

# BHARAT HEAVY ELECTRICALS LIMITED

## TRANSMISSION PROJECTS ENGINEERING MANAGEMENT



DOCUMENT No.	TB-317-316-034	Rev. No.	00	Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECIFICATION			NAME	NK/ VK	DKM RS
TITLE ALUMINIUM CHANNEL LADDER	SIGN					
	DATE			16.05.13	17.05.13	28/5
	GROUP			TBEM	W.O. No	87011 & 87012
CUSTOMER	NHPC LIMITED, Faridabad					
PROJECT	(1) 66KV SWITCHYARD - NIMOO-BAZGO HEP, LEH, J&K (2) 66KV SWITCHYARD- CHUTAK HEP, KARGIL, J&K (3) 220KV SWITCHYARD- TEESTA LD, WEST BENGAL (4) 400KV SWITCHYARD- PARBATIII, H.P.					

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## SECTION – I

### SCOPE, SPECIFIC TECHNICAL REQUIREMENT AND QUANTITIES

#### 1.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and dispatch of Aluminium Channel ladder.

The equipment is required for the following project.

Name of the customer : NHPC Limited, Faridabad

Name of the Projects : 1) 66kV Switchyard- Nimoo-Bazgo HEP, J&K  
2) 66kV Switchyard- Chutak HEP, J&K  
3) 220kV Switchyard- Teesta Low Dam, West Bengal  
4) 400kV Switchyard- Parbati-III, H.P.

#### 1.1 SPECIFIC TECHNICAL REQUIREMENT

Material: Aluminium

Working Height: 8.5M/10.5 M (As per BOQ)

Platform: Yes. Suitable for two persons with tools

Wheels: Yes. The ground level/surface of switchyard is filled with 40mm dia gravel. Wheels shall be able to move on this type of surface. Diameter of Wheels shall be mentioned in the bid.

Other: i) Built in ladder with flat skid resistant treads & grab rails  
ii) Ladders are required to access equipments terminals or various other electrical points in switchyard for maintenance/operation purpose.

#### 1.2 BILL OF QUANTITY

SN	Description	Nimoo-Bazgo	Chutak	Teesta	Parbati-III	Total Qty
1.	Telescopic Aluminium Channel ladder with wheels and platform suitable for two persons with tools (Working height = 8.5M)	2 Nos.	2 Nos.	-	2 Nos.	6 Nos.

PROJECTS: NIMOO-BAZGO, CHUTAK, TEESTA LD, PARBATI-III

EQUIPMENT: Aluminium Channel Ladder

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2.	Telescopic Aluminium Channel ladder with wheels and platform suitable for two persons with tools (Working height = 10.5M)	-	-	2 Nos.	-	2 Nos.
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### 1.3 APPLICABLE STANDARD

IS 4571 or equivalent national/international standard. All Aluminium raw material used (Alloy & temper) conforming to IS: 733 (Latest).

### 1.4 EXPERIENCE

The manufacturer should have manufactured, type tested and supplied similar size of equipments during last ten (10) years. The equipment should have been supplied at least at three power stations/substations.

Bidder shall submit the following documents with the offer:

- i) Catalogue
- ii) Technical datasheet
- iii) Drawing
- iv) Working instruction
- v) Test report
- vi) Past 10 years supply list of similar equipments
- vii) Certificates from end users.

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PROJECT: (1) 66 KV SWITCHYRAD FOR NIMOO-BAZGO HE PROJECT, J&K  
 (2) 66 KV SWITCHYARD FOR CHUTAK HE PROJECT, J&K

**SECTION - 2**  
**GENERAL PROJECT INFORMATION**

**3.0 GENERAL:**

The provision under this section is intended to supplement general requirements for the materials, equipment and services covered under other sections.

**3.1 PROJECT INFORMATION AND SYSTEM PARAMETERS**

**3.1.1 NIMOObAZGO**

a) Customer: NHPC Limited, Faridabad

b) Project: 3x15 MW Nimoo-Bazgo (Alchi) HEP, LEH, J&K

c) Location:

Nimoo-Bazgo HE Project is located near Alchi village (Pondage on river Indus) in Leh district of Jammu & Kashmir.

d) Road head:

All whether road exists up to village Alchi from Leh-Srinagar road. It is 70 km from Leh which is 440 km from Srinagar and 475 km from Manali. Although both roads are closed during winter season from December to March due to heavy snowfall and landslides.

e) Railhead:

Nearest railhaed is Jammu/Kiratpur, which is about 740 km from Leh.

