FINAL ENVIRONMENT ASSESSMENT REPORT [FEAR]
FOR
SYSTEM STRENGTHENING IN SOUTHERN AND WESTERN REGION FOR KRISHNAPATNAM UMPP

ENVIRONMENT AND SOCIAL MANAGEMENT DEPTT.
POWER GRID CORPORATION OF INDIA LTD.
(A GOVERNMENT OF INDIA ENTERPRISE)
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SECTION I: PROJECT DESCRIPTION

1.0 BACKGROUND:

POWERGRID, the Central Transmission Utility (CTU) of the country is engaged in power transmission with the mandate for planning, co-ordination, supervision and control over complete Inter-State transmission system. As on 30th April 2015, POWERGRID has established about 1,16,117 Ckt kms of transmission lines at 765 kV, 400 kV, 220 kV & 132 KV EHVAC & +500 KV HVDC levels and 193 sub-stations with transformation capacity of about 2,33,209 MVA. This transmission network, spread over length and breadth of the country, is consistently maintained at an availability of over 99% through deployment of state-of-the-art Operation & Maintenance techniques at par with global standards. About 50% of total power generated in the country is wheeled through transmission network.

India has a peninsular geography comprising vast coast line. Majority of this coast line is lying in Southern part of India extending from eastern coast in Andhra Pradesh & Tamil Nadu to western coast in Kerala and Karnataka. As part of Government of India programme for accelerated capacity addition, a number of Ultra Mega Power Projects (UMPP) with capacity of 4000 MW each are being developed. Krishnapatnam UMPP is one of these UMPPs which is proposed to be developed at Krishnapatnam along eastern coast of Andhra Pradesh near Nellore in Southern Region. The Krishnapatnam UMPP project is a multi-regional project where beneficiaries of the project are located in more than one region. As indicated by the project developer, the allocation of power from Krishnapatnam UMPP to different beneficiaries comprise of 3200 MW to various constituents of Southern Region (viz. Andhra Pradesh - 1600 MW, Karnataka - 800 MW and Tamil Nadu - 800 MW) and 800 MW to Maharashtra in Western Region.

The present project comprises of development of Inter-regional “Transmission Highway” between Southern and Western Region and strengthening of transmission systems within Southern and Western Regions. The above scheme has been agreed by all the constituents of Southern & Western Regions in their respective Standing Committee meetings.

The Final Environment Assessment Report (FEAR) for System Strengthening in Southern and Western Region for Krishnapatnam UMPP has been prepared in accordance with Environmental & Social Policy and Procedures (ESPP) of the Corporation. The present report describes the environmental issues/effects that have been encountered or may arise due to setting up this project and various mitigation measures are being taken care of by POWERGRID during construction and maintenance stages.

1.1 OBJECTIVE OF THE PROJECT:

The main objective of this system is to :

- Enhancement of inter-regional transmission capacity to export surplus power of southern region;
- Provide strengthening of transmission system in Southern and Western for reliable transfer of power,
- Reduction in transmission losses.
1.2 PROJECT DESCRIPTION:

Southern Region having a vast coast line presents attractive opportunity for development of imported coal based coastal generation projects. Towards this, POWERGRID, as a nodal agency for Long Term Open Access has already received number of applications amounting to capacity addition of about 30,000 MW from generation project developers for transfer of power to various beneficiaries in Southern, Western and Northern Region. These generation projects are in various stages of development and most of them are still in process of identifying their beneficiaries. Accordingly, the firm requirement of inter-regional capacity can be arrived at only after finalization of beneficiaries by the generation project developers. However, from the target beneficiaries indicated by the generation developers, it is apparent that with the coming of large number of coastal based generation projects, Southern region is likely to be major exporter of power.

The applications for long term open Access to the Inter State Transmission System (ISTS) inter-alia also include application of M/s Coastal Andhra Power Limited who have proposed to setup 4000 MW Ultra Mega Power Project (UMPP) to be located at Krishnapatnam in Andhra Pradesh. As a part of Govt of India programme for accelerated capacity addition, a number of Ultra Mega Power Projects (UMPP) with capacity of 4000 MW each are being developed. Krishnapatnam UMPP is one of these UMPPs which is proposed to be developed at Krishnapatnam along eastern coast of Andhra Pradesh near Nellore in Southern Region.

The Krishnapatnam UMPP project is a multi-regional project where beneficiaries of the project are located in more than one region. As indicated by the project developer, the allocation of power from Krishnapatnam UMPP to different beneficiaries comprise of 3200 MW to various constituents of Southern Region (viz. Andhra Pradesh - 1600 MW, Karnataka - 800 MW and Tamil Nadu - 800 MW) and 800 MW to Maharashtra in Western Region. Based on the firm power transfer requirement of 800 MW from Krishnapatnam UMPP and the interest evinced by the generation developers coming through Long term open access process, it is prudent that high capacity transmission corridor is developed between Southern and Western region.

Accordingly, a power transmission “Highway” encompassing Kurnool & Raichur in Southern region and Sholapur & Pune in Western region has been planned. The power from Krishnapatnam UMPP and also from other generation projects materializing through long term open access route shall be transmitted to this transmission “Highway” through separate transmission schemes. As per load flow studies carried out for “System strengthening in Southern & Western Region for Krishnapatnam UMPP” scheme, there would be reduction of losses of about 220 MW in the Southern and Western grid.

