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No. HRED/C-1109/SG/AK/34  
Dated: June 23, 2020

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**Sub: Review of report on Hydrology and Installed capacity for Ressing HEP (2×5 MW) in Papampare District of Arunachal Pradesh.**

- Ref:** (i) DHPD agreement with M/s Gepong dated Aug. 12, 2019  
(ii) Letter no. G/IIT/ROORKEE/Ressing HEP/2020-21/1079 dated May 22, 2020 received from M/s Gepong  
(iii) Email May 22, 2020 received from M/s GS Geo-Environs.  
(iv) Email dated June 02, 03, 04, 05, 06, 09 and 16, 2020 received from M/s Geo-Environs

Dear Sir,

M/s Gepong was sanctioned by DHPD vide agreement referred at sl. no. (i) for development of Ressing Hydro Electric Project for 6.0 MW. M/s Gepong asked HRED for techno-economic review of DPR of above project vide their letter referred at sl. no. (ii). The report containing hydrology and power potential study of above project was received by HRED from M/s GS Geo-Environs, Dehradun (Consultant of developer) vide their letter referred at sl. no. (iii). Further details and other clarifications were received from M/s GS Geo-Environs vide their e-mails referred above. All these reports/details/documents have been reviewed and our observations on hydrology and power potential study of above project are as follows:

## 1. Hydrology

### (i) Discharge Observations

The developer has observed discharge data at diversion site of above project for the period of Jan. 2018 to Dec. 2019 (24 months). This period covers the minimum requirement of discharge observations for consecutive two lean seasons.

### (ii) Meteorological Data

The long term rainfall data is available (for the period of January 2010 to December 2019) at Ressing rain gauge station of State Govt. which is at distance of about 1.5 km from the diversion site. This data have been used to determine the long term discharge data for the project.

### (iii) Long term Discharge Data

The long term discharge data is neither available at Ressing project site nor at nearby catchments. In order to determine the long term discharge data, the linear regression analysis (regression coefficient 0.72) has been carried out between observed discharge data at diversion site of above project and rainfall data available at Ressing rain gauge station for the same period. By using this regression analysis, the discharge data have been obtained for project site for the period of Jan 2010 to Dec 2018. By arranging the total annual flow in each year (from year 2010 to 2019) in descending order, the 50%, 75% and 90 % dependable discharge years have been obtained as 2012-13, 2013-14 and 2011-12 respectively.

(iv) **Environmental Flow**

The environmental flow is taken as 1.20 cumec which is 20% of average lean season discharge (from Nov. 2011 to Jan. 2012) corresponding to 90% dependable year which is in order.

(v) **Design Flood**

The catchment area of project site is 118.63 km<sup>2</sup>. The design flood has been estimated by CWC unit hydrograph method and calculated as 965 cumecs for 100 years return period. The river bed level at barrage site is 1242.50 m. The high flood level at barrage site has been calculated as 1250.175 m with flow depth of 7.675 m. The river bed level near power house site is 1114.96 m. The high flood level near powerhouse site has been calculated as 1121.0 m with flow depth of 6.04 m.

**2. Power Potential Study**

(i) **Design Discharge for Power Generation**

The design discharge of 9.48 cumec has been taken for power generation of 10 MW and 20 % extra discharge is diverted for silt flushing (total discharge 11.85 cumec). Further 1.20 cumec discharge is released continuously for environmental flow. The dependability of total discharge of 13.05 cumec is obtained as 28.59% corresponding to 90% dependable year which is in order.

(ii) **Head available for Power Generation**

FSL at diversion barrage site is 1252.10 m. The normal tailrace water level (for rated discharge of both machines) and minimum tail water level (corresponding to 10% discharge of one machine) have been calculated as 1123.50 m and 1123.00 m respectively. The tail race bed level is 1122.50 m. The gross head for power generation is obtained as 128.6 m. The total head losses and net head available for power generation have been calculated as 5.75 m and 122.85 m respectively which are in order.

(iii) **Installation Proposed**

The power potential study has been carried out corresponding to 90% dependable year (2011-12). The incremental energy calculations have been carried out between 5 MW to 15 MW in the step of 1 MW. Based on this study, the developer has proposed to develop the project for 10 MW by providing 2 units of 5 MW each.

(iv) **Energy Generation**

The calculation has been carried out for annual energy generation corresponding to year (2011-2012) by reducing the discharge of 1.20 cumec as environment flow. The machine availability factor, auxiliary consumption and transformer losses have been taken as 95%, 1% and 0.5% respectively. The efficiency of turbine and generator have been taken as 92% and 95% respectively with overall efficiency taken as 87.4%. The design energy and PLF have been worked out as 65.07 MU and 69.52% respectively which are within acceptable range.

**3. Recommendations**

In view of above details, it is proposed that M/s Gepong may be allowed to develop the project for 10 MW. It is further submitted that due to high PLF, this project has the potential for development of slightly higher capacity (upto 12 MW). In case the developer has the capability of developing this project for 12 MW then they may be allowed for the same.

Yours faithfully,



**(M.K. SINGHAL)**  
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