

DORDI KHOLA HYDROPOWER PROJECT

LAMJUNG, NEPAL



Monthly Progress Report

December 2017



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1 Introduction

Dordi Khola Hydropower Project developed by Himalayan Power Partner Ltd. (HPPL) Kathmandu, Nepal is a Run-of-River type hydroelectric project with generating capacity of 27 MW in Lamjung.

2 Project Schedule

Construction of the project was started from April 2014. Initial completion date was scheduled for June 2017 but due to earthquake, blockade and delay in transmission line RCOD has been extended up to 31 August 2019. However, the construction works are rescheduled to complete by December 2018 and RCOD on 22 March 2019. Contingency plan to evacuate generated power is in process with NEA.

3 Project Features

- Gross Head : 212.0 m
- Design Discharge : 15.28 m³/sec
- Installed Capacity : 27.0 MW
- Total Annual Energy : 148.697GWh
- Total Annual Contract Energy : 142.319GWh
 - Dry Season Energy* : 21.367 GWh
 - Wet Season Energy* : 120.952 GWh
- Power Purchase Agreement (PPA) Rate :
 - Dry Season Energy : 8.40/unit
 - Wet Season Energy : 4.80/unit
- Water Ways
 - Closed Conduit/Steel pipe (Ø2.65m) : 3237 m
 - Headrace Tunnel (Ø3.3m) : 2662 m
 - Penstock Pipe (Ø2.3m) : 700 m
 - Tailrace : 330 m
- Powerhouse Type : Surface
- Turbine Type : Horiz. Francis (3x9 MW)
- Grid Connection Point : Udipur Hub/ Lamjung
- Transmission Line Length : 132 kV Single Circuit
: 1.2 km

4 Progress

4.1 Financial Progress

Facility agreement to provide Term Loan of amount NPR 3,170 million, 75% of total project cost NPR 4,235 million, for construction of the project and working capital of amount 99 million was concluded with Bank Consortium led by Prime Commercial Bank Ltd. on 7 November 2013.

Financial progress up to December 15, 2017 (End of Mansir 2074) including mobilization advance and advance payment to the contractors is 1,752 million (41.36%).

HPPL has completed the process of IPO after allotting equity shares worth NPR 319.625 million (30% of equity capital NPR1, 065 million) to general public including project effected people and company employees in Shrawan 2074. The public shares of HPPL have been listed in Nepal Stock Exchange & being trading in Secondary Market.

4.2 Physical Progress

Physical Progress of major construction contract and their status up to November 2017 are given in the following table:

S.N	Name of Contract	Contractor	Award date	Completion date	Physical Progress
1	Preparatory Works: Service Road, Bridge and Land Development	Rasuwa Construction Company Pvt. Ltd.	March 28, 2014	July 02, 2016	100%
2	Civil Works				
2.1	Surface Civil Works	Rasuwa Construction Company Pvt. Ltd.	February 03, 2015	June 30, 2018	59.33 %
2.2	Underground civil Works (Tunnel & Surge Shaft)	Multi Infra Structure Development Co. Pvt. Ltd.	May 10, 2017	December 30, 2018	36.98%
3	Hydro-mechanical Works				
3.1	Steel Supply	Jindal Steel Ltd. India	May 06, 2015	May 23, 2017	100%
3.2	Transportation, Fabrication & Installation	Machhapuchhre Metal and Machinery Works Pvt. Ltd.	February 03, 2015	June 30, 2018	35.00%
4	Contract Package IV: E & M Equipment	Voith Hydro Pvt. Ltd. India	April 10, 2015	March 15, 2019	78.24%
	Overall Physical Progress Up to Nov. 2017				61.45%

Up to date progress of all the surface civil construction works in respect to the components are explained below:

Surface Civil Works/ Rasuwa Construction Co.

The construction of civil surface works including hydro-mechanical works of the project which includes, headworks, desilting basin, water conductor pipe, penstock pipe, powerhouse, tailrace

and switchyard and all related hydro-mechanical works, was awarded to MS Rasuwa Construction Company Pvt. Ltd. in February 2015. Considering the necessity of smooth coordination between civil and hydro-mechanical works, the HM works were included in contract package II along with civil works. The prime contractor Rasuwa Construction Company Pvt. Ltd. has appointed Machhapuchhre Metal and Machinery Works (3MW) as nominated subcontractor, which is doing all the hydro-mechanical works.

- **Diversion Weir, Intake and Feeder Pipe**

Intake structure including embedment parts, under sluice portion of diversion weir, apron slab, right bank shear wall is completed. Spillway portion and left bank shear wall is under construction.

The feeder pipe alignment civil works are planned to start from the second week of January 2018 since the access to the desilting basin can be made from the downstream of the weir across Dordi Khola. Due to the dry season, the river discharge is less and a temporary pipe has been installed across the river and temporary access to the desilting basin has been constructed. The required civil works will start soon for the feeder pipe. The pipes are already fabricated and ready for installation.



Intake and Undersluice Structures

- **Desilting Basin**

The construction works of desilting basin started from May 2016. The structure is not in the critical path and hence given less priority than other structure. The construction of the desilting basin structure can be continued even in the wet season. The base part of the structure has completed throughout the length and the structural concreting works up to the top level of slope part is almost completed.



