NEA Engineering Company Limited (NEAC) Call for Application for Roster/Register of Consultants (National)

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NEA Engineering Company Limited (NEAEC), Nepal is working on Detailed Feasibility / Engineering Study of few large hydro power projects including Phukot Karnali (480MW) PROR, Betan Karnali (442MW) PROR, Kimathanka Arun (450 MW) PROR and other similar projects for different developer Clients. The NEAEC wishes to receive the services of undermentioned Experts/Specialists, experienced in the planning and design of large hydraulic infrastructure for the purpose of Expert Review (ER) on the Updated Feasibility Study Report (UFSR) of Phukot Karnali PROR Hydroelectric Project. The NEAEC also plans to employ the below services as a part of Project Review Panel to review the Documents related to the UFSR on behalf of its Clients to bring these Detailed Feasibility Studies to International standards and satisfaction of Project Financiers.

Panel of Experts (Technical Support Groups - TSG)

1. **Job Title: Team Leader/ Geotechnical/Tunnel & Underground structures:**

(a) Qualification and Experiences:

- Minimum of M.Sc. in Tunnel/Geotechnical Engineering or equivalent.
- of 20 years of working experience with Int'l experience in design of tunnel and underground structures during Detailed Engineering study, preferably in hydropower projects.

(b) **Terms of Reference (TOR):**

Main task would be as follows but not limited to:

- Review of geotechnical standards and criteria to guide in the implementation and performance of the various structures of the Project.
- Review the tunnel design and managing all engineering tasks.
- Review the regional and local geological characteristics and seismic conditions for all hydraulic infrastructures to be built under the project;
- Review the analytical results of construction material sources including results of borehole investigation, laboratory testing, in-situ tests for infrastructures under the project;
- Review of the support system designed for headrace tunnel, surge shaft, underground powerhouse with respect to structural sufficiency, optimization of time and cost.
- Review the proposed designs of underground structures with respect to their arrangement, structural analysis and rock support system;
- Review testing results, design recommendations and documents detailing the studies conducted.
- Review of the potential landslide areas along the project.
- Review geotechnical investigation reports carried out by the consultant.

- Review of the laboratory tasks including scheduling, performing analysis, quality control/quality assurance, reporting, ordering supplies, and equipment maintenance.
- Review of field observations, data, maps, and calculations in geology, geotechnical, and environmental reports.
- Review of project and site management of geotechnical and environmental projects to ensure worksite and project safety.
- Review of geotechnical laboratory tests.
- Review the report of investigation design, cost estimates, scope-of-work, contracts, and coordination for geotechnical investigations and soils laboratory analysis.
- Review and analyse the report/ design drawings assumptions of tunnel structures.
- Review the tunnel design criteria.
- As a team leader clarify the duties, roles and functions of team members between both prospective competing team members and their superiors.
- As a team leader give clear direction and instruction to all team members to review the report of PKHEP on time.
- Team leader will coordinate the activities and communications of the Panel, call and chair its meetings, In this regard, he will:
    - Review each panel members contribution to the panel report
    - Summarise key findings and recommendations including additional investigations if required.
    - Lead in preparing minutes/summary report of PoE meeting in coordination with all participating panel members
    - Prepare and submission of final POE report to client and present the findings.

2 Job Title: EM/Power System Expert/Electrical Engineer:

(a) Qualification and Experiences:

- Minimum of Master's Degree in Electrical Engineering; or other relevant subject.
- Minimum of 15 years of experience in hydropower project with Int'l experience as Electro-Mechanical Engineering/expert in hydropower projects

(b) Terms of Reference (TOR):

- Review the Designing, maintaining, implementing, or improving electrical instruments, facilities, components, equipment products, or systems for industrial, commercial or domestic purposes.
- Review construction, manufacturing or installation standards or specifications of electrical machines by performing a wide range of detailed calculations.
- Review and ensure the code used for the design electrical machines and equipment.
- Review and evaluate electrical systems, products, components, and applications by designing and conducting research programs; applying knowledge of electricity and materials.
- Review and Confirms electrical system's and components' capabilities by designing testing methods; testing properties.
- The Expert will review the choice of generating equipment, namely, generators, auxiliary equipment, valves, gates, cranes, control equipment. Review of the optimal number of generating, units consistent with the system profile, domestic and export load demands, review the specification of all electrical and review the Electro Mechanical Study Reports and other associated documents carried out by the consultant.
- Review and check the single line diagram.