1.3 PROJECT HIGHLIGHTS:

<table>
<thead>
<tr>
<th>a) Project Name</th>
<th>System Strengthening in Southern and Western Region for Krishnapatnam UMPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Location</td>
<td>Andhra Pradesh</td>
</tr>
<tr>
<td>c) Beneficiary States</td>
<td>Constituents of Southern &amp; Western Region</td>
</tr>
</tbody>
</table>
1.4 PROJECT SCOPE:

Transmission lines

1. Raichur – Solapur 765 kV S/C line - 208 km
2. LILO of existing Raichur- Gooty 400 kV Quad D/C line at Raichur- 10.5 km
3. Sholapur – Pune 765 kV S/C line - 268 km
4. Kurnool (New) – Raichur 765 kV S/C line - 92 km
5. Pune (New) – Pune 400 kV D/C (Quad) line – 5 km
6. LILO of Parli-Pune 400 kV D/C and Pune-Aurangabad 400kV D/C line at Pune - 48.5 km

Substations

1. Establishment of new 765/400kV substation at Raichur with 765/400 kV 7x500 MVA single phase transformers including Bays;
2. Establishment of new 765/400kV substation at Solapur with 765/400 kV 7x500 MVA single phase transformers including Bays;
3. Extension of 765/400kV substation at Kurnool, Pune (only 7x500 MVA single phase transformers excluding Bays);
4. Extension of Gooty 400/220 kV substation – 2X63 MVAR three phase shunt reactor excluding Bays.

A power map showing the transmission grid of Western Region highlighting the above scope of works is placed as Exhibit - I.

1 Both the lines included in earlier scope stand deleted. New LILO Lines at Sl. No.6 have been added in place of 400 kV D/C (Quad) Pune-Pune line due to system requirements and RoW problem faced at Pune.
SECTION II : BASELINE DATA

2.0 The project is located in the State of Andhra Pradesh, Maharashtra and Karnataka in India. The basic details of the area under project are given below:

2.1 ANDHRA PRADESH :

Andhra Pradesh has a geographic area of 27.51 million ha, which constitutes 8.37% of the total area of the country. It is situated in the tropical zone and lines between latitude 12° 40’ and 19° 50’ N and longitude 76° 45’ and 84° 40’ E.

Physiographically the state can be divided into 3 distinct regions viz. (i) the mountainous region having Nallamalai and Erramalai Hills of the Rayalaseema and the Eastern Ghats (ii) the plateau having an altitude of 100 m to 800m and (iii) the deltas of rivers and the sea coast. The proposed project is located in the district of Anantapur of Rayalaseema region. The general land use pattern of the state is given in Table 2.1.

Table-2.1: Land use Pattern

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area in ‘000 ha</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total geographical area</td>
<td>27,507</td>
<td></td>
</tr>
<tr>
<td>Reporting area for land utilization</td>
<td>27,505</td>
<td>100.00</td>
</tr>
<tr>
<td>Forests</td>
<td>6,230</td>
<td>22.65</td>
</tr>
<tr>
<td>Not available for cultivation</td>
<td>4,827</td>
<td>17.55</td>
</tr>
<tr>
<td>Permanent pastures and other grazing lands</td>
<td>553</td>
<td>2.01</td>
</tr>
<tr>
<td>Land under misc.tree crops &amp; groves</td>
<td>289</td>
<td>1.05</td>
</tr>
<tr>
<td>Culturable wasteland</td>
<td>614</td>
<td>2.23</td>
</tr>
<tr>
<td>Fallow lands other than current fallows</td>
<td>1,558</td>
<td>5.66</td>
</tr>
<tr>
<td>Current Fallows</td>
<td>2,273</td>
<td>8.26</td>
</tr>
<tr>
<td>Net area sown</td>
<td>11,161</td>
<td>40.58</td>
</tr>
</tbody>
</table>

Source: Land use statistics, Ministry of Agriculture, GOI, 2011-12

Climate of the state is hot and humid with temperatures ranging from 15 °C to 45° C. Annual rainfall rages from 1,100 to 1,250 mm in the north, reducing to about 500 mm in the south. The north-eastern areas along the coastline are periodically lashed by cyclones.

The major rivers of the State are the Godavari, the Krishna and the Pennar, which pass through the Deccan Plateau and drain into the Bay of Bengal. Nearly 75% of the state area is covered by the river basins of the Godavari, Krishna and Pennar, and their tributaries. There are 17 smaller rivers like the Sarada, Nagavali and Musi, as well as several streams.

