

LETTER OF REFERENCE

Company ZRE Gdańsk S.A. performed a contract for Bjärke Energi – Refurbishment and upgrade to full-Kaplan of existing NOHAB 1400 mm semi-Kaplan turbine with gearbox and generator in Kallafors Hydro Power Plant - between 2013-11-27 and 2015-05-29

Scope of works performed by ZRE Gdansk:

1. Design works for upgrade of the 1400 mm NOHAB hydraulic turbine and new asynchronous generator in Kallafors HPP, including guidelines for the building, concrete and automatics/control system adjustments at the plant,
2. Complete CFD study
3. Manufacturing and delivery of new runner 1400 mm
4. Manufacturing and delivery of new guide-vane apparatus
5. Disassembly and assembly on site
6. Cavitation repairs of runner chamber
7. Turbine bearing refurbishment
8. Transport to and from Källafors HPP/Sweden
9. Sand or hydro-blasting and painting of mechanical turbine parts in water way
10. Delivery of new asynchronous generator 650kW
11. Delivery of new appropriate gearbox between turbine and generator including adaptations
12. Delivery of new hydraulic equipment for guide-vanes control
13. Re-use of existing hydraulic pressure unit,
14. Adaptation of the equipment for runner blades regulation,
15. Commissioning and start-up,
16. FAT and SAT
17. Documentation:

During the following works employees of ZRE Gdańsk S.A. have shown professionalism and a high level of technical knowledge, performing their tasks according to the schedule and in a professional manner. We rate the quality of performed works as very good.

We express complete satisfaction with cooperation with ZRE Gdańsk S.A. and would recommend it as a reliable business partner.

Källafors Kraft EB



Måns Reventberg



Sigvard Krantz