3. Job Title: Hydrological/Sedimentological Expert:

(a) Qualification and Experiences:

- Minimum of a MSc in Hydrology/Water Resource/ Hydropower or equivalent with specialization in Sediment Engineering.
- Minimum of 15 years of working experience having Int'l experience as Hydrological/ Sedimentological Expert during Detailed Engineering study preferably in hydropower projects.

(b) Terms of Reference (TOR):

The expert will review available hydro-meteorological data, long term hydrological series developed and adopted for energy generation, flood peaks adopted for statistical analysis of return period floods, assess probability of occurrence of 'GLOF' in the project catchment and its impact on design flood if any. The expert will also review the available daily flow data of hydrological stations, rainfall data of stations in the catchment and other available hydro-meteorological data.

The expert will review the hydrological study reports carried out the Consultant including but not limited to the following:

- Review of all hydrological and sediment data, hydrology and sedimentation studies including all numerical modelling related to reservoir sedimentation in consideration of flushing operation of Phukot Karnali PROR Hydropower Project;
- Evaluate the impact of the expected sediments on the choice of intake structures and desilting facilities
- Review the hydrological analysis for daily, monthly, yearly flow calculated by the consultant
- Review the analysis of the flow duration curve used for power generation.
- The criteria and methods by which the data were used to estimate Maximum Probable Flood, Design Flood
- Review of GLOF and its impact in Project Structures
- Low flow analysis.
- Review the hydrological investigation reports carried out by the consultant.
- Review the sediment logical study reports carried out by Consultant.
- Review the energy calculation.
- Review the Hydrological and Sedimentological report on the basis of TOR for Consulting service for the Preparation of Detail Feasibility/Engineering Study of Phukot Karnali PRoR Hydro Electric Project with NEC.

4. Job Title: Hydraulics Expert:

(a) Qualification and Experiences:

- M.Sc. or higher Degree in Hydraulic Engineering/Hydropower Engineering or equivalent.
- Minimum of 15 years of working experience in hydraulic design including computational flow dynamics (CFD) analysis of hydropower/similar projects of medium/high head projects

(b) **Terms of Reference (TOR):**

Review hydraulic design of the Project structures, Intake, Connecting Pressure conduit Settling basin, spillway, barrage, tunnels, caverns, surge tunnel, pressure shaft, hydro-mechanical/ electro-mechanical equipment structures of the powerhouse and tailrace. The expert will review the Hydraulics Design reports carried out the Consultant including but not limited to the following.

- Review the General layout of diversion dam, cofferdams and appurtenances.
- Review Spillway configuration and its adequacy (from a structural viewpoint only) to handle the design flood.
- Review of the overall Hydraulic design of the scheme.
- Review the Optimization of Hydraulics Structure.
- Review the Transient analysis.
- Review the simulation of Peaking reservoir.
- Review of Spillway and barrage design.
- Review the Dynamic and Static Analysis of Dam.
- Review the dam break analysis.
- Review the Hydraulic analysis of semi pressurized Settling Basin.
- Review the Design report on the basis of TOR for consulting service for the Preparation of Detail Feasibility/Engineering Study of Phukot Karnali PRoR Hydro Electric Project with NEC.

5. Job Title: Structural Expert

(a) Qualification and Experiences:

- Minimum Master's Degree in Civil/Structural Engineering or equivalent.
- Minimum of 15 years of working experience having Int'l experience in structural design including 3D finite element analysis (FEA) linear and non-linear modeling and earthquake engineering analysis during Detailed Engineering study, preferably in hydropower projects.