Ecological Resources Total recorded forest area in the state is 63,814 sq. km., which works out to 23.20% of its geographical area. Reserved, Protected and Unclassed Forests constitute 79.10%, 19.38% and 1.52% of the total forest area respectively (Map-1). The forests are the main source of supply of fodder and fuel and subsistence for the poorest sections of the people and tribal population in the interior under-developed areas of the state. The five forest types occurring in the state are Tropical Dry Deciduous, Tropical Thorn, Tropical Moist Deciduous, Tropical Dry Evergreen, and Littoral and Swamp forests. Forests are distributed mainly in the form of a wide strip in the north starting from Nizamabad district in the west to Srikakulam in the east. Besides
this, a belt runs from central to the southern part of the state in the Nallamalai hills. There are 6 National Parks and 21 Wildlife Sanctuaries covering an area of 0.14 million ha and 1.16 million ha respectively. Thus, a total of 1.30 million ha area constituting 4.73% of the geographical area of the state is under protected area network. Nagarjuna Sagar-Srisailam, the largest tiger reserve of the country with an area of 0.36 million ha is located in the state.

The project involves two districts of Andhra Pradesh i.e. Kurnool and Mehboobnagar. However, due to precaution taken during route alignment the forest area has been completely avoided. The details of forest resources available in the project area are as follows:

<table>
<thead>
<tr>
<th>District</th>
<th>Geographic area</th>
<th>Area in sq. km.</th>
<th>Very Dense forest</th>
<th>Moderately Dense forest</th>
<th>Open forest</th>
<th>Total</th>
<th>% Forest cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kurnool</td>
<td>17,658</td>
<td>72</td>
<td>1488</td>
<td>549</td>
<td>2109</td>
<td></td>
<td>11.94</td>
</tr>
<tr>
<td>Mehboobnagar</td>
<td>18,432</td>
<td>329</td>
<td>537</td>
<td>1076</td>
<td>1942</td>
<td></td>
<td>10.54</td>
</tr>
</tbody>
</table>

Source: India State of Forest Report 2013 by Forest Survey of India

The economy of Andhra is based on widely diversified farming base with a rich variety of cash crops. It is surplus in food grains, and produces over 10 m tons of rice therefore called as the granary of South. Agriculture sector accounts for around 50% of state economy and provides livelihood for 70% of the population. The major crops of the state are paddy, jawar, bazra, ragi, maize, groundnut, tobacco, cotton, castor and sugarcane etc. The district Anantapur is not rich in the Forest Wealth. The name ‘Forest’ in Anantapur District does not indicate any dense tree population with thick foliage of variform of pastures.

2.2 MAHARASHTRA:

Maharashtra, with an area of 30.77 million ha, is the third largest state of the country, constituting 9.36% of the total geographic area. It lies between latitude 15° 35’ and 22° 02’ N and longitude 72° 36’ and 80° 54’ E.

Physiographically, the state can be divided into five regions viz. Deccan Plateau, Central Highland, Eastern Chotanagpur Plateau, Eastern Ghat and Coastal plain. Except around Mumbai, and along the eastern limits, the State of Maharashtra presents a monotonously uniform, flat-topped skyline. This topography of the state is the outcome of its geological structure. The state area, barring the extreme eastern Vidarbha region, parts of Kolhapur and Sindhudurg, is practically co-terminus with the Deccan Traps. The general land use pattern of the State is given in Table 2.2.

Table-2.2 : Land use Pattern

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area in ‘000 ha</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total geographical area</td>
<td>30,771</td>
<td></td>
</tr>
<tr>
<td>Reporting area for land utilization</td>
<td>30,758</td>
<td>100.00</td>
</tr>
<tr>
<td>Forests</td>
<td>5211</td>
<td>16.94</td>
</tr>
<tr>
<td>Not available for cultivation</td>
<td>3179</td>
<td>10.34</td>
</tr>
<tr>
<td>Permanent pastures and other grazing lands</td>
<td>1244</td>
<td>4.04</td>
</tr>
<tr>
<td>Land under misc.tree crops &amp; groves</td>
<td>250</td>
<td>0.81</td>
</tr>
<tr>
<td>Culturable wasteland</td>
<td>919</td>
<td>2.99</td>
</tr>
<tr>
<td>Fallow lands other than current fallows</td>
<td>1192</td>
<td>3.88</td>
</tr>
</tbody>
</table>
Current Fallows | 1378 | 4.48
Net area sown | 17386 | 56.53

*Source: Land Use Statistics, Ministry of Agriculture, GOI, 2011-12*

**Climate:** The state enjoys a tropical monsoon climate; the hot scorching summer from March onwards yields to the rainy monsoon in early June. The rich green cover of the monsoon season persists during the mild winter that follows through an unpleasant October transition, but turns into a dusty, barren brown as the summer sets in again.

**Rainfall:** The average annual rainfall varies between 160-200 cms. However, seasonal rains from the western sea-clouds are very heavy and the rainfall is over 400 cm. on the Sahyadrian crests. The Konkan on the windward side is also endowed with heavy rainfall, declining northwards. East of the Sahyadri, the rainfall diminishes to a meagre 70 cm. in the western plateau districts, with Solapur-Ahmednagar lying in the heart of the dry zone.

**Temperature:** The average annual temperature varies from 25-35 °C.

**Soil:** The soils of Maharashtra are residual, derived from the underlying basalts. In the semi-dry plateau, the regur (black-cotton soil) is clayey, rich in iron, but poor in nitrogen and organic matter; it is moisture-retentive. The higher plateau areas have Pather soils, which contain more gravel. In the rainy Konkan, and the Sahyadri Range, the same basalts give rise to the brick-red laterite soil.

