DETAILED PROJECT REPORT

North Karanpura Transco Limited

IMMEDIATE EVACUATION FOR NORTH KARANPURA (3X660MW) GENERATION PROJECT OF NTPC ALONG WITH CREATION OF 400/220KV SUB-STATION AT DHANBAD (ERSS-XIX)

Doc No. FCE-1116122-EL-DOC-RPT-2900-001, Rev.1

July'2019

Table of Contents

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

1. PROJECT DETAILS

1.1 Introduction

With the introduction of Electricity act 2003, competition was brought into power sector and its sub sectors. Power generation business was delicensed which led to huge capacity addition by the private sector and this warranted transmission network to be reinforced so that all the power generated could be supplied to the end users. The provision for independent transmission licenses were created for private sector to get in to the business.

The Government of India, Ministry of Power, vide Gazette Notification dated July 08, 2014 has notified REC Transmission Project Company Ltd. to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Transmission System for “Immediate Evacuation for North Karanpura (3X660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)” through tariff based competitive bidding process.

The BPC invited Bids for selection of Transmission Service Provider to establish the Transmission System for “Immediate Evacuation for North Karanpura (3X660MW) generation project of NTPC along with creation of 400/220kV Substation at Dhanbad (ERSS-XIX)” (hereinafter referred to as 'Project’) on Build, Own, Operate and Maintain basis, and to provide transmission service on a long term basis to the Long Term Transmission Customers.

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

1.2 Project Scope

Project scope will include:

Sr. No.	Scheme/ Transmission Works	Completion Target
IMMEDIATE EVACUATION FOR NORTH KARANPURA (3X660MW) GENERATION PROJECT OF NTPC		
1	North Karanpura – Gaya 400kV D/C line with quad moose conductor	23 Months
2	North Karanpura – Chandwa (Jharkhand) Pooling Station 400kV D/c line with quad moose conductor	14 Months
Creation of 400/220kV Substation at Dhanbad (ERSS-XIX)		
3	Establishment of 400/220 kV, 2x500 MVA sub-station at Dhanbad **400 kV** • ICTs: 400/220 kV, 2x500 MVA • ICTs bays: 2 no. • Line bays: 4 no. • 400 kV bus reactor bays: 2 no. • Bus reactor: 2x125 MVAR • Space for future bays: 4 no • Space for future 400/220 kV, 500 MVA ICT along with associated bay **220 kV** • ICTs bays: 2 no. • Line bays: 4 no. • Space for future bays: 4 no	18 Months
4	LILO of both circuits of Ranchi – Maithon-RB 400kV D/c line at Dhanbad (Twin Moose)	18 Months

***The Project Effective date for above time lines 01-May-2019**
Both 400kV D/C North Karanpura Chandwa and North Karanpura Gaya Lines will be on multi circuit towers up to common point at Angle point number AP/19.

