01 | HEAT RECOVERY STEAM GENERATION FROM EXHAUST GAS WITH AN OPTIONAL GAS TURBINE

Type of project / service: Feasibility Study
Client: MiRO Mineralölraffinerie Oberrhein GmbH & Co. KG
Location: Karlsruhe, Germany
Project scope: 4 man-months

Project description:
REINSTEIN was awarded the contract for the preparation of a feasibility study to assess the technical feasibility and associated costs of the provision of a heat recovery steam generation from exhaust gas. In addition to the heat recovery, the feasibility of an optional use of a 16 to 24MW gas turbine (GT) was to be investigated to supply the heat recovery steam generator with hot exhaust gas for additional steam generation. REINSTEIN provided pre-basic engineering services considering the various alternatives, and the results and calculated costs were documented in a comprehensive report and formed the basis of the client's selection of the most appropriate alternative.

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Project result:

“The findings of the study feature a high information content and a good quality. REINSTEIN provided a good basis for MiRO’s decision-making; in particular considering the very short project duration of only three months. We are impressed by the reliability and perfect adherence to schedule of REINSTEIN’s experts. REINSTEIN proved to be a professional and flexible engineering partner, and qualified itself for being included in MiRO’s list of bidders for future projects”, as stated by Mr. Herkenhoff, responsible for MiRO’s purchasing division.

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02 | FILTRATION OF EXHAUST AIR IN A NUCLEAR POWER PLANT

Type of project / service: Consulting / Feasibility Study
Client: Kernkraftwerk Leibstadt AG
Location: Leibstadt, Switzerland
Project scope: 15 man-months

Project description:
REINSTEIN reviewed the feasibility to provide an exhaust air filtration in the air ventilation system of a safety-relevant power plant area. The independent review was carried out in three project phases, and separate detailed reports were issued for each phase:

Phase I: assessment of the actual status and identification of requirements
Phase II: analysis of the feasibility and implementation of possible solutions
Phase III: detailed analysis of the feasibility of the solution identified in Phase II.

To achieve close coordination with the client, REINSTEIN conducted regular status meetings, which optimised the cooperation with KKL's specialised departments (mechanical engineering, radiation protection, security services). The well-documented results of the study provide KKL with a sound basis for its decisions about the next steps to be taken, and for its discussions with the regulatory authorities.

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Project result:

The client was especially impressed by the excellent expertise of REINSTEIN's staff members, in particular with regard to nuclear safety aspects.

Michael Rank of KKL's mechanical engineering division: „REINSTEIN's know-how and the structured yet always transparent handling of the project significantly contributed to the overall success of the program. The REINSTEIN staff members are extremely flexible and team-oriented with strong communication skills. And at the end, time and costs did not exceed the scope estimated by REINSTEIN at the beginning of the project".

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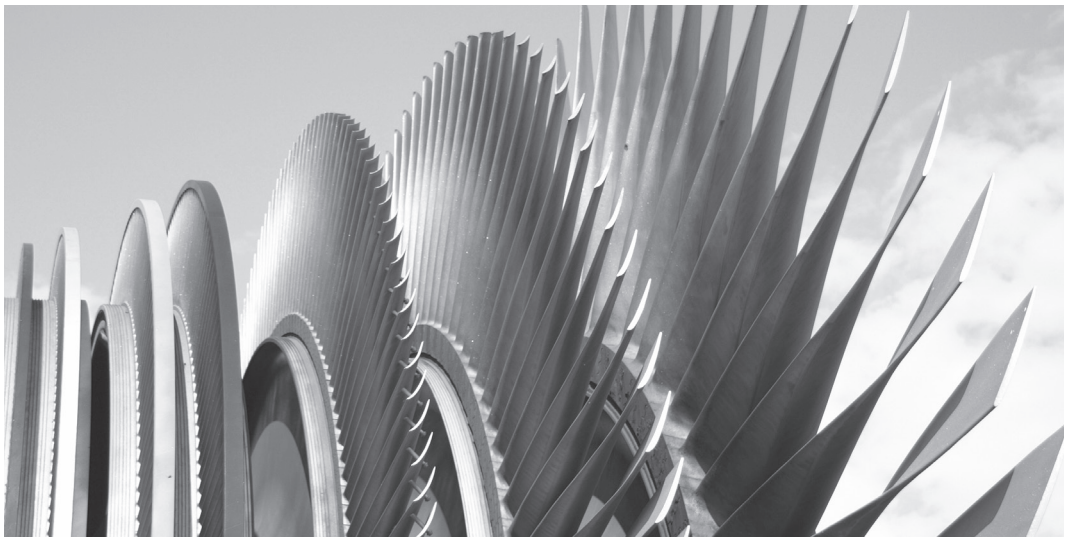
03 | RENEWAL OR RETROFIT OF STEAM TURBINES OF A CHP UTILITY