**Mineral Resources:** The mineral-bearing zones of Maharashtra lie beyond the area of the basalts in eastern Vidarbha, southern Kolhapur and the Sindhudurg area. The Chandrapur, Gadchiroli, Bhandara and Nagpur Districts form the main mineral belt, with coal and manganese as the major minerals and iron ore and limestone as potential wealth. The Ratnagiri coast contains sizeable deposits of ilmenite.

**Water Resources:** Water is the most precious natural resource of the state, greatly in the demand, and most unevenly distributed. The major rivers like the Krishna, Bhima, Godavari, Tapi-Purna and Wardha-Wainganga through its Fluvial action has further aided in the compartmentalization of the state into broad, open river valleys, alternating with plateau interfluves.

**Ecological Resources:** The recorded forest area of the state is 61,357 km² which is 19.94% of the geographical area. The Reserved Forests constitute 84.01%, Protected Forests 10.96% and Unclassed Forests 5.02% of the recorded forest area. There are six forest types in the state, viz. Tropical Semi Evergreen, Tropical Moist Deciduous, Tropical Dry Deciduous, and Tropical Thorn, Subtropical Broadleaved hill and Littoral and Swamp forests (Map-2). Maharashtra has 6 National Parks and 35 Wildlife Sanctuaries covering an area of 15,526 km² which constitutes 5.04% of the state's geographical area. There are three Tiger Reserves, namely, Melghat, Tadoba-Andhari and Pench covering an area of 1,660km². A wetland of national importance Ujni is located in Sholapur district.

The lines of proposed transmission system passed through mainly two district of this state viz. Solapur and Pune having forest cover ranging from 0.31 % to 11.08%. Earlier route involved 45.17 ha. of forest land. However, with the change in location of
substation to Shikrapur, the route is so aligned that it doesn’t involve any forest land. Details of forest cover of these districts are as follows:

<table>
<thead>
<tr>
<th>District</th>
<th>Geographic area</th>
<th>Very Dense forest</th>
<th>Moderately Dense forest</th>
<th>Open forest</th>
<th>Total</th>
<th>% Forest cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solapur</td>
<td>14,895</td>
<td>0</td>
<td>8</td>
<td>38</td>
<td>46</td>
<td>0.31</td>
</tr>
<tr>
<td>Pune</td>
<td>15,643</td>
<td>0</td>
<td>757</td>
<td>977</td>
<td>1,734</td>
<td>11.08</td>
</tr>
</tbody>
</table>

Source: India State of Forest Report 2013 by Forest Survey of India

About 70 per cent of the people in Maharashtra depend on agriculture. Agriculture contributes more than 22% of the state’s income. Maharashtra is the largest producer of a number of items such as Alphonso mango, Thomson seedless grapes, Cavendish bananas, soft seeded pomegranates, sugar, cotton, oilseeds and cashew. Important cash crops are cotton, sugar cane, groundnut and tobacco. Although the state accounts for 9.2% of the total population of the country, it shares about 11% of industrial units, over 17% of labour, about 16% of investment and 23% of the value of industrial output.

Maharashtra’s major industries are chemicals and allied products, textiles, electrical and non-electrical machinery and petroleum and allied products. Other important industries are pharmaceuticals, engineering goods, machine tools, steel and iron castings and plastic ware. The development of offshore oil fields at Mumbai High and the nearby basins have contributed greatly for the industrial development of the state.

2.3  **KARNATAKA** :

Karnataka is located in southwestern part of the country and lies between latitude 11°10’ to 18° 25’N and longitude 74°10’ to 78°35’E. It has a geographic area of 19.18 million ha constituting 5.83% of the total area of the country. It has a coastline of approximately 400 km.

**Physiographically** the State can be divided into two distinct regions viz. the ‘Maland’ or hilly region comprising of Western Ghats and the ‘Maidan’ or the plain region comprising he inland plateau of varying height. Karnataka has representatives of all types of variations in topography - high mountains, plateaus, residual hills and coastal plains. The State is enclosed by chains of mountains to its west, east and south. It consists mainly of plateau which has higher elevation of 600 to 900 metres above mean sea level. The entire landscape is undulating, broken up by mountains and deep ravines. General land use pattern of the state is given in **Table 2.3**.

**Table 2.3: Land use Pattern**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area in ‘000 ha</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total geographical area</td>
<td>19,179</td>
<td></td>
</tr>
<tr>
<td>Reporting area for land utilization</td>
<td>19,050</td>
<td>100.00</td>
</tr>
<tr>
<td>Forests</td>
<td>3,072</td>
<td>16.13</td>
</tr>
<tr>
<td>Not available for cultivation</td>
<td>2,220</td>
<td>11.65</td>
</tr>
<tr>
<td>Permanent pastures and other grazing lands</td>
<td>908</td>
<td>4.77</td>
</tr>
<tr>
<td>Land under misc. tree crops &amp; groves</td>
<td>285</td>
<td>1.50</td>
</tr>
<tr>
<td>Culturable wasteland</td>
<td>413</td>
<td>2.17</td>
</tr>
</tbody>
</table>
**Climate:** The state enjoys three main types of climates. For meteorological purposes, the state has been divided into three sub-divisions namely Coastal Karnataka, North Interior Karnataka and South Interior Karnataka. The Tropical Monsoon climate covers the entire coastal belt and adjoining areas. Southern half of the State experiences hot, seasonally dry tropical savana climate while most of the northern half experiences hot, semi-arid, tropical steppe type of climate. The climate of the State varies with the seasons.