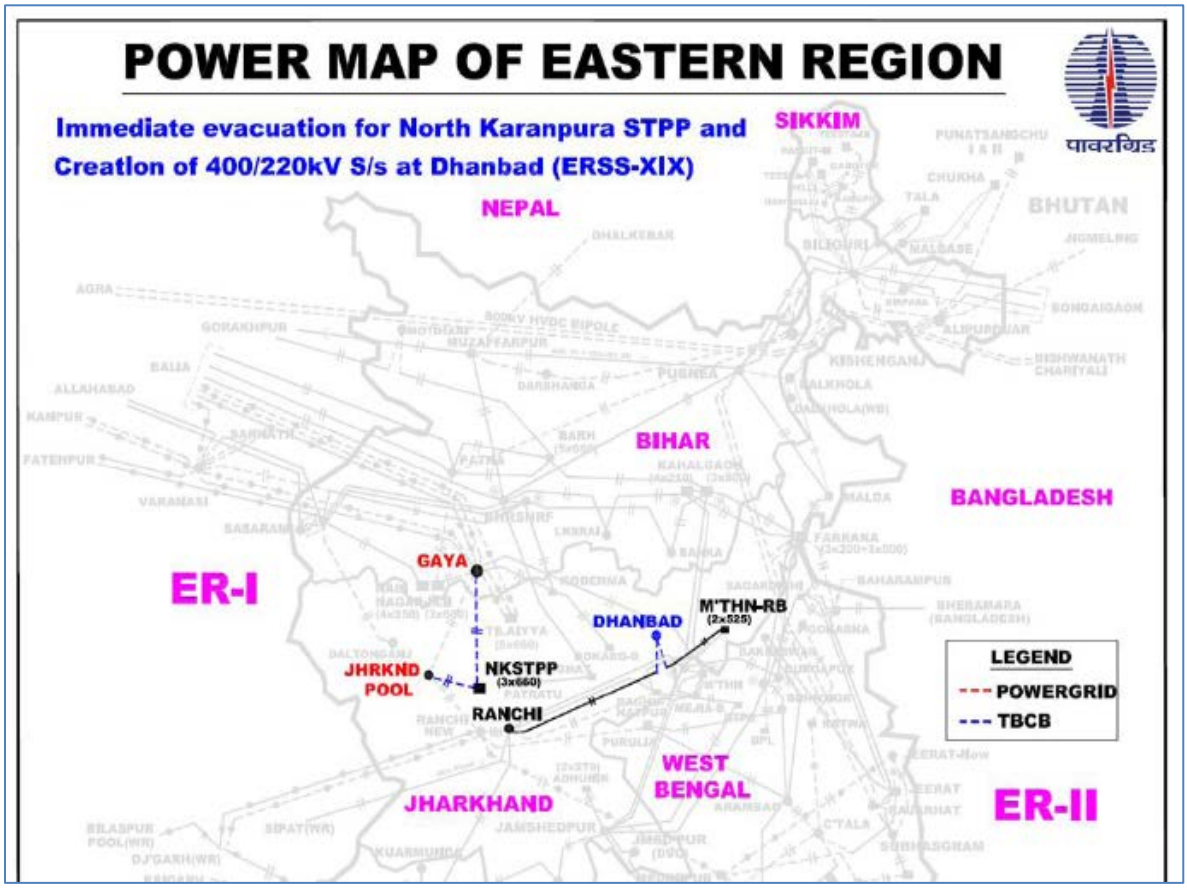
Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

1.3 Technical Specification

The technical requirements of this project has been brought out under the section ''Technical specification'' in the Request for Proposal (RFP) by BPC which has been evolved from the CEA technical standards and CTU practices. NKTL is mandated to adhere to these requirements during design, engineering and execution.

1.4 Location of the Project:

The project is in Jharkhand State. Locations of projects are shown in the sketch furnished below:



2. METHODOLOGY/ PHILOSOPHY OF ROUTE SELECTION

In order to execute such transmission system, precise planning, costing, scheduling etc. were required. Optimum deployment of resources also was of prime target in implementing this

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

transmission system. It is essential that at the planning stage itself various alternative routes and technical solutions for transmission lines be examined in detail.

For undertaking such studies, one of the major requirements is obtaining adequate information regarding physical constrains, environmental factors etc. along the route so that optimum solutions are identified. Subsequently, during implementation of the project, it is required to obtain elaborate details about terrain, soil conditions, constraints etc. of the route for proper resource planning, costing etc. as well as reduction in implementation time.

Presently, conventional methods of survey like walk over survey, preliminary survey and detailed survey are carried out at various stages from conceptualization of the project to implementation, which are time consuming tasks. There are new means available which is used to conduct route survey using Google, DGPS based survey etc.

Following are the major factors taken into account while deciding the line route of the projects as per provisions of the acts and rules –

a. Major habitation and Settlement area avoided.
b. Wild Life Sanctuary's , Biosphere's, Dense forest avoided
c. Minimum Vegetation / tree cutting in the route of line
d. Minimum no. of River Crossings, Railway Crossings, Highway Crossings, Power Line Crossings are considered.
e. Lowest minimum forest area demand in the proposed route
f. Archeological Structures, defense sites, airport area etc. are avoided
g. Accessibility of approach road to the project site.
h. Rich gardens, plantations, notified industrial area, etc. to be avoided
i. Economic viability of the route

2.1 Preliminary & Route Alignment Survey

Preliminary Survey included the following steps:

- Map study
- Walkover survey

Route survey was carried out for following benefits:

- To select optimal route from the alternatives for ease of construction followed by O&M with economy.