(b) Terms of Reference (TOR):

Adhering to the Terms of Reference, the tasks of the Structural expert include (but not limited to):

- Review design criteria and project constraints and other available data used for structural design and analysis of various hydropower components.
- Review and compare the results of geotechnical and geological studies with those used in foundation design and other structural design.
- Critically review and suggest about design methodologies and design basis adopted.
- Review critically the structural design calculations, technical and practical aspects of various structural components including Dams, Cofferdams, Spillways, Under sluice, Vertical shaft, Sediment Flushing systems etc.
- Analyse the inputs and outputs of 3D software Model used for Structural Analysis and design.
- Review calculations and analyses related to underground structure design and various support systems and check their adequacy in preventing landslide and other hazards.
- Evaluate whether the results of seismic hazard analysis are incorporated in design of major Structural components to reduce the associated seismic risk.
- Review and comment on Drawings of various abovementioned components and suggest whether these can be readily converted into tender drawings at the later detailed design phase of various abovementioned components.

6. Job Title: EM/HM Expert-Mechanical Engineer:

(a) Qualification and Experiences:

- Master's Degree in Mechanical Engineering or equivalent.
- Minimum of 15 years of experience in hydropower project with Int'l experience as hydro-mechanical/Electro-Mechanical Engineering/expert in hydropower projects.

(b) Terms of Reference (TOR):

- The Expert shall have extensive experience in the design, preparation of specifications and installation of powerhouse, electro-mechanical equipment of similar hydropower projects.
- The Expert will review the choice of generating equipment, namely, turbine, generators, auxiliary equipment, valves, gates, cranes, control equipment. Review of the optimal number of generating, units consistent with the system profile, domestic and export load demands, review the specification of all electrical equipment and review the Electro Mechanical Study Reports and other associated documents carried out by the consultant.
- Review the design of Electromechanical of Phukot Karnali PRoR Hydro Electric Project on the basis of TOR of Consulting service for the Preparation of Detail Feasibility/Engineering Study of Phukot Karnali PRoR Hydro Electric Project with NEC.

7. Job Title: Engineering Geologist:

(a) Qualification and Experiences:

- Minimum of a Master's Degree in Engineering Geology or equivalent
- Minimum of 15 years of working experience with Int'l experience in review of engineering geological mapping, geological investigations, Construction materials, seismic analysis, tunnel design and underground structures during Detailed Engineering study in hydropower projects.

(b) Terms of Reference (TOR):

Main task would be as follows but not limited to:

- Review engineering geological mapping in the Project area.
- Review the regional and local geological characteristics and seismic conditions for all hydraulic infrastructures to be built under the project;
- Evaluate all Field Investigation/s and Laboratory Test/s to review the geological conditions of the Settling Basin, Spillway, barrage, surge tunnel, headrace tunnels, hydropower plants, etc. as well as construction materials of quarries/borrow areas in order to ascertain their properties. Evaluate the adequacy both in quality and quantity of all construction materials.
- Evaluate all Field and Laboratory Investigations to describe the geological conditions and design parameters at and along the extent of the project structures. Review the design of the project structures in so far as they adequately satisfy the engineering geological requirements.
- Review of quality and sufficiency of the geological investigations and the interpretation thereof; correctness of the geological interpretation of the project area, engineering implications with respect to support system, stability of natural and excavated slopes; and support for surface and underground excavations.
- Review the analytical results of construction material sources including results of borehole excavation, laboratory testing, in-situ tests for infrastructures under the project;
- Review the tested results of borrow materials for concrete aggregates for hydraulic infrastructures under the project
- Review in-situ, rock mechanical and laboratory tests results and recommend on the documents detailing the studies conducted.
- Review of the potential landslide areas along the project.
- Review of the seismic analysis and recommended coefficient.
- Review the Geological Report on the basis of TOR of Consulting service for the Preparation of Detail Feasibility/Engineering Study of Phukot Karnali PRoR Hydro Electric Project with NEC.

8. Job Title: Construction Planning Expert

(a) Qualification and Experiences:

- Master's Degree in Engineering/contract management/Construction Planning or equivalent
- Experience as contract expert in large scale projects.
- Minimum 15 years of experience with Int'l experience.