**Soil:** The Red soil constitutes major soil type, followed by Black soil. In some area Lateritic soils, Alluvio- Colluvial Soils are also found.

**Rainfall:** The annual rainfall in the State varies from 2,000 3,200 mm in the Western Ghats and between 400-500 mm in the northern and northeastern parts. Average summer and winter temperature varies from 26°C to 35°C and 14°C to 25°C respectively.

**Temperature:** Both day and night temperatures are more or less uniform over the State, except at the coastal region and high elevated plateau. They generally decrease south-westwards over the State due to higher elevation and attain lower values at high level stations. April and May are the hottest months.

**Mineral Resources:** Karnataka is endowed with fairly rich mineral wealth distributed more or less evenly over its territory. It has one of the oldest Geological Survey Department in the country, started as far back as 1880. The State contains deposits of asbestos, bauxite, chromite, dolomite, gold, iron ore, kaolin, limestone, magnesite, manganese, ochre, quartz and silica sand. Karnataka is the sole producer of felsite and leading producer of gold (84%), moulding sand (63%) and fuchsite quartzite (57%).

**Water Resources:** Karnataka accounts for about six per cent of the country's surface water resources of 17 lakh million cubic metres (mcm). About 40 percent of this is available in the east flowing rivers and the remaining from west flowing rivers. The major rivers of the State are Krishna, Cauvery, Godavari, North Pennar and South Pennar.

**Ecological Resources:** The recorded forest area of the state is 38,284 km² which is 19.96% of its geographical area. The Reserved Forests constitute 74.94%, Protected Forests 10.27%, and Unclassed Forests 14.79% (Map-3). The forests are the main source of supply of fodder and fuel and subsistence for the poorest sections of the people and tribal population in the interior under-developed areas of the state. The five forest types found in the State are Tropical Wet Evergreen, Tropical Semi Evergreen, Tropical Dry Evergreen, Tropical Dry Deciduous and Tropical Thorn forests. Most of the forests in Karnataka are situated in a belt running from north to south starting from Belgaum to Mysore in the Western Ghats. Karnataka has 5 National Parks and 21 Wildlife Sanctuaries covering an area of 2472 km² and 3,879 km² respectively. Thus a total of 6,351 km² area constituting 3.31 % of the state's geographical area is under protected area network. Karnataka has two Tiger Reserves namely, Bandipur.
Nagarhole (extension) and Bhadra, covering an area of 1,366 km². A part of the famous Nilgiri Biosphere Reserve (area 5,520 km²) also lies in the state.

The lines of proposed transmission system passed through two district of this state viz. Raichur and Gulbarga having forest cover ranging from 0.35% to 01.82%. It may be noted from the table below that the forest cover in the above said districts are generally open/degraded. However, with due precaution in the route alignment the forest area has been avoided completely.

<table>
<thead>
<tr>
<th>District</th>
<th>Geographic area</th>
<th>Area in sq. km.</th>
<th>% Forest cover</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Very Dense forest</td>
<td>Moderately Dense forest</td>
</tr>
<tr>
<td>Raichur</td>
<td>6,827</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Gurbarga</td>
<td>16,224</td>
<td>0</td>
<td>87</td>
</tr>
</tbody>
</table>

Source: *India State of Forest Report 2013 by Forest Survey of India*

Karnataka is one of the more economically progressive states in India. Nearly 56% of the workforce in Karnataka is engaged in agriculture and related activities. Karnataka is the manufacturing hub for some of the largest public sector industries in India, including HAL, NAL, BHEL, ITI, BEML and HMT, which are based in Bangalore. Since the 1980s, Karnataka has emerged as the pan-Indian leader in the field of Information Technology. Exports from IT firms exceeded Rs. 50,000 crores ($12.5 billion) in 2006-07, accounting for nearly 38% of all IT exports from India. Karnataka also leads the nation in biotechnology. It is home to India’s largest bio cluster, with 158 of the country’s 320 biotechnology firms being based here. The state also accounts for 75% of India’s floriculture.
SECTION III: POLICY, LEGAL & REGULATORY FRAMEWORK

3.0 POWERGRID’s activities by their inherent nature and flexibility have negligible impacts on environmental and social attributes. Indian laws relating to environmental and social issues have strengthened in the last decade both due to local needs and international commitments. POWERGRID undertakes its activities within the purview of Indian laws keeping in mind appropriate international obligations and directives and guidelines with respect to environmental and social considerations of Funding Agencies.