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

- Maintenance & additional construction cost can be brought to the minimum.
- Material Estimation and procurement can be done fairly on realistic basis. Limited Reserve/Protected/Private Forest Area.
- Proper planning can be done for networks keeping provision for future routes etc.
- Approvals from Railways, Civil Aviation, Forest authorities etc. can be obtained faster.
- Preparation of Master Network and fixing construction/erection targets can be done on realistic basis, which will help in the judicious planning of materials flow, cash flow and manpower requirements.
- Appreciable time can be saved during construction & maintenance of roads, if selection of Rivers, route along hill sections and power line etc., are properly made.

2.2 Map Study

After drawing various routes of alignment network within the topo maps, a comparative study was made on the basis of the following data:

- Route length.
- Nos. and type of important road points in each indicating alignment of each road as measured on the map.
- Nature and number of major crossings.
- Mapping the industrial installations, structures, and important places for identification of Roads.
- Approach to the line in general for construction & maintenance.
- Reaches through protected or Reserved Forests
- Continuously long stretches in paddy fields.
- Close parallelism with Railway lines.
- Restricted areas such as civil and military airfield are avoided.
- Aircraft landing approaches are avoided.

Walkover Survey was carried out going over the area associated with the routes and collecting features observed other than those existing on the map. In addition the indications on following features are also checked.

- Communication lines
- Accessibility and smoother approach.
- Logistics of the route.
- Economic viability of the route.
- Existing and Present course of River

- Power lines (existing)
- Expanding villages and towns
- Rich gardens and plantations
- Reserved forests and high tree areas
- National Parks & Wild life sanctuaries
- Archeological monuments
- Aerodromes, radar centers etc.
- Steep sloping terrain, Areas prone to landslides, soil instability etc.
- Prohibited areas declared under statutory regulations

2.3 Route survey techniques

Three (3) alternate route alignments were carried out by help of satellite images available in google map. Physical walk over survey was conducted on all the three routes and GPS coordinates were collected at every 100 meters along with soil strata. Based on the information so collected, the best route was selected after evaluation of factors like, minimum forest coverage, angle points, river crossing, power line crossing, habitation etc.

The Infrastructural Details along the Routes are as follows:

Name of Proposed Transmission Line	:	400 kV D/C (Quad Moose) North Karanpura–Gaya Transmission Line (Jharkhand Portion)
District	:	Latehar (Jharkhand), Chatra (Jharkhand),
Total No. Angle Points	:	Jharkhand Portion 78 Nos (From common point AP/19 to AP/92) Total: 78 Nos
Total Route Length	:	Jharkhand Portion= 69.74 km. (From common point AP/19 to AP/92)
Terminal Points		Gantry North Karanpura : E : 298128 N : 2639035 Gantry Gaya: E : 292646

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

		N : 2725070	
Major Crossings along the route :			
Total H.T. Line	:	Total = 3 Nos 220 kV (1Nos.) and 400 kV (2nos.)	
Total Railway Line	:	01 Nos.	
National Highway (NH)	:	02 Nos	
State Highway (SH)	:	Nil	
River Crossing	:	Major River :	Nil
	:	Minor River:	Nil
Forest /Sanctuary	:	42.828 Kms (PF & Jungle Jhari)	
Towns, Cities & villages along the route	:	The route alignment is avoiding towns/ inhabitants	
Minerals in the route corridor		Nil	
Type of Crops, Fruits, Forest Land, Hill are along the route	:	a) Crops	Rice, Arahar, Maize, Sugarcane and Wheat etc.
		b) Soil	Normal Dry, Wet, Wet Paddy, Wet, PS, FS, DFR & Hard Rock. Soil Investigation report shall be furnished on later date
		c) land	Plain (92%)
		d) Hill	HILL (8%)
Land involvement	:		Combination of Sparse Open Scrub, Govt. Land, Forest Land, barren and agriculture land
Climate	:	Seasons	Summer= March to June, Rain = July to September, Winter = October to February
		a) Maximum Temperature	46°C
		b) Minimum Temperature	19°C

