NEW COOPERATION - NEW KNOW-HOW!
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BILFINGER BABCOCK TYAZHMASH – A STRONG PARTNER FOR POWER PLANT TECHNOLOGIES AND SERVICES
Bilfinger Babcock Tyazhmash combines German know-how in power plant engineering (by Bilfinger Berger Power Services) and Russian knowledge of power plants (by Tyazhmash). As of now the new venture provides measures to conversion, modernization, life extension and efficiency enhancement including services of engineering, fabrication, delivery, construction and commissioning.

BILFINGER POWER SYSTEMS GMBH
Bilfinger Power Systems GmbH is part of the Bilfinger SE Multi Service Group. Numerous German and international companies operate under the Power Services umbrella. The subgroup’s core business consists of power plant technology in the areas of Energy Technology, Nuclear & Environmental Technologies, Piping Systems and Machinery & Apparatus Engineering.

A close network of branches connects activities in the Group’s most important markets: Germany and the rest of Europe as well as the Middle East and South Africa. The Bilfinger Power Systems Group has approximately 7,800 employees.

TYAZHMASH
„TYAZHMASH“ founded in 1941 is one of the leading Russian companies of heavy, power and transport engineering. Power engineering, ferrous and non-ferrous metallurgy, civil engineering, chemistry and petroleum refining, agriculture, gold-and-diamond mining, defence and the cosmos - this is only a partial list of industries where the products manufactured at „TYAZHMASH“ JSC successfully operate.

The plant has earned recognition and established business relations practically on all the continents. First of all good business standing is explained by the high quality of our products, their reliability, long service life and high maintainability.
FULL LIFE CYCLE SERVICE

**COAL MILLS**

- **very fine grinding, stable performance**
  - Development by Tyazhmash and Babcock Borsig Steinmüller
  - Suitable for the grinding of worldwide coals
  - Optimisation of distribution
  - Fine grinding and optimal classifying for NOx reduced firing

**OIL, GAS AND COAL BURNERS**

- **High efficient and low NOx emissions**
  - Defined flow dynamics in the near burner area
  - Defined ignition at burner tip
  - Low air ration in primary combustion zone
  - Staged air addition to primary combustion process
  - Defined mixing processes in the flame

**Optimised furnace air balance**

- Total air ratio as low as possible
- Low air ratio at burner
- Staged air ratios along burner planes
- Air staging by over fire air
- Protection of evaporator surface by side wall air
ASH HANDLING SYSTEMS
- Dry and submerged ash handling systems for bottom and fly ash
- Hydraulic ash handling systems
- Pneumatic ash handling systems
- Mill discharged systems
- Water impounded hopper systems
- Recooling systems with solids reduction for submerged scraper conveyor overflow water
- Submerged ash dewatering systems and classification and sortation of ash
- Ash silos with dewatering systems

BOILER
Optimization of combustion systems and efficiency increase
- Low NOx burners
- Over-fire air
- Side-wall air
- Optimised air supply and control
- Exchange of membran walls and coils

BELCHATÓW POWER PLANT
HEATING SURFACE CLEANING SYSTEMS
The range of products includes all types required for the cleaning of heating surfaces in power plants and incinerators.

Heat transfer surface cleaning covers the design and project development of soot blowers, water cannons, water spraying systems, rapping gears and shot cleaning systems. These various systems maintain the efficiency, increase the continuous operating time of the boiler plants considerably and reduce the manual cleaning effort to a minimum.

The latest technology allows to install systems without bringing operation of a boiler to a standstill.

E-FILTER RETROFIT
We offer different options:

- Place one or more fabric filter (FF) behind (back-up) or in parallel (slip stream) to the existing ESP
- Conversion of the existing ESP into fabric filters
- Replacement of the ESP with new FF

E-FILTER
Upgrade of the e-filter efficiency by

- Optimization of the gas flue by conversion of the gas distribution walls
- By flue gas conditioning (SO₂-conditioning) by dosing some ppm of H₂SO₄ into the raw gas to increase the precipitation of the filter

E-FILTER COMBINED WITH FABRIC FILTER
Upgrade of the filter efficiency by

- Replacement of part of the existing e-filters with fabric filters in the same component
- E-filter section allows removal of ashes to be used later for civil work
- Fabric filters allow increased cleaning of flue gas from SO₂

FABRIC FILTER
The replacement of the e-filter part with fabric filters allows a higher degree of flue gas cleaning than only with ESP.
HEAT UTILIZATION SYSTEMS

Low temperature heat from flue gas upstream of the FGD plant is used to preheat the low pressure feedwater. This energy partly replaces the steam extraction from the turbine which is therefore available for a higher amount of power generation.

- Electric power gain (average up to 2 %)
- Lower fuel consumption
- Reduced water consumption of FGD
- Reduced CO₂ output
- Corrosion-resistant heat exchanger – utilization of innovative materials
- Application as retrofit as well as in new power plants

FLUE GAS CLEANING

Since the mid-1980s our engineers have been planning and constructing flue gas purification plants for conventional power plants. We supply entire plants according to the latest technological standards.

FLUE GAS DESULPHURIZATION

The efficiency of existing flue gas filters can be increased by implementation of a gas distribution tray (patented). This leads to:

- optimized flow distribution and therefore increase of reaction surface,
- the precipitation of SO₂/SO₃ and dust can be controlled, and
- positive economical effects.