Type of project / service: Audit, Feasibility Study & Assessment
Client: Wärmeverbundkraftwerk Freiburg (WVK)
Location: Freiburg, Germany
Project scope: 4 man-months

Project description:
WVK produces electric power and heat for a large industrial customer, and provides approximately 40% of the electricity demand of the city of Freiburg. REINSTEIN was tasked to carry out a study to review an improvement of the existing steam turbines. In addition, the general framework for finding optimal modification solutions was to be elaborated. The new turbines had to be designed flexibly to accommodate future steam consumption changes.

In a first step, REINSTEIN conducted a detailed review and analysis of all possibilities and alternatives.

In a second step, pre-basic engineering activities were provided, and the results and calculated costs summarised in a comprehensive report, which formed the basis of WVK's decision about the solution to be implemented.

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In order to evaluate eligibility of the project for the German “KWK-Förderung” (CHP subsidisation program), the theoretical costs of the construction of new power plants of the same technical capacity were also calculated.

Project result:
„REINSTEIN has really convinced us during all project phases. In addition to the professional, systematic approach, we are particularly impressed by the high quality and informative value of the study findings”, as stated by Torsten Jung, Energy Supply Manager of Solvay Acetow.

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04 | FEASIBILITY STUDY FOR EFFICIENCY IMPROVEMENT OF AN INDUSTRIAL POWER PLANT

Type of project / service: Feasibility Study
Client: Kartonfabrik Buchmann GmbH
Location: Annweiler, Germany
Project scope: 8 man-months

Project description:
The pulp and paper industry is one of the most resource intensive basic industries. Energy in the form of steam and electricity has to be provided as efficiently and cost-effectively as possible. REINSTEIN was tasked with the preparation of a feasibility study to identify potential areas of energy efficiency improvement in the pulp and paper mill's own power plant.

First, the project goals were determined in a customer workshop. In interviews with employees and by analysing the documentation available, the weak points of the facility could be identified. In addition, REINSTEIN collected its own measuring data.

Afterwards, the enhancement proposals resulting from the analyses and inspections were firmed up. Over a prolonged period of time, a multitude of production conditions

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and plant operation modes including specific incidences could be reviewed. The technical specifications for various scenarios were developed, and budget quotations for the individual work packages obtained and reviewed.

Project result:
The study proves that the mill's own electricity production can be further enhanced. Moreover, the thermal losses, which are already low, can be further reduced. In addition, the study shows that the necessary investments will already amortise themselves within three to five years. REINSTEIN's study enabled the customer to assess the profitability of his investments in great detail.

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05 | CONSTRUCTION OF A NEW COMBINED-CYCLE POWER PLANT

Type of project / service: General Site Manager Services
Client: STATKRAFT
Location: Hürth, Germany
Project scope: 26 man-months

Project description:
At its site in Hürth, STATKRAFT constructed the combined cycle power plant Knapsack II. General contractor was Siemens. REINSTEIN was tasked by STATKRAFT with the provision of the general site manager for the construction of the power plant. REINSTEIN's defined scope included:

- consulting the project management team throughout all construction, commissioning, and inspection & testing phases
- representing the project owner's interests towards the general contractor Siemens
- conducting meetings and clarifying facts with third-party consultants, licensing authorities, etc.
- checking variations to scope, specifications of supplies and services, award of contracts, and checking the due performance.

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Project result:

„REINSTEIN convinced us throughout the entire project implementation time - on a professional and personal level. We would resort to REINSTEIN's services at any time again", as stated by Dr. Horst Kesselmeier, Project Director at STATKRAFT.

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06 | CONSTRUCTION OF A COAL FIRED POWER STATION

Type of project / service: Construction Management Services (Electrical / I&C, and Plant & Industrial Sectors)
Client: RWE AG
Location: Hamm-Uentrop, Germany
Project scope: 110 man-months

Project description:
For the construction of the new "Westfalen" power plant, REINSTEIN provided RWE with full time on-site management services for the plant's communication network. Support to the plant's electrical site manager was also provided as and when required, in areas including electric cable installation, lightning protection, lighting system, compliance with health, safety and environmental regulations.

In addition, a REINSTEIN expert worked on site on a full-time basis as a construction manager for plant and industrial engineering, with main focus on the plant's insulation system.

