORK IMPLEMENTATION AND FACILITY COMMISSIONING (ART.152 PARA. 2 OF SPA):

Stage 1 Preparatory work and temporary structures
Stage 2 Unit 1 Steam turbine and generator rehabilitation
Stage 3 Replacement of Unit 2 generator
Stage 4 Unit 3 Steam turbine and generator rehabilitation
Stage 5 Unit 4 Steam turbine and generator rehabilitation
Stage 6 Construction of flue gases desulphurization plant for Units 1 and 2, including common facilities
Stage 7 Construction of flue gases desulphurization plant for Units 3 and 4
Stage 8 Unit 5 Steam turbine rehabilitation
Stage 9 Unit 6 Steam turbine rehabilitation
Stage 10 Rehabilitation and strengthening work on the turbine hall external facade.
CONSTRUCTION OF THE DESULPHURIZATION PLANTS FOR UNITS 1, 2, 3 AND 4; UPGRADING THE UNITS 5 AND 6 POWER CAPACITY

ACTUAL STATUS OF THE PROJECT IMPLEMENTATION:

- Stage 1 is accomplished – it includes preparatory and temporary construction and installation work (CIW), and commissioning approval by State Approval Commission.
- Objects accomplished through stages 2, 3, 4, 5, 6 and 7 are commissioned into operation as per Permit for Use.
- Stage 10 object is in state of preparation for presentation to the State Approval Commission.
- Stages 8 and 9 are in process of implementation – assessment is being made on conformity with the Detailed designs.
Defining the boundaries between the stages

The boundaries between the stages are defined by check points in the process flow chart.
Reconstruction objectives

Objectives of Units 1÷4 reconstruction:

• Upgrading the turbine efficiency: from 34.1% as before the rehabilitation, up to 45% after the rehabilitation

• Increasing the generator output power capacity – with old output power capacity on the bus 150 MW, this power capacity after the rehabilitation becomes 170 MW (an increase by more than 13%) 

• Prolongation of the facilities useful life, replacing physically depreciated equipment by new up-to-date one

Objectives of the desulphurization plant construction for Units 1÷4:

• The newly built desulphurization plant shall ensure degree of the flue gases desulphurization minimum 94%

• The dust concentration after the electric filters shall be decreased by 50%
Key events through the investment process implementation

- Approval of the conceptual design and obtaining construction permit

Consultant’s complex report on conformity with the Conceptual design

Construction permit issued by the Ministry of Regional development and welfare (MRDW) of 12.10.2005 as per Art. 142, Para.2 of SPA
Cooperation with the Employer

Cooperation with the Employer thereby ensuring flexible management through the project implementation, using the legislation regulatory instruments stipulated in the Spatial planning act (SPA)

Order by MRDW No. PC-10/11.06.2007 on supplementing Construction permit №PC 23 of 12.10.2005, with significant divergences in the meaning of Art. 154, Para 2, Items 6 and 7 of SPA
Key events through the investment process implementation

- Approval of Detailed designs prior to CIW implementation

Consultant’s complex report on conformity with the Detailed design

Construction permit by MRDW of 12.10.2005 as per Art.142 Para 2 of SPA
Execution of construction supervision

- Execution of construction supervision through the investment process implementation
- Control on the procurement and CIW quality

Composition of acts and protocols during the construction work

Control on the supplies documentation, verifying compliance with the Law on Technical requirements to the Products
Key events through the investment process implementation

- Verification of conformity of the accomplished construction with the design and normative parameters and requirements
  - Complex tests performed by certified laboratories
  - Positive statements of control/regulatory authorities
Key events through the investment process implementation

- Commissioning into operation and obtaining usage permit
- Final Consultant’s report on establishing the capability of usage on each construction Stage
- Usage permit by the Directorate for national construction control, for each construction Stage
CONSTRUCTION AND INSTALLATION WORK (CIW) IMPLEMENTED WITHIN THE PROJECT SCOPE

CIW in the turbine hall

CIW outside of the turbine hall (absorber platform and lime inventory)
Demolishing work on the existing foundation of the Unit turbo-generator;
Reconstruction of the existing foundation of the TG, in order to install the turbine, the generator, and the condenser;
Construction of foundations for the TG auxiliary equipment;
Procurement and installation of the new turbine;
Procurement and installation of the condenser;
Procurement and installation of 42 pipeline systems.
CIW in the turbine hall – Stages 2, 3, 4 and 5