Desilting Basin
Construction

- Water Conductor Pipe & Penstock Pipe Alignment and Valve house

Rasuwa construction company Pvt. Ltd. (RCC) started the opening of track along the water conductor pipe (WCP) alignment from headworks site to the tunnel inlet portal site soon after mobilization. The length is about 3200 m and the alignment falls under cultivated land, rocky steep cliffs and jungles. All the required land for the structure and access along the pipe alignment has been acquired. Rasuwa has completed the excavation work along the pipe alignment approximate up to the top level of WCP. The nominated subcontractor Machhapuchhre Engineering Pvt. Ltd. (MEPL), a sister company of 3MW has started trench excavation and laying of pipe. The trench excavation work has already started from the beginning right after the desilting basin structure and simultaneously laying of WCP is going on.



WCP Alignment Excavation and installation of pipes



Penstock Pipe Alignment and excavation of Anchor Block AB-06



The excavation works along the penstock pipe alignment has also been started. Anchor Block no. 6 excavation is almost completed and soon will start concrete works. The penstock pipes fabricated at headworks site workshop, are being transferred to the yard at penstock alignment.

The construction of valve house, which is situated immediate after the tunnel outlet and beginning of the penstock pipe shall be started only after completion of tunneling works.

- Power House

The powerhouse structure is situated at the left bank of Marsyangdi River. Foundation excavation, laying of earth mat and blinding concreting of powerhouse foundation is completed for all the three units. The structural concreting of the machine foundation has been raised up to EL. 520.14 m with first stage embedded E&M parts for the third unit up to the generator pocket foundation. Similarly, the concreting work at the tail pool has raised up to the design level,



Powerhouse construction works

however, the shear wall has been raised up to level 551.0m at the unit three portion and up to level 554.20m at the unit one and unit two. The rebar placement work at the foundation has been started for the units one and two. The surrounding slopes of the powerhouse is stabilized by shotcreting to prevent from sliding. The physical progress of the civil works is about 40%.

Underground Civil Works/Tunnel

The excavation work in the tunnel is continued, although the progress is slow due to poor geological condition. The geology of both of the tunnel faces are still not so good and the excavation process is going on with steel rib supports. Total progress achieved up to the end of December is 1092m (40%)

- **Excavation from Inlet**

The rock mass condition is still not good even after crossing the major shear zone. The phyllitic rockmass with few quartz veins are appearing with seepage. The tunnel is being advancing slowly by heading and benching method. The progress up to the end of December reached is 316m.

- **Excavation from Outlet**

The rockmass encountering is phyllitic with few quartz veins with seepage. However patterned rock bolts and shotcrete has been applying for the support system. The tunnel is being advancing slowly with rib support. The excavation progress achieved till the end of December is 776 m.



Inlet Tunnel face



Outlet Tunnel Face

Hydro-Mechanical Works

The hydro-mechanical works of contract package II is being conducted by the nominated sub-contractor Machhapuchhre Metal and machinery works Pvt. Ltd. (3MW). 3MW has already installed the embedded metallic parts along with gate/stoplog frames at undersluice, Intake, Desilting Basin and Draft Tube at powerhouse. As the civil works were disturbed during the monsoon season, the installation works of pipe and other embedded parts could not be performed. The coal-tar tape has been imported by 3MW for the wrapping of headrace pipe and already delivered at site but due to lack of expert, the coal tar tape wrapping work is being slow. The excavation works of trench for laying of the water conductor pipe is continued and in parallel laying pipe along with welding and testing are going on. As the civil works along the penstock pipe alignment has started, the delivery of penstock pipe at the laying site is starting soon. A separate hydro-mechanical team has been deployed for penstock and installation work will start

soon. The trifurcation and the individual pipe bends of each unit have already been fabricated and being delivered at powerhouse site. For the unit three, as the concrete work is going on smoothly, a bend and straight pipe with reducer will install soon.

Electro-Mechanical Works

The electro-mechanical works including supply and installation of equipment was awarded to Voith Hydro Private Ltd. under the contract package IV. Voith has already delivered three units



Electro-Mechanical Equipment Stored at army yard



EOT Crane Parts Delivered at Project Site

of generator sets, LAVT, NGT panels, EOT and HOT cranes at site. Generator transformers, MIV, turbine, PPV, Spiral Casing, switchyard equipment etc. have already been dispatched and waiting for custom clearance at the India border side. Because of the lagging in civil works progress, the equipment dispatched/ delivered are being stored at the Army yard at Udipur near the powerhouse area. As the concrete works at the powerhouse site is progressing, a representative from Voith Hydro is visiting the site for the supervision of the installation of 1st stage embedment parts whenever require.

Transmission Line/Power Evacuation

Grid connection agreement with Nepal Electricity Authority was concluded to evacuate the generated power in proposed Udipur Hub by 1.2 km 132 kV single circuit Transmission Line. Construction of Udipur Hub and transmission line along the Marsyangdi Corridor by NEA, is delayed and expected to be completed by 2019 subsequently RCOD has been extended up to 31st August 2017. However, a contingency plan is under way to change grid connection point from Udipur Hub to Middle Marsyangdi Switchyard at Siudibar to ensure power evacuation, in case, the project is completed earlier.

5 Environmental Mitigation, Social Support and Land Acquisition

- **Environmental mitigation**
- **Geo-environmental Unit** in the project site has been already established to address environmental mitigation works. Bio-engineering and slope stability works are going on along water conductor/service road alignment.



Bio-engineering Works Along WCP alignment

- **Social support**
Social support to local communities in project affected areas such as construction/ improvement of local roads, drinking water schemes, support to community schools, rural electrification etc. are going on under this heading.
- **Land acquisition**
Acquisition of private land for headworks, water conductor (pipe line), penstock pipe and power house almost completed. Ownership tittle of 205 ropani land has been transferred to HPPL.
- **Government Approval for tree falling and use of forest land**
Approval for tree cutting and use of forest land for construction of surge shaft was granted on April 2017 only. The process for tree cutting for surge shaft is underway.