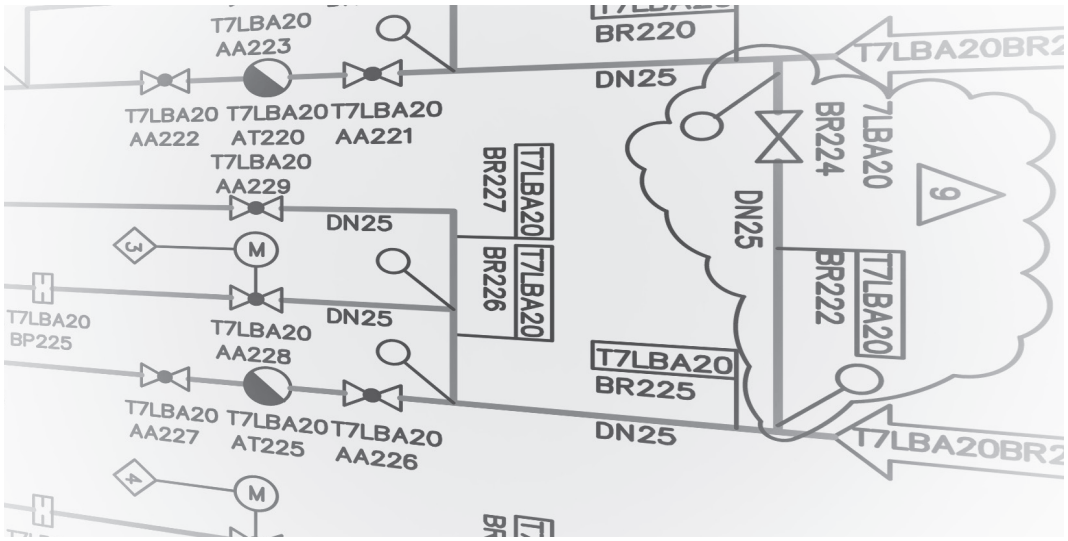
07 | PROJECT PROGRESS EVALUATION IN TWO COMBINED CYCLE POWER PLANTS IN PAKISTAN

Type of project / service: Audit / Independent Evaluation
Client: Deutsche Investitions- und Entwicklungsgesellschaft / KfW-Group
Location: Pakistan
Project scope: 2 man-months

Project description:
DEG, a German business development bank, provides support to various countries for infrastructure projects. REINSTEIN, as “banker’s engineer”, was awarded the contract for the preparation of an independent status report on two combined cycle power plants in Pakistan to provide an objective view of the actual project status, to identify potential risks and mitigation measures, and to elaborate project optimisation measures.

Project result:
REINSTEIN’s project engineer visited both construction sites for several weeks, analysing the local situation and liaising with REINSTEIN’s back-office experts to provide the best solutions to difficult technical problems during the commissioning phase in addition to the required project status report.

08 | OPERATING MANUAL FOR NEURATH POWER PLANT

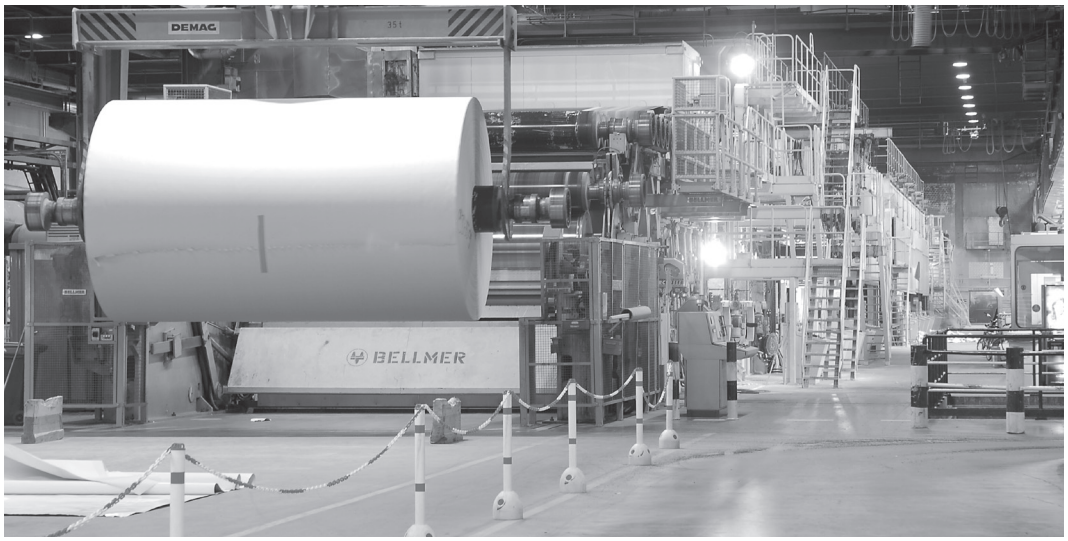


Type of project / service: Power Plant Documentation
Client: ALSTOM Power GmbH
Location: Neurath, North Rhine Westphalia, Germany
Project scope: 6 man-months