PROCUREMENT AND INSTALLATION OF MAIN EQUIPMENT

- Procurement and installation of auxiliary equipment for the turbine;
- Procurement and installation of new generator “Toshiba”;
- Procurement and installation of grounding cabinet, connecting (coupling) the generator with the existing turbine;
- Procurement and installation of two pipeline systems – for the generator stator cooling water;
- Procurement and installation of relevant I&C equipment for the new TG.
CIW in the turbine hall – Stages 2, 3, 4 and 5

PROCUREMENT AND INSTALLATION OF AUXILIARY EQUIPMENT

- Main steam control valve (MSCV)
- Combined reheat valve (CRV)
- HPR8 (high pressure reheater 8)
- HPR7
- HPR6
- LPR4 (low pressure reheater 4)
- LPR3
- LPR2
- LPR1
- Drain vessel
- Main ejector
CIW in the turbine hall – Stages 2, 3, 4 and 5

PROCUREMENT AND INSTALLATION OF AUXILIARY EQUIPMENT (2)

- Main oil pump
- Emergency oil pump
- Main oil tank
- Main oil cooler
- Oil clean-up unit
- Filter pump of the oil clean-up unit
- Extractor of the evaporation products from the oil tank
- Governor system oil tank (EHC)
- Governor system oil pump
- Steam sealings condenser
- Steam sealings exhauster
CIW in the turbine hall – Stages 2, 3, 4 and 5

INSTALLATION OF NEW I&C EQUIPMENT
IMPLEMENTATION OF UP-TO-DATE PROCESS CONTROL

- Installation of measuring instruments and transducers
- Installation of pressure and differential pressure transducers on the elevations around turbogenerator 3 (elevation -3.60, up to elevation +9.00)
- Placement and installation of the cabinets of the TG control system in the Unit Main control room 2 non-operative part (MCR 2)
- Installation of the UPS cabinets in the MCR non-operative part
- In place installation of connection boxes around turbine 3
CIW in the turbine hall – Stages 2, 3, 4 and 5

INSTALLATION OF NEW I&C EQUIPMENT
IMPLEMENTATION OF UP-TO-DATE PROCESS CONTROL (2)

- Installation of cable routes; cable laying, connecting and ring testing
- Start-up and adjustment work on measuring instruments and transducers, as well as actuating mechanisms of the isolating and control valves
- Implementation of the dedicated software realizing the TG control logic in the TAC and D-EHC systems, as well as visualization of the state of the actuators and measured parameters
- 72-hour trial tests, with composed protocols on the results thereof
CIW outside of the turbine hall – Stages 2, 3, 4 and 5

- Procurement and installation of two flue fans (FF) for the Unit;
- Procurement and installation of three compressing air fans, servicing the FF;
- Procurement and installation of a bypass damper;
- Procurement and installation of two hoists serving the FF;
- Procurement and installation of following Unit gas ducts: electric filters outlet duct – from the electric filters to the flue fans inlets, outlet gas duct from the flue fans to the desulphurizing plant inlet damper and to the bypass damper, bypass gas duct from the bypass damp to the existing 180m stack K1 or K2;
- Construction of oil station for servicing the flue fans and the relevant pipelines and facilities thereof.
CONSTRUCTION OF FLUE GAS DESULPHURIZATION (FGD) PLANTS FOR UNITS 1-4

CIW IMPLEMENTED WITHIN THE PROJECT SCOPE

CIW on the absorber platform

CIW on the lime inventory
CIW implemented on the absorber platform

PROCUREMENT AND INSTALLATION OF THE MECHANICAL AND PROCESS EQUIPMENT

- Recirculation pumps
- Absorber suspension pumps
- Oxidation air compressors
- Dampers at the FGD inlet
- Absorber suspension agitators
- Device for mist removal
- Gypsum hydrocyclone
CIW implemented on the absorber platform

LARGE SIZE MECHANICAL EQUIPMENT, MECHANICAL EQUIPMENT STRUCTURES

- Absorbers and equipment thereof: nozzles, filters, agitators etc.;
- Tanks for gypsum suspension;
- Pipeline systems;
- Gas ducts.
CIW implemented on the limestone inventory

- Systems for limestone transportation
- Systems for limestone processing and limestone suspension preparation
Bearing structures and foundations of cable-pipe trestles „A”, „B” and pipe trestles „L” and „K”, serving for transportation of the gypsum suspension to the excavator pump station – starting from the absorber, the gypsum suspension is transported by trestles “E”, “C” and “D” to the limestone inventory area, where from, by trestles “B”, “A”, “L”, “K” and again by trestle “L”, is directed to the excavator pump station (trestle “K” over-bridges the canal, whereby its both ends border upon the two parts of trestle “L”).
CIW implemented on the limestone inventory (3)

- Building for limestone processing (grounding, crushing, silos, and electrical equipment hall)
- Pump compartments for process water and limestone suspension