The following system parameters shall prevail:

Nominal system voltage	132 kV
Highest system voltage	145 kV
Frequency	50 Hz
Rated short time current	31.5 kA for 1 sec
Dry and wet one minute power frequency withstand voltage	275 kV
Dry and wet impulse withstand voltage positive and negative	650 kVp
Minimum total creepage	3625 mm
System Earthing	Effectively Earthed

f) Ambient Temperature

- i. Ambient air temp. (max.) : 40 deg C
- ii. Ambient air temp. (min.) : (-)30 deg C
- iii. Design ambient temp. : 40 deg C

g) Altitude: L 3093.0 m

h) Wind speed: 39 m/s

i) Seismic Coefficient: 0.18 g for design & Max 0.36 g (lies in Zone IV)

j) Average Annual rainfall: Up to 264 mm

k) Ice Loading: 25 mm

PROJECT: (1) 66 KV SWITCHYARD FOR NIMOO-BAZGO HE PROJECT, J&K  
 (2) 66 KV SWITCHYARD FOR CHUTAK HE PROJECT, J&K

### 3.1.2 CHUTAK

- a) Customer: NHPC Limited, Faridabad  
 b) Project: 4x11 MW CHUTAK HEP, KARGIL, J&K

c) Location:  
 Chutak HE Project is located in Kargil district of Ladakh region. Kargil is located at a distance of 205 Km from Srinagar on Srinagar-Leh road. The nearest railhead is located at Jammu, which is about 500 Km away from Kargil. In Ladakh region, civil airport is available at Leh, which is connected to Delhi, Srinagar, Jammu & Chandigarh by air.

d) Road access to the Project Area:  
 Jammu being the nearest railhead, transportation of equipments and materials to project site has been proposed by road from jammu to kargil via Srinagar. Jammu-Srinagar road is National highway (NH-1A) and Srinagar-Kargil road is State highway maintained by BRO.

The road from Srinagar to kargil remains open for approximately 5-6 months i.e. May/ June to November in a year and for rest of the period of the year the road remains blocked due to heavy snowfall. During the aforesaid road opening period, one day in a week the road is kept closed for routine maintenance. Kargil is also approachable by road from manali via Leh. The distance from manali to Leh is approximately 475 Km and from Leh to Kargil is 230 Km. This approach road also remains open for 5-6 months in a year. During the period of road closure i.e. November/December to May/June the available approach to Kargil is by air upto Leh and from Leh to kargil by road.

e) Physiography

Suru river joins the Indus river beyond the LOC just down stream of Kargil town. This is one of the major tributeries of Indus and is bounded by Ladakh range on the north and by great Himalayan range on the south. Suru river drains Kargil area with its main tributeries as Chelong, Kochik, Wakha and Kanji nallah. River Suru rises at an altitude of about EL 4500 m at a place called Tutso-Lancho Tso, near Pensilla. The river has a fall of about EL 1920 m from its origin to confluence with the river Indus in a stretch of about 140 Km. The river has thus an average bed slope of 1 in 74. Steep reaches as well as placid reaches exist in the total traverse of 140 Km.

The following system parameters shall prevail:

Nominal system voltage	132 kV
Highest system voltage	145 kV
Frequency	50 Hz
Rated short time current	31.5 kA for 1 sec
Dry and wet one minute power frequency withstand voltage	275 kV
Dry and wet impulse withstand voltage positive and negative	650 kVp
Minimum total creepage	3625 mm
System Earthing	Effectively Earthed

f) Ambient Temperature

- i. Ambient air temp. (max.) : 42 deg C  
 ii. Ambient air temp. (min.) : (-)26 deg C  
 iii. Design ambient temp. : 42 deg C

g) Altitude: L 2710.0 m

PROJECT: (1) 66 KV SWITCHYARD FOR NIMOO-BAZGO HE PROJECT, J&K  
(2) 66 KV SWITCHYARD FOR CHUTAK HE PROJECT, J&K

- h) Wind speed: 39 m/s
- i) Seismic Coefficient: 0.18 g for design & Max 0.36 g (lies in Zone IV)
- j) Average Annual rainfall: Up to 264 mm
- k) Ice Loading: 25 mm