3.1 ENVIRONMENTAL

3.1.1 CONSTITUTIONAL PROVISIONS

Subsequent to the first United Nations Conference on Human Environment at Stockholm in June, 1972, which emphasized the need to preserve and protect the natural environment, the Constitution of India was amended through the historical 42nd Amendment Act, 1976 by inserting Article 48-A and 51-A(g) for protection and promotion of the environment under the Directive Principles of State Policy and the Fundamental Duties respectively. The amendment, inter alia provide:

"The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". [New Article 48A]

"It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures". [New Article 51A (g)]

Article 21 of the constitution provides, “no person shall be deprived of his life or personal liberty except according to procedure established by law”.

Article 21 is the heart of the fundamental rights and has received expanded meaning from time to time after the decision of the Supreme Court in 1978. The Article 21 guarantees fundamental right to life – a life of dignity to be lived in a proper environment, free of danger of disease and infection. The right to live in a healthy environment, as part of the Article 21 of the Constitution. Recently, Supreme Court has broadly and liberally interpreted the Article 21, transgressed into the area of protection of environment, and held that the protection of environment and citizen’s right to live in eco-friendly atmosphere interpreted as the basic right guaranteed under Article 21.

Thus the Indian Constitution has now two fold provision:

(a) On the one hand, it gives directive to the State for the protection and improvement of environment.
(b) On the other hand the citizens owe a constitutional duty to protect and improve natural environment.

3.1.2 MANDATORY REQUIREMENTS (NATIONAL)

- MOP order/sanction under The Electricity Act, 2003:

Sanction of MOP, GOI is a mandatory requirement for taking up any new transmission project under the section 68(1) of The Electricity Act, 2003. The sanction authorize
POWERGRID to plan and coordinate activities to commission the new projects. Electricity act does not explicitly deal with environmental implications of activities related to power transmission. However, POWERGRID always integrates environmental protection within its project activities.

- **Forest Clearance Under The Forest (Conservation) Act, 1980:**

When transmission projects pass through forest land, clearance has to be obtained from relevant authorities under the Forest (Conservation) Act, 1980. This Act was enacted to prevent rapid deforestation and environmental degradation. State governments cannot de-reserve any forest land or authorize its use for any non-forest purposes without approval from the Central Government. POWERGRID projects, when involving forest areas, undergo detailed review and approval procedures to obtain a Forest Clearance certificate from Ministry of Environment and Forests (MoEF), Government of India before starting any construction activity in designated forest area.

- **Environmental Clearances under Environment (Protection) Act,1986:**

Since transmission line projects are environmentally clean and do not involve any disposal of solid waste, effluents and hazardous substances in land, air and water they are kept out of the purview of Environment (Protection) Act, 1986. However, the recent amendment in the Environment (Protection) Act, 1986 made it necessary to obtain clearance from MoEF for power transmission projects in three districts in the Aravalis (viz., Alwar in Rajasthan and Gurgaon & Nuh -Mewat in Haryana). The Aravali range, in these areas, is heavily degraded; hence, any industrial activity there becomes critical. Environment Impact Notification, 2006 lays down specific project categories that require clearance from MoEF, Power transmission projects are not included in this list.

- **Ozone Depleting Substances (Regulation and Control) Rules, 2000:**

MoEF vide its notification dt. 17th July, 2000 under the section of 6, 8 and 25 of the Environment (Protection) Act, 1986 has notified rules for regulation/control of Ozone Depleting Substances under Montreal Protocol adopted on 16th September 1987. As per the notification certain control and regulation has been imposed on manufacturing, import, export and use of these compound. POWERGRID is following provisions of notification and is phasing out all equipment which uses these substances and planning to achieve CFC free organization in near future.

- **Batteries (Management and Handling) Rules, 2001:**

MoEF vide its notification dt. 16th May, 2001 under the section of 6, 8 and 25 of the Environment (Protection) Act, 1986 has put certain restriction on disposal of used batteries and its handling. As per the notification it is the responsibility of bulk consumer (POWERGRID) to ensure that used batteries are not disposed off, in any manner, other than by depositing with the dealer/manufacturer/registered recycler/importer/re-conditioner or at the designated collection centers – and to file half yearly return in prescribed form to the concerned State Pollution Control Board.

- **The Hazardous Wastes(Management, Handling and Transboundary Movement) Rules, 2008 :**

MoEF vide its notification dt. 20th May, 1986 under the section of 6, 8 and 25 of the Environment (Protection) Act, 1986 has put used mineral oil under the category of hazardous waste which require proper handling and disposal. As per the notification, all
used oil is to be auctioned / sold to registered recyclers only and file annual return on prescribed form to the concerned State Pollution Control Board.

- **The Biological Diversity Act, 2002:**

Under the United Nations Convention on Biological Diversity signed at Rio de Janeiro on the 5th day of June, 1992 of which India is also a party, MoEF has enacted the Biological Diversity Act, 2002 to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith. As per the provision of act certain area which are rich in biodiversity and encompasses unique and representative ecosystems are identified and designated as Biosphere Reserve to facilitate its conservation. All restrictions applicable to protected areas like National Park & Sanctuaries are also applicable to these reserves. POWERGRID will abide by the provision of act wherever applicable and try to totally avoid these biosphere reserves while finalizing the route alignment.