HEAT RECOVERY STEAM GENERATORS (HRSG)

- Horizontal – single, double or triple pressure, with or without supplementary firing up to 1000°C, “O”/“C” modules, bundles or loose harps
- Vertical – single, double or triple pressure, with or without supplementary firing up to 800°C, “O”/“C” modules, bundles or loose harps
- Industrial size - GT 25 – 170 MWe
- Utility size - GT > 170 MWe
- Downstream industrial process - ad hoc design
- Possible extension of HRSG package up to „turnkey“ delivery of complete boiler island
PERSONAL AND MATERIAL AIRLOCKS
- Engineering, manufacturing, delivery and installation of Personal and Emergency airlocks compliant with Nuclear Power Plants requirements
- Hydraulic or electro-mechanical operation
- Entrance for personnel into the containment.
- Prevention of inadmissible releases of radioactive materials into the environment.
- To make possible escape and rescue operations from the reactor containment vessel.
- Prevention of uncontrolled access to the containment.

CORE CATCHERS AND DEVICES
A main safety enhancement of new generation NPP is the provision of core catching devices and equipment in case of a severe accident (core melt), i.e. no radioactive fuel release in the environment.

MANUFACTURE OF RADIOACTIVE WASTE STORAGE CONTAINERS
- Designed for low and intermediate radioactive waste included in a cement matrix
- Certified in Russia

POLAR CRANES FOR NPP OF NEW GENERATION
Manufacturing of cranes for lifting of heavy components like steam generators, reactor vessel and other components

Electrical round-trip overhead crane for nuclear power plants (polar):
- Lifting capacity: 160-400 t
- Span length (diameter): 31-43 m
COMPLEX OF LIQUID AND SOLID RADIOACTIVE WASTE TREATMENT
Design, manufacturing and construction and contracting of radioactive waste treatment complexes:

- Building composition
- Manipulators
- Remote cutting, sawing, gripping equipment
- Auxiliary tools for fuel and waste handling
- Cranes
- Lifting devices
- Super compactors
- Shielding windows
- Decontamination devices
- Inner building transport conveyers
- Cementation

COMPLEX OF LIFTING AND CONVEYING EQUIPMENT (LCE) OF KP LRW NPP CEMENTATION LINE

SPECIAL EQUIPMENT FOR FUEL AND WASTE HANDLING
Design and manufacture of special equipment for remote disposal

- Transport means for containers
- Lifting devices
- Turning devices
NUCLEAR FACILITIES - EQUIPMENT AND COMPONENTS FOR NEW BUILD AND SERVICE FOR EXISTING FACILITIES

CONTAINMENT LINER (CARBON STEEL LINER)
Engineering, detailed design, manufacturing and construction of a containment liner for a NPP

Steel liners for Containments in NPPs:
- Design and beyond design studies
- Structural analysis
- Manufacturing design
- Manufacturing and construction
- Welding control (VT, UT, PT, RT, MT)

STAINLESS STEEL LINERS
Stainless Steel liners for hot cells in treatment facilities and spent fuel pools in NPPs:

- Design and beyond design studies
- Structural analysis
- Manufacturing design
- Manufacturing and construction
- Welding control (VT, UT, PT, RT)
FABRICATION AND DELIVERY
For the new construction and conversion of power plants we offer a wide spectrum of know-how and high quality components, support the complete cycle from planning, engineering, production and supply of components and spare parts to assembly, commissioning and service team.

Worldwide, the different fabrication locations produce parts of the boiler components, including heating surface banks, membrane walls, headers, high pressure pipes and heating surface cleaning systems as well as pulverization systems, burners, filters and nuclear equipment/components.

FABRICATION LOCATIONS:
- Germany:
  - Aschersleben, Dortmund, Jänschwalde, Nordhorn, St. Ingbert
- Austria: Linz
- Croatia: Slavonski Brod
- Czech Republic: Blansko
- Russia: Syzran
- South Africa: Pretoria
- Thailand: Laemchabang

OVERALL FABRICATION CAPACITIES OF TYAZHMASH:
- Almost 7,000 employees
- Area: 1,320,000 m²
- More than 1,200 units of metal-cutting equipment
- Unique boring and turning machine with processing diameter up to 25,000 mm

FABRICATION FACILITY OF BILFINGER POWER SYSTEMS IN PRETORIA, SOUTH AFRICA
CONSTRUCTION
To meet demanding construction challenges highly qualified personnel is required. In this field, we offer a wide range of know-how and experience with high quality and safety standards.

Throughout the whole construction period our site staff is supported by the specialists of our engineering departments, making sure, that the best possible solution could be realized. Our competent site managers and our scheduling specialists ensure an on-time realization and a high-quality execution of the work. We can provide you the engineering and supply of special installation equipment.

RANGE OF SERVICES:
- Construction, modernization and modification
- Construction of plant components, such as steam generators, piping and structural steelwork
- Maintenance, boiler overhaul and regular inspections
- Trouble shooting and 24-hours standby service
- Construction, on site supervision, coordination
- Provision of welding and commissioning specialists and supervisory personnel for quality and safety management