### **3.2 GENERAL REQUIREMENT**

- 3.2.1 The bidders shall furnish catalogues, engineering data, technical information, design documents, drawings etc., fully in conformity with the technical specification.
- 3.2.2 It is recognised that the bidder may have standardised on the use of certain components, materials, processes or procedures different than those specified herein. Alternate proposals offering similar equipment based on the manufacturer's standard practice will also be considered provided such proposals meet the specified designs, standard and performance requirements and are acceptable to the Purchaser. Unless brought out clearly, the Bidder shall be deemed to conform to this specification scrupulously. All deviations from the specification shall be clearly brought out in the respective schedule of deviations. Any discrepancy between the specification and the catalogues or the bid, if not clearly brought out in the schedule, will not be considered as valid deviation.
- 3.2.3 Except for lighting fixtures, wherever a material or article is specified or defined by the name of a particular brand, Manufacturer or Vendor, the specific name mentioned shall be understood as establishing type, function and quality and not as limiting competition.
- 3.2.4 Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/ or needed for erection, completion and safe operation of the equipment as required by applicable codes, though they may not have been specifically detailed in the Technical Specifications unless included in the list of exclusions. Materials and components not specifically stated in the specification but which are necessary for commissioning and satisfactory operation of the switchyard unless specifically excluded shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost. All similar standard components/parts of similar standard equipment under supply shall be inter-changeable with one another.

### **3.3 STANDARDS**

- 3.3.1 The works covered by the specification shall be designed, engineered, manufactured, built, tested and commissioned in accordance with the Acts, Rules, Laws and Regulations of India.
- 3.3.2 The equipment to be furnished under this specification shall conform to latest issue (with all amendments) of specified standards, unless specifically mentioned in the specification.
- 3.3.3 The Bidder shall note that standards mentioned in the specification are not mutually exclusive or complete in themselves, but intended to compliment each other.
- 3.3.4 The Contractor shall also note that list of standards presented in this specification is not complete. Whenever necessary the list of standards shall be considered in conjunction with specific IS/IEC.
- 3.3.5 When the specific requirements stipulated in the specifications exceed or differ from those required by the applicable standards, the stipulation of the specification shall take precedence.

### **3.4 SERVICES TO BE PERFORMED BY THE EQUIPMENT BEING FURNISHED**

- 3.4.1 All equipment shall also perform satisfactorily under various other electrical, electromechanical and meteorological conditions of the site of installation.

PROJECT: (1) 66 KV SWITCHYRAD FOR NIMOO-BAZGO HE PROJECT, J&K  
(2) 66 KV SWITCHYARD FOR CHUTAK HE PROJECT, J&K

3.4.2 All equipment shall be able to withstand all external and internal mechanical, thermal and electromechanical forces due to various factors like wind load, temperature variation, ice & snow, (wherever applicable) short circuit etc for the equipment.

### 3.5 ENGINEERING DATA & DRAWINGS

3.5.1 The engineering data shall be furnished by the bidder in accordance with the Schedule for each set of equipment as specified in the Technical Specification.

3.5.2 The list of drawings/documents, which are to be submitted to the purchaser, shall be discussed and finalised by the purchaser at the time of award.

The bidder shall necessarily submit all the drawings/documents unless any thing is waived. The bidder shall submit 7 (Seven) sets of drawings/ design documents/ data/ test reports as may be required for the approval of purchaser.

**All documents/drawings shall be made and furnished to us for Customer / Consultant's approval following the Title Block appended to this Specification. Any documents / drawings made WITHOUT this Title Block shall be REJECTED straight away by the Consultant / Customer and delay because of this account shall be of Bidder / Supplier's responsibility.**

### 3.6 PACKAGING & PROTECTION

#### 3.6.1 GENERAL:

All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling upto Mumbai Port. On request of the Owner / Purchaser, the supplier shall also submit packing details/associated drawing for any equipment/material under his scope of supply, to facilitate the Purchaser to repack any equipment/material at a later date, in case the need arises. While packing all the materials, the limitation from the point of view of availability of Railway wagon sizes in India should be taken into account. The supplier shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the supplier. The purchaser takes no responsibility of the availability of the wagons.