### 3.1.3 FUNDING AGENCIES:

**WB Operational Policies (OP) 4.01/ ADB’s Operations Manuals (OM) - F1/BP and JBIC Environmental Guidelines:** These outlines funding agencies policy and procedures for environmental assessment (EA) of different developmental projects. All these guidelines classified developmental projects into three categories (A-C) based on its possible environmental and social impacts though WB & ADB has another category F1 applicable only to projects involving a credit line through a financial intermediary.

Transmission line projects are categorized as category-B project having limited impact that can be further minimized through mitigative /management measures and would normally require only an environmental review. POWERGRID takes remedial measures to prevent, minimize, mitigate, or compensate for adverse impact and improve environmental performance. Environment Assessment will take into account the natural environment, human health and safety, social aspects and trans-boundary and global environmental aspects. During EA process public is also informed at every stage of project execution and their views are considered during decision-making process.

### 3.1.4 PRESCRIPTIVE FRAMEWORK (NATIONAL)

- Applicable Legislations

### 3.1.5 RELEVANT POLICIES

- Policy statement for Abatement of pollution, 1992
- National Environment Policy, 2006

### 3.2 SOCIAL

#### 3.2.1 CONSTITUTIONAL PROVISIONS

Constitutional provisions in regard to social safeguards are well enshrined in the preamble such as **JUSTICE**, social, economic and political; **LIBERTY** of thought, expression, belief, faith and worship; **EQUALITY** of status and of opportunity;
FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation. Fundamental Rights and Directive Principles guarantee the right to life and liberty. Health, safety and livelihood have been interpreted as part of this larger right. Social safeguards provisions are dealt in detail in different Articles such as Article-14, 15, 17, 23, 24, 25, 46, 330, 332 etc. POWERGRID, through this document, ESPP, commits itself to implementing the said constitutional provision in true sprit to fulfill its environmental and social obligations and responsibilities.

3.2.2 MANDATORY REQUIREMENTS (NATIONAL)

- National Rehabilitation and Resettlement Policy, 2007:

The Ministry of Rural Development, GoI, has notified “The National Rehabilitation, and Resettlement Policy” in October 2007 applicable to all development projects involving displacement of 400 or more families en masse in plain areas or 200 or more families en masse in hilly areas. It essentially addresses the rehabilitation of Project Affected Families (PAFs) and provides a broad canvas for an effective consultation between PAFs and the project authorities. It has also listed R&R measures and entitlements for different category of PAFs. Though the national policy as such, is not applicable to POWERGRID because transmission projects do not involve displacement of such a large number of families, since land required for substations is quite small. However, the entitlement benefits listed in the national policy for PAFs have been adopted by POWERGRID in its “Social Entitlement Framework” that is being implemented wherever land acquisition for substations is undertaken.

- Right of Way (RoW) And Compensation Under Electricity Act, 2003:

The act has a provision for notifying transmission company under section 164 (B) to avail benefits of eminent domain provided under the Indian Telegraph Act, 1885. MoP, GoI vide gazette notification dt 23.12.2003 had already notified POWERGRID under this section of said act. Therefore, for the purpose of placing of any wires, poles, etc., POWERGRID has all the powers that the telegraph authority possesses. Thus, POWERGRID can erect and construct towers without actually acquiring the land. However, all damages due to POWERGRID activity are compensated at market rate. Power transmission schemes are always planned in such a way that the power of eminent domain is exercised responsibly.

- Provisions under Land Acquisition Act, 1894, as amended in 1984:

When land is acquired for sub-stations, POWERGRID will follow procedures laid down under the Land Acquisition Act (LA Act), 1894. POWERGRID sub-stations have never resulted in large scale displacement or loss of livelihoods. There have been only marginal impacts due to flexibility exercised by POWERGRID in selecting sites. The LA, Act specifies that in all cases of land acquisition, no award of land can be made by the government authorities unless all compensation has been paid.

3.2.3 FUNDING AGENCIES:

For POWERGRID, mandatory requirements vis-à-vis Funding Agencies are comprehensive Resettlement and Rehabilitation (R&R) guidelines and an entitlement framework as per World Bank Operational Directives 4.30 (OP-4.12) and 4.20 (OP-4.10) and ADB’s Safeguard Policy Statement, June 2009.
• **World Bank OP- 4.12: Involuntary Resettlement:**

This directive describes Bank Policy and procedures on involuntary resettlement as well as conditions that borrowers are expected to meet during operations involving resettlement of affected groups. It requires an entitlement framework aimed at restoration, replacement and participation of affected groups. A detailed social assessment and development of an action plan having list of measures for betterment/restoration of lost assets/income is required to be submitted to bank before start of project work. However where only a few people (e.g. about 100-200 individuals) are to be relocated at a particular location, appropriate compensation for assets, logistical support for moving and a relocation grant may be the only requirements but the principle on which compensation is to be based will remain same as for larger groups.

• **World Bank OP 4.10: Indigenous People (IP):**

This directive describes World Bank policies and procedures for projects that affect indigenous people. The objective is to ensure that development benefits are socially and culturally compatible and that the IPs are consulted. Thus, the Indigenous People Development Plan/Tribal Development Plan is to be prepared as a prerequisite. POWERGRID will not only incorporate the IP component whenever necessary, but will also pay attention to marginalized groups such as women, children, etc.