Project description:
For ALSTOM, to which REINSTEIN had already provided support in several power plants, REINSTEIN prepared a detailed description and documentation of the complex plant system as part of the operation manual for ALSTOM's coal-fired power plant at Neurath.

Project result:
In the course of the project, the client was particularly impressed by the great expertise of REINSTEIN's specialists. "With the know-how of its experts, REINSTEIN is a perfect match for our project requirements, always responding to our inquiries very quickly and flexibly. The specialists impress us with their high people skills and extensive project management expertise. Again, REINSTEIN proved to be an extraordinarily reliable partner - last but not least through the provision of personal assistance throughout the project by REINSTEIN's general management", as stated by Reiner Peters, Head of the German Plant Construction Division of ALSTOM Power.

09 | OPTIMISATION OF THE INDUSTRIAL POWER PLANT OF A PULP AND PAPER MILL



Type of project / service: Efficiency enhancement
Client: Kartonfabrik Buchmann GmbH
Location: Annweiler, Germany
Project scope: 20 man-months

Project description:
Based on a feasibility study, REINSTEIN upgraded the process steam and electricity generation capacity of the mill's in-house CHP plant. Main activities for REINSTEIN included the development of technical specifications related to the retrofit of one steam turbine, and the optimisation of an existing steam generator. REINSTEIN was also contracted to prepare all required detail engineering documents, provide technical expertise and recommendations for the selection of the most suitable tenderers, participate in technical meetings with suppliers, manage all technical interfaces and oversee the construction and commissioning progress.

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10 | ENERGY EFFICIENCY OPTIMISATION OF A REFINERY

Type of project / service: Efficiency Enhancement and Audit
Client: Bayernoil AG
Location: Neustadt, Germany
Project scope: 5 man-months

Project description:
Bayernoil AG is constantly striving to improve the energy efficiency of their Neustadt refinery site. As part of a company-wide initiative REINSTEIN was asked to identify the site's largest consumers of energy (electrical, steam), assess the potential of energy savings for these components e.g. through new or refurbished components or changes to operational procedures, and carry out detailed feasibility studies for the components with the highest energy saving potential.

Project result:
The studies identified and assessed several potential approaches, e.g. considering current component utilisation and operational procedures & constraints. Costs and availability of energy were reviewed and a full technical and economical assessment was carried out and led to the recommendation of the most beneficial approach.

11 | OPERATING PERSONNEL FOR A COAL-FIRED POWER PLANT

Type of project / service: Provision of Power Plant Operators
Client: STEAG AG
Location: Lünen, Germany
Project scope: 24 man-months

Project description:
STEAG AG operates the coal-fired TRIANEL power plant at Lünen. REINSTEIN is providing support to the STEAG operating staff by deploying two senior experts, one for the overall plant supervision and operation sector, and one for the water analysis and water treatment area. The two specialists work as integrated members of the STEAG teams, and assist in ensuring smooth operation of the 750 MW power plant.

12 | QUALITY ASSURANCE / CONTROL OF RADIOACTIVE WASTE PACKAGES

Type of project / service: Independent Quality Assurance
Client: ISE Ingenieurgesellschaft für Stilllegung & Entsorgung
Location: Würgassen, Germany
Project scope: 2 man-months

Project description:
During the decommissioning of nuclear facilities, considerable amounts of residual materials are generated that require proper disposal. A large percentage of the residual materials falls below the release limit of the Radiation Protection Ordinance and can immediately be recycled to the economy or to landfills. A low percentage of the radioactive residues, which cannot be decontaminated down to the release limit according to the latest state of technology, has to be subjected to a suitable conditioning treatment for final storage. The logistics of the treatment of residual materials and waste is complex and is fully monitored by various redundantly designed IT systems. REINSTEIN was tasked with an independent inspection of the processes employed for the conditioning of radioactive waste.