#### 3.6.2 PACKING LIST:

Contents of each shipping package shall be itemized on a detailed list showing the exact weight, overall dimensions, length, width, and height of each Container. If all Containers are uniform in size and weight, the dimensions and weight of only one may be shown. One copy of the detailed packing list shall be enclosed in each package delivered. There shall also be enclosed in one package a master packing list summarizing and identifying each individual package which is a part of the shipment. The box number in which the master packing list is contained should be shown on each packing list.

On barrels, bags, drums, or kegs where it is not feasible to place the packing list inside the Container, all pertinent Information is to be stenciled on the outside and this will thus constitute a packing list.

#### 3.6.3 SHIPPING ADVICE:

It may be noted that all material have to be transported to J&K Region via tough road/terrain having hard physical condition as given in clause no. 3.1 (c), (d) & (e).

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### SECTION - 3

#### GENERAL PROJECT INFORMATION

#### 3.0 INTRODUCTION

4 x 40 MW Teesta Low Dam Hydroelectric power plant, Stage-IV is located in district Darjeeling of West Bengal. As a part of the project, 220 kV Switchyard is being carried out.

#### 3.1 PROJECT INFORMATION

SL. NO	DESCRIPTION	
a)	Customer	NATIONAL HYDRO ELECTRIC POWER CORPORATION LIMITED (NHPC)
b)	Project	4 x 40 MW Teesta Low Dam Hydro Project (Stage - IV)
c)	Project locations	At about 350m upstream of Teesta-Kalikhola confluence on National Highway (NH-31A), which connects the state of Sikkim with the rest of the country via. Siliguri.
d)	Nearest Airport	Bagdogra, which is about 48km from the project site
e)	Nearest Railway station/Gauge Distance from Railway Station	The nearest broad guage railway head is New-Jalpaiguri which is 35 km from the project site.
f)	Road Approach	The principal access road to the site is 7 km stretch of New Jalpaiguri-Siliguri, 22 Km stretch of Siliguri-Sevok National Highway NH-31 and 6 Km stretch of Sevok-Kalijhora National Highway NH-31A. The road to the project site being a National Highway is an all weather road and is in good condition. The right bank of the project site can be approached from NH-31A either from an existing kuccha road starting off from around 1.0 Km upstream of Dam Axis or from Kalikhola Bridge near PWD Bungalow for construction of temporary and permanent works. The left bank area (where switchyard is proposed) shall be approached by Bailey Bridges on diversion channel after Stage-I diversion.
	Inner line permit/pass	Inner line permit/pass are required in the state at present. The same shall be arranged by contractor on his own cost.
	Transport Limit	Transportation of the construction material/equipment will be made via the NH-31/NH-31A. This road is being upgraded by the BRO for NH-31A and by PWD for NH-31. Obstruction due to upgraded activities and landslides are not ruled out. The contractor must appraise the situation and plan suitably the transportation of all material/machinery required for execution of work. The bridges on the road from Siliguri to project site are of class 18 to class 70

		loading. No claim shall be accepted for delays due to any obstruction along any part of the entire rout to site. Contractor must find out alternate route for transportation of heavy consignment if required by them. The contractor shall not pass any equipment and/or vehicle exceeding the rated capacity of the bridges en-route without prior written permission of the Engineer-In-Charge and BRO/PWD. The contractor shall not contravene such stipulation. For the contravene or violation of the requirement the contractor shall be solely responsible and the contractor shall indemnify and keep the corporation harmless from and against such liabilities.
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### 3.2 SITE CONDITIONS

SL. NO	DESCRIPTION	
i.	Altitude	About 215 m above mean sea level.
ii.	Seismic Zone	Zone – IV as per Indian standard IS:1893 (Current Issue). Value of peak ground acceleration has been recommended as 0.44g for Max Credible Earthquake (MCE) and 0.22g for Design Basis Earthquake (DBE)
iii.	Rainfall (Average annual rainfall)	The average annual rainfall in the entire Teesta basin is 1328 mm, 2619 mm & 3289 mm for the upper, middle and lower parts respectively. The catchment area at proposed dam site of TLDP-IV extends upto lower portion.
iv.	AMBIENT AIR TEMPERATURE (a) Max. temp (b) Min. temp	37 °C 8 °C
v.	RELATIVE HUMIDITY (a) Maximum (b) Minimum	95 % 40 %
vi.	Temperature zone	Humid tropical zone

Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the above tropical conditions.

