

PÖYRY CASE SUMMARY

PHONESACK GROUP/LAOS PDR Nam Theun 1 Hydropower Project



Located at Nam Kading River, 30 km upstream of the confluence to Mekong. Nam Theun 1 is the latest Hydropower Plant off the Nam Theun - Nam Kading/Theun river cascade. Begin of construction was in February 2016 (=Start of Diversion Tunnel excavation). Commissioning of the Plant is scheduled for end 2020.

RCC Arch-Dam

The dam crest is 297 m above sea level. The dam height will be 187 m. The dam crest width will be 771 m.

For the dam construction 4.1 Mio. m³ RCC Concrete and 272.500 m³ CVC Concrete will be cast.

Inside of dam Inspection- und Grouting-Tunnels will be built.

The maximum reservoir volume will be 3,009 Mio. m³ within an area of von 93.6 km².

The dam will be founded on strong to very strong, slightly fractured and fresh to slightly weathered Sandstone. The dam foundation was geologically investigated by drilling campaigns during the tender and construction stage.

A grout curtain will seal the dam foundation against under current water.

POWERHOUSE

The key elements of the powerhouse area are two turbine shafts (EDL und EGAT).

At the 50.6 m deep EDL Shaft one Francis-Turbine will be installed in a 23 m wide turbine pit. At the 56.7 m deep EGAT Shaft two Francis-Turbines will be mounted at a 46 m wide turbine pit.

The design discharge of the three turbines will be 517.3 m³/sec. The total installed capacity is 650 Megawatt.

Both shafts have a permanent geotechnical Instrumentation (Extensometer, Inclinator, Piezometer und Groundwater standpipes).

The water will be discharged by three Tail Race Outlets to the Nam Kading River.

HEAD RACE TUNNEL

The 427 m long Head Race Tunnel will excavated with a diameter 12.9 m. After excavation mainly Steel Liners will be installed and partially Concrete linings will be cast. Contact and Consolidation Grouting are planned.

PENSTOCK TUNNELS AND LOWER ERECTION BAY

Three Penstock Tunneli are excavated with diameters of 5.5 m (Unit 1) and 7.2 m (Unit 2 und 3). Steel Liner will be installed. Contact Grouting is foreseen.

One Erection Bay will be excavated with length = 74 m, width = 64.4 m and height = 17.5 m in 3 phases (Top Heading, upper and bottom bench).

DIVERSION TUNNEL

The 930 m long Diversion tunnel was opened in January 2017 after inner lining was cast.

The diversion tunnel was excavated with 13 m diameter.

The purpose of this tunnel is the river diversion to dewater the river bed after construction of RCC cofferdams.

PRE-COFFERDAMS AND COFFERDAMS

First two pre-cofferdams (upstream and downstream) will be backfilled in 4 phases.

For the abutment of the pre-cofferdams consolidation grouting of bed rock and slopes will be carried out.

The pre-cofferdams will be sealed by Jet Grouting.

Afterwards two RCC Cofferdams (upstream and downstream) will be constructed with the purpose to get a long term dewatering of the river bed.

After the dewatering the works for RCC Main Dam foundation and concreting of the RCC Main Dam can start.

SLOPE EXACAVATION OF POWER INTAKE AND MAIN DAM

At present the slopes for Power Intake and Main Dam are excavated and afterwards supported by shotcrete, wire mesh, rock-bolts and PVC drainage pipes.

The upper 40 – 70 m are excavated in Topsoil and moderately to completely weathered Sandstone – Siltstone.

At the bottom part fresh to moderately weathered Sandstones and Siltstones and one 1-2 m thick silt-clayed bedding-parallel fault zone are encountered.