DESIGN DESCRIPTION & CONTROL PHILOSOPHY

FOR

DEWATERING SYSTEM

REGIONAL RUSUMO FALLS HYDROELECTRIC PROJECT

RUSUMO POWER COMPANY LIMITED (RPCL)

Nile Equatorial Lakes Subsidiary Action Program Coordination Unit (NELSAP-CU)

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1. DEWATERING SYSTEM

1.1 INTRODUCTION

Dewatering system is common for the powerhouse. A dewatering system shall be provided in the powerhouse for dewatering of penstock, scroll case and draft tube (partial or complete) between penstock / Inlet chamber gate and draft tube gate for access to turbine for inspection and maintenance.

The water to be drained out from the turbine space and the lowest part of the penstocks below tail water level shall be drained into the dewatering header through piping located in the dry pit, from where it shall be simultaneously pumped out of the powerhouse through online connected centrifugal pumps. The water shall be discharged downstream of the closed tail race gates at EL. 1301.664 m (Above the Flood level EL.1300.95 m).

This document is to be read in conjunction with ANDRITZ HYDRO drawing no.: RU-CP2-HIP300-DWG-MDEW-FD-0010.

1.2 DESCRIPTION

A unit wise draft tube drain pipe from the bottom most point of the draft tube shall be provided which is connected to a common dewatering sump located at one end of the powerhouse.

Two no’s of long spindle gate valves (0LSL10 AA 503 & 0LSL10 AA 504, 0LSL10 AA 505 & 0LSL10 AA 506, 0LSL10 AA 507 & 0LSL10 AA 508) are connected to the unit draft tube drain pipe respectively, the long spindle valve shall be located inside the dewatering dry pit and is operated from pit’s top level.

The draft tube drain pipe header connected with the two no’s of centrifugal pumps (0LSL11 AP002 & 0LSL11 AP 003) which works as (1 no. working + 1 no. Stand by) for dewatering purpose and a one no of smaller auxiliary centrifugal pump (0LSL11 AP001) to operate to evacuate the leakages from gates.

One no. of gate valve (0LSL10 AA571, 0LSL10AA572 & 0LSL10AA573) is provided before each centrifugal pumps for isolation of individual pump suction pipe respectively.

The automatic operation of the dewatering pumps shall be done with the help of differential pressure (DP) switches (0LSL10 CP352, 0LSL10CP353 & 0LSL10 CP351) on each of the dewatering pumps installed in the dewatering pipe header. The pump designated and assigned as the main pump shall be started after opening of the long spindle gate valve and cut off on receipt of signal from the DP switch through control panel. Pressure indicators (0LSL10 CP121,
0LSL10 CP122 & 0LSL10 CP123) are provided in the discharge line of each pump respectively, which shall provide local indication of pressure. The changeover of pump motor set from main to stand by shall be initiated based on the feedback from the pressure switches (0LSL10 CP001, 0LSL10 CP002 & 0LSL10 CP003) or through the motor contactor. The Pump shall alternate at each cycle.

The non-return valves (0LSL 10AA 701, 0LSL 10 AA702 & 0LSL 10 AA 703) are there to prevent the back flow.

The gate valve (0LSL 10 AA574, 0LSL 10 AA575 & 0LSL 10 AA576) are used to isolate the isolate the individual pump discharge line respectively.

A submersible pump motor set (0LSL10 AP 001) is provided to evacuate any pit’s floor drain / leakages. A set of level switches are provided for the operation of submersible pump.

Drainage sump and dewatering pipe header shall be interconnected by piping having electrical operated gate valve operated interconnecting valve (Normally close) (0LSL10 AA 101) and an NRV (0LSL10 AA 704). In case of failure of drainage pumps, dewatering pumps can be manually put into operation for emergency drainage by manual opening of electrical operated gate valve from dewatering sump top cover level.

In the eventuality of major leakage / flooding condition of the powerhouse both pumps of drainage system as well as pumps of the dewatering system can work simultaneously.

To avoid the accumulation of contamination / silt at upstream of the long spindle gate valve, a compressed air injection pipe has been provided for the flushing of the same.

1.3 CONTROL SYSTEM

A local control & indication panel for Dewatering system is provided. Following controls & indications shall be provided:

a. The switchgear and controls shall be suitable for automatic and manual operation of pumps.

b. Local manual control of pump motor sets shall imply manual control from the panel.

c. The switchgear and controls shall comprise direct on line motor starters, relays, protection, single phase prevention device, auto/manual selector switch, push buttons, indicating lamps etc.

d. The selector switches shall be provided for mode change over auto – manual operation and pump main stand by role etc.
e. Start / stop push buttons.

f. Emergency stop push button switch.

g. The motors shall be suitable for 400 V ± 10%, 3 phase, 50 Hz AC supply.

h. Remote control of the dewatering system shall be provided from the central control room.