**SECTION - 4**

**GENERAL PROJECT INFORMATION**

**4.0 GENERAL**

This section stipulates the General Technical Requirements under the Contract and will form an integral part of the Technical Specification.

The provisions under this section are intended to supplement general requirements for the materials, equipments and services covered under other sections and are not exclusive. However in case of conflict between the requirements specified in this section and requirements specified under other sections, the requirements specified under respective sections shall hold good.

**4.1 SITE INFORMATION**

	Particular																				
a)	Customer/ Owner	NHPC LIMITED																			
b)	Purchaser	Bharat Heavy Electricals Limited																			
c)	Project Title	Parbati Hydroelectric Project Stage-III(H.P.) India																			
d)	Location	Located in Kullu District of Himachal Pradesh. Project Headquarter is proposed at Sainj which is about 258 kM from Chandigarh on Chandigarh-Manali National Highway NH-21.																			
e)	Transport Facilities	<p>The nearest broad gauge railhead is at Kiratpur, which is 190 kM away. The nearest Airport is located at Bhuntar. The approximate distance of Sainj (Project Headquarter) from different important towns is as follows:</p> <table> <tr> <td>From Bhuntar(Airport)</td> <td>36 kM</td> </tr> <tr> <td>From Delhi</td> <td>508 kM</td> </tr> <tr> <td>From Chandigarh</td> <td>258 kM</td> </tr> <tr> <td>From Kiratpur</td> <td>190 kM</td> </tr> <tr> <td>From Shimla</td> <td>208 kM</td> </tr> </table> <p>Parbati H.E.Project, Stage-III is connected by 172 kMs long National Highway(NH-21) from nearest broad gauge railhead Kiratpur sahib upto Aut and thereafter by the existing 3/5 M wide state PWD road 21 kMs in length upto dam proposed at village Suind and other components of the project.</p> <p>The maximum permitted size of bulkiest package for transportation upto project site is as under:</p> <table> <tr> <td>Length</td> <td>-</td> <td>6.0 M</td> </tr> <tr> <td>Width</td> <td>-</td> <td>4.5 M</td> </tr> <tr> <td>Height (including trailer bed</td> <td>-</td> <td>5.5 M</td> </tr> </table> <p>Height above ground)</p>	From Bhuntar(Airport)	36 kM	From Delhi	508 kM	From Chandigarh	258 kM	From Kiratpur	190 kM	From Shimla	208 kM	Length	-	6.0 M	Width	-	4.5 M	Height (including trailer bed	-	5.5 M
From Bhuntar(Airport)	36 kM																				
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From Kiratpur	190 kM																				
From Shimla	208 kM																				
Length	-	6.0 M																			
Width	-	4.5 M																			
Height (including trailer bed	-	5.5 M																			
f)	Postal Address	To follow																			
<b>SITE CONDITIONS</b>																					

a)	Mean Max. Ambient air temp.	46°C
b)	Mean Min. ambient air temp.	-4°C
c)	Design Ambient Temperature	50°C
d)	Maximum Relative Humidity	98.8%
e)	Minimum Relative Humidity	4.40%
f)	Maximum height above sea level	1000 M for GIS and 1087 for Potyard
g)	Pollution Severity	Heavily Polluted (Creepage 25 mm/kV)
h)	Basic horizontal Seismic Co-efficient	Zone V Peak ground acceleration 0.36g for Maximum Credible Earthquake(MCE) and 0.18g for Design Basis Earthquake(DBE)
i)	Average number of thunder strom days per annum	
j)	Average Soil resistivity	
k)	Average rainfall	
l)	Maximum wind speed	
m)	Prevailing Wind Direction	