Project Description

The new Rheinfelden power plant, which is located 25 km east of Basel will replace its forefather, the first run-of-river hydroelectric power plant in Europe, located 500 m downstream the Rhine. The old power plant only uses a flow rate of 600 m$^3$/s and generated 185 GWh during a normal year. A relatively small amount of energy, comparing to the river’s 1000 m$^3$/s flow rate during an average year. With advancements in turbine technology and the cost-effective design of the power house, the new project is becoming a reality for its owners, Energiedienst AG (ED). The scope of the new power plant includes construction of seven spillways, a power house and deepening of the tailrace. The project consists of four 25 MW bulb turbines and a small turbine with a 2 MW capacity integrated into the separating pier between the power house and the first spillway, in order to ensure that the downstream flow is continually maintained. The new power plant will increase the annual energy production to a total of 600 GWh, in other words a tripling of the current production. The project has an investment volume of EUR 350 million.

Pöyry Energy Ltd. is providing major engineering services including feasibility study, tender and contractual documents, environmental impact study, and detailed design of the power house.

Client

Energiedienst AG (ED), Rheinfelden / Germany / Switzerland

Project

Construction of a new spillway and a new power station (100 MW) near the location of an existing old power plant on the river Rhine

Services

- Study of existing scheme
- Environmental study
- Assistance during concession agreement negotiations
- Feasibility study
- Optimization study
- Tender and contractual documents
- Construction supervision
- Detailed design of the power house

Service Provider

Pöyry Energy AG (joint venture with a German consultant)

Execution Period

1984 – 1994 Pre-design
2005 – 2012 Tender design, detailed design, supervision management

Rheinfelden Run-of-River Power Plant

Key Data

Energy Production
- Energy production GWh/year: 600
- Installed capacity MW: 100

Turbines
- Runner type: Bulb turbine
- Number of units: 4
- Rated output per unit: 25 MW
- Rated speed: 75 U/min
- Runner diameter: 6.5 m
- Maximum gross head: 9.4 m
- Minimum gross head: 6.0 m
- Maximum turbine discharge: 1500 m³/s
- Average discharge: 1030 m³/s

Mandatory Release Unit
- Runner type: Kaplan
- Installed capacity MW: 2

Main Civil Works
- Excavation volume of PH: 0.4 Mio. m³
- Excavation volume of tailrace: 1.0 Mio. m³
- Concrete volume of PH: 99'000 m³
- Size of the power house (PH):
  - Length: 71 m
  - Width: 83 m
  - Height: 32 m
- Cofferdams during construction:
  - Type: Fill dam with sheet piles
  - Design Flood: 4000 m³/s

Spillways
- Type: radial gate
- Number: 7
- Design capacity: 5400 m³/s

Picture 1: Power house, plan view

Picture 2: Areal view to the new spillway and the power house construction