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

Specific features	:	This alternative route-1 Central Coalfields limited (CCL) and Ministry of Coal (MOC) has issued NOC for route-1 minimum coal blockage Hence, Route-1 is the only option for the project

2.4 Legal Frame Work

It is proposed to execute the above entire transmission system as per provisions contained in the Indian Electricity Act 2003 and the rules made there under and the Electricity (Supply) Act 1910 and 1948, so far as these are applicable.

The following regulatory and Government approval will be taken. :-

- Transmission License from Central Regulatory Electricity Commission (CERC)
- Approval of under section 68 of Indian Electricity Act 2003.
- Approval of under section 164 of Indian Electricity Act 2003.
- Tariff Adoption from CERC.

3. ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Forest involvement / Clearance

As per the practice, preliminary route selection is done based on such documents as the Forest Atlas and the survey of India maps using “bee” line method followed by field clarification through walk over survey. All possible steps are taken to avoid the route alignment through forest. In case where it becomes unavoidable due to the geography of terrain, the alignment is made in such a way that the route through the forest is the barest minimum.

3.1.1 For selection of optimum routes following points are taken into consideration

- The route of the transmission line does not involve any human rehabilitation.
- Any monument of culture or historical importance is not getting affected.
- The route does not create any threat to the survival of any community with special reference to tribal.
- It does not affect any Public Utility Services like Play Ground, School, other Establishment, etc.
- It does not pass through any sanctuaries, Nation Park etc. if any alternative route is feasible.
- It does not infringe with areas of natural resources.
- Away from major towns to account for future urban expansion

In case where it becomes unavoidable due to the geography of terrain, the alignment is made in such a way that the bare minimum line route through forest is selected.

Name of Transmission line	Forest – Involvement (Approx. length in km)
400 kV D/C North Karanpura – Gaya Transmission Line (Jharkhand Portion)	42.828 Kms

3.2 Environmental Problems Due to Design

i) Escape of polluting materials

The equipment installed on lines are static in nature and do not generate any fumes or waste materials.

ii) Explosion/fire hazards

During the survey and site selection for transmission lines, it has been ensured that these are kept away from oil/gas pipelines and other sites with potential for creating explosions or fires. Fires due to flashover from lines can be a more serious problem in deciduous forest.

iii) Erosion hazards due to inadequate provision for resurfacing of exposed area

Topsoil disturbed during the development of sites will be used to restore the surface of the platform. Infertile and rocky material will be dumped at carefully selected dumping areas and used as fill for tower foundations.

iv) Noise/vibration nuisances

Due to transmission line, minor impacts associated with corona generated audible noise, but is expected to be less. The increased noise level at the edge of the right-of-way may be discernible or audible during wet-weather conditions, although line noise would most often be masked by naturally occurring sounds at locations beyond the right-of-way, and would not be significant.

4. PROJECT COST

The total project cost including taxes and duties works out to INR **167** crores.

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi

5. APPROVALS AND CLEARANCES

Following approvals and clearances need to be obtained from the various authorities at the different stages of the project. Close follow up will be exercised for the timely approval of the below items.

Sl. No.	Statutory Clearances	Concerned Authority
A	**Required prior to construction**	
1	Approval Under section 68 of E.A 2003	MoP
2	Approval Under section 164 of E.A 2003	CEA
3	Transmission License	CERC
4	Tariff Adoption	CERC
B	**Required during/after construction**	
5	Forest Approval	MoEF
6	Aviation	AAI
7	PTCC clearance	PTCC
8	Power Line Crossing	Concern Utility
9	Railway Crossing	Railway Authority
10	National Highway Crossing	NHAI
11	Final Charging Clearance approval	CEA

Chandra Shekhar Singh
Assistant Manager
North Karanpura Transco Limited
Ranchi