(b) Terms of Reference (TOR):

- Review the Construction Planning and Detail cost estimate of Phukot Karnali PRoR Hydro Electric Project on the basis of TOR of Consulting service for the Preparation of Detail Feasibility/Engineering Study of Phukot Karnali PRoR Hydro Electric Project with NEC.
- Review of project construction schedule, methodology and technology to be adopted.
- Review, Design and maintain all construction technical catalogues and prepare supplier data and interpret all contract plans and specification.
- Review and evaluate projects and recommend various cost savings methods for construction of the project.
- Review the construction planning of Main Civil, Hydro mechanical, Electromechanical, Switchyard and Transmission Line works, Access Road and Transportation Method, Construction Power, Camp Facilities etc.
- Review the contract packages and planning.
- Review the man, material, machine and other data used for the making of construction schedule.
- Review the construction planning of Main civil structures such as Diversion Tunnel, Cofferdam, The Sediment Bypass Tunnel, Main Dam with Spillway, Plunge Pool, Intake Structure, Powerhouse for Environment Release D/S of Dam, The Valve Chamber, Surge Tunnels, Adit Tunnel, Upper Horizontal Penstock Tunnel, Vertical Shaft, Lower Horizontal Penstock Tunnel, Manifold, Powerhouse, The Gate Chamber, The Busbar Tunnel. The Tailrace Tunnel after D/S Surge Chamber, The Tailrace Tunnel Outlets and appurtenances structures. etc

9. Job Title: Hydropower Planning/ Project Cost Estimate

(a) Qualification and Experiences:

- M.Sc. or higher Degree in civil/water resources/hydropower Engineering or equivalent.
- Minimum of 15 years of working experience and having Int'l experience in hydropower projects during feasibility study and/or detailed engineering design.

(b) Terms of Reference (TOR):

- Review the overall layout, design criteria and parameters, specifications of the Project structures, Intake, Connecting Pressure conduit Settling basin, spillway, barrage, tunnels, caverns, surge tunnel, pressure shaft, hydro mechanical/electromechanical equipment of the powerhouse and tailrace.
- Review the Hydropower Planning and Detail cost estimate on the basis of TOR of Consulting service for the Preparation of Detail Feasibility/Engineering Study of PKHEP with NEC.
- Review the General layout of diversion dam, cofferdams and appurtenances.
- Review Spillway configuration and its adequacy (from a structural viewpoint only) to handle the design flood
- Review the energy calculation
- Review of the Project Cost

10. Job Title: Financial/Economical Expert

(a) Qualification and Experiences:

- Master degree in Finance or Engineering Economics or Chartered Accountancy.
- Minimum 15 years of experience in relevant professional field.
- Having worked as a Financial Analyst for minimum of Five years, producing indices from various "data collection and analysis" in Hydropower Projects.

(b) Terms of Reference (TOR):

- Review the Financial and Economical Evaluation on the basis of TOR of Consulting service for the Preparation of Detail Feasibility/Engineering Study of Phukot Karnali PRoR Hydro Electric Project with NEC.
- Review the project cost benefit analysis.
- Review the sensitivity analysis; revenue and cost sensitivity, project cost overrun, interest rate sensitivity
- Review the financial evaluation result by checking the financial indicators.

Interested eligible and competent experts/specialists may obtain further information from NEC Website; www.neaec.com.np

Interested experts/specialists must submit their Curriculum Vitae along with the Expected Remuneration and facilities (hourly/daily/weekly/monthly) and other conditions of engagement to perform the services within 15 days from the first published date by E-mail or hard copy. The notice deadline may be rolled over automatically as per company need.

Address:

2nd floor of Trade Tower Building, Thapathali; Kathmandu.

Mail: hr@neaec.com.np

Website: www.neaec.com.np, Phone: 01-5111024/25

Application Form for Consultant

1	Name of Expert	
2	Expert Position	
3	Qualification	
4	Total Experience No of Years	
5	Relevant Experience no of years	
6	Remuneration expected: Per hour or day or month (a day = 8 hours, and a month = 176 hours) inclusive of all taxes applicable	
7	Other terms and conditions (if applicable)	
8	Allowance if needed for site visit	
9	Transportation costs (if applicable)	
10	Negotiable rate (Yes/No)	
11	PAN or VAT no	
12	Contact mobile no.	
13	Contact email address	
14	NEC Membership No. or Equivalent	

Note: Please Scan and submit NEC membership Certificate or Equivalent¸ Education certificate copy with Highest Degree, Experience Certificates and Training Certificates.