13 | DECOMMISSIONING OF OBRIGHEIM NUCLEAR POWER PLANT

Type of project / service: Project Controlling und Planning
Client: EnBW KK GmbH
Location: Obrigheim, Germany
Project scope: 12 man-months

Project description:
REINSTEIN is providing decommissioning support to the operator EnBW at their Obrigheim Nuclear Power Plant, including:

- project control of the activities and adherence to time schedule
- plant adjustment to optimise the restricted access areas and supervised areas in preparation of the future dismantling or capacity reduction of ventilation plants, compressed air plants and similar systems
- planning activities for plant adjustments to prepare the future dismantling of electrical and structural components.

14 | OPERATOR TRAINING (COAL-FIRED POWER PLANT)

Type of project / service: Power Plant Training
Client: Hitachi Power, in cooperation with Kraftwerksschule Essen, a PowerTech Training Center
Location: Medupi & Kusile, South Africa
Project scope: a total of 15 months

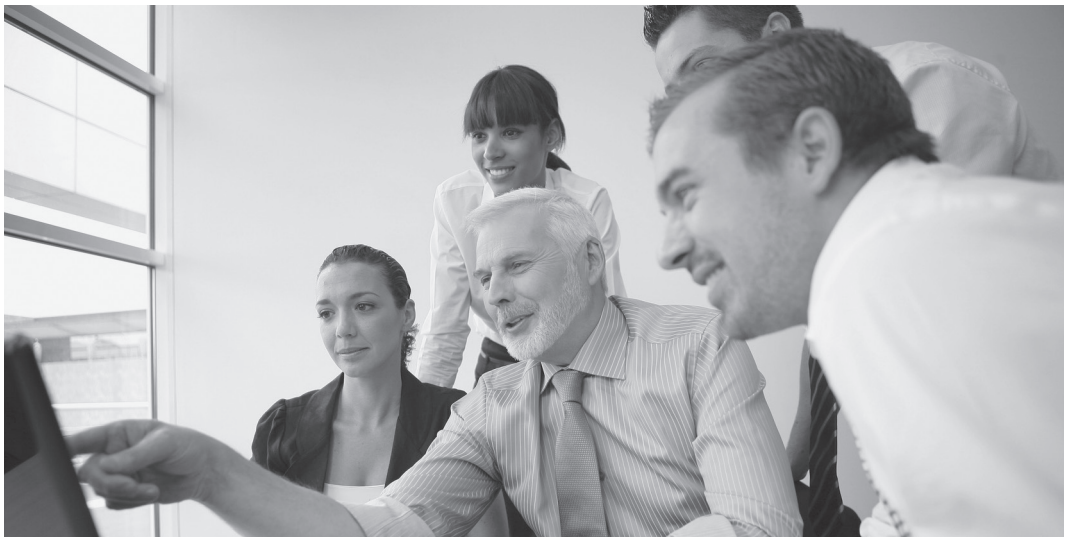
Project description:
ESKOM, South Africa's state-owned utility was constructing several new coal fired power plants and required component-specific operator training for the plants' 12 Hitachi boilers with a thermal power of 800MW each. REINSTEIN was tasked with the creation of training material and documents based on the available manufacturer's technical documentation covering all relevant areas e.g. tasks and operation methodology, operation & maintenance, risks & mitigation, fault investigation. In total eight training seminars were held by REINSTEIN's experts over nine weeks in South Africa.

15 | OPERATOR TRAINING (COMBINED HEAT AND POWER PLANT)

Type of project / service: Power Plant Training
Client: Kraftwerksschule Essen (PowerTech Training Center) for EVN Bulgaria
Location: Plovdiv, Bulgaria
Project scope: 1.5 man-months

Project description:
EVN Bulgaria, owned by Austrian company EVN, constructed a new gas fired combined heat and power plant and required plant-specific operator training in the overall plant processes and thermodynamics, the electrical system and the plant control system. REINSTEIN was tasked with the creation of training material and documents in order to introduce the operators in the technology and functionality of a modern combined cycle power plant. The two weeks' training seminars were held by REINSTEIN's experts in Bulgaria.

16 | BASIC POWER PLANT TECHNOLOGY TRAINING



Type of project / service: In-house Training
Client: ABB AG
Location: Mannheim, Germany
Project scope: Regular seminars of 3 days each

Project description:
Within the scope of an in-house training program, ABB awarded the contract to REINSTEIN to acquaint engineers with some basics of thermal power plant technology. The training included:

- an introduction to industrial power plant, co-generation plant, combined-cycle power plant, gas turbine, steam turbine, and distance heating technology
- an introduction to the main components of steam boilers
- an introduction to electrical and process control, generator, and generator protection technology.

REINSTEIN's training documents were created such that later on, they could be used by the trainees as reference books.