• **ADB Safeguard Policy Statement, June 2009:**

The SPS, June 2009 describes Bank Policy and operational procedures on three key safeguard areas viz. Environmental, Involuntary resettlement and Indigenous Peoples as well as a set of specific safeguard requirements that borrowers are expected to meet during operations when addressing social and environment impacts and risks. Its objective is to ensure social and environmental sustainability of projects through avoidance, minimization, mitigation and/or compensate of adverse impacts on environment and affected peoples. It also classified project into three categories like Category-A where resettlement is significant and involve physical displacement of more than 200 persons, which require a detailed resettlement plan. Category-B where resettlement is not that significant and requires a short resettlement plan. Category-C where no resettlement of peoples are foreseen and neither require neither resettlement plan nor a resettlement framework.

POWERGRID emphasizes that displacement is not an issue with transmission projects because land below tower/line is not acquired and only a small piece of land is required for substations. However, all affected persons/families shall be provided compensation and rehabilitation assistance along with other measures as per POWERGRID's social entitlement framework which is based on these directives/manuals and National R&R Policy to restore income/livelihood of all affected persons.

### 3.2.4 PRESCRIPTIVE FRAMEWORK (NATIONAL)

- National and State-wide Laws and Policies Relating to Land Acquisition and Issues of R&R
- Maharashtra Project Affected persons Rehabilitation Act, 1986
3.2.5 RELEVANT POLICIES

- Resettlement and Rehabilitation Policy - Coal India Ltd., May, 2008
- Resettlement and Rehabilitation Policy - NHPC Ltd., 2007
- Policy for Rehabilitation and Resettlement of Land Owners - Land Acquisition Oustees – Haryana State, December, 2007;
- The Orissa Resettlement and Rehabilitation Policy, Orissa, May, 2006;
- Resettlement and Rehabilitation Policy – NTPC Ltd., June, 2005;
4.1 ROUTE SELECTION

Environmental impact of transmission line projects are not far reaching and are mostly localized to ROW. However, transmission line project has some affects on natural and socio-culture resources. These impacts can be minimized by careful route selection. To minimize these possible impact POWERGRID at the system planning stage itself try to avoid ecological sensitive areas like forest. Wherever such infringements are substantial, different alternative options are considered to select most viable route alignment. For further optimization of route modern survey techniques/tools like GIS, GPS aerial photography is also applied. Introduction of GIS and GPS in route selection result in access to updated/latest information, through satellite images and further optimization of route having minimal environmental impact. Moreover, availability of various details, constraints like topographical and geotechnical details, forest and environmental details etc. help in planning the effective mitigate measures including engineering variations depending upon the site situation/location. The route/site selection criteria followed by POWERGRID is detailed below:

Environmental Criteria for Route Selection

For selection of optimum route, the following points are taken into consideration;

(i) The route of the proposed transmission lines does not involve any human rehabilitation.
(ii) Any monument of cultural or historical importance is not affected by the route of the transmission line.
(iii) The proposed route of transmission line does not create any threat to the survival of any community with special reference to Tribal Community.
(iv) The proposed route of transmission line does not affect any public utility services like playgrounds, schools, other establishments etc.
(v) The line route does not pass through any sanctuaries, National Park etc.
(vi) The line route does not infringe with area of natural resources.

In order to achieve this, POWERGRID undertakes route selection for individual transmission lines in close consultation with representatives from the Ministry of Environment and Forests and the Department of Revenue. Although under National law POWERGRID has the right of eminent domain, yet alternative alignments are considered keeping in mind the above-mentioned factors during site selection, with minor alterations often added to avoid environmentally sensitive areas and settlements at execution stage.

- As a rule, alignments are generally cited 10-15 km away from major towns, whenever possible, to account for future urban expansion (refer final route map).
- Similarly, forests are avoided to the extent possible, and when it is not possible, a route is selected in consultation with the local Divisional Forest Officer, that causes minimum damage to existing forest resources.
- Alignments are selected to avoid wetlands and unstable areas for both financial and environmental reasons.
In addition, care is also taken to avoid National parks and sanctuaries and any other forest area rich in wild life. Keeping above in mind the routes of line under this transmission system have been so aligned that it takes care of above factors. As such different alternatives were studied with the help of Govt. published data like Forest Atlas, Survey of India topo-maps etc. to arrive at most optimum route which can be taken up for detailed survey using GIS/GPS. and assessment of environmental and social impacts for their proper management. In the instant projects also these techniques have been used for studied of 3 alternatives route (Annexure-1).

Similarly the TOR for detailed survey using modern tool like GIS/GPS also contained parameters to avoid/reduce environmental impact while deciding the final route alignment. The major objectives for detailed survey that are part of contract are summarized below:

(i) The alignment of transmission line shall be most economical from the point of view of construction and maintenance.

(ii) Routing of transmission line through protected and reserved forest area should be avoided. In case it is not possible to avoid the forest or areas having large trees completely then keeping in view of the overall economy, the route should be aligned in such a way that cutting of trees is minimum.

(iii) The route should have minimum crossing of major rivers, railway lines, and national/state high ways, overhead EHP power lines and communication lines.

(iv) The number of angle point shall be kept to a minimum.

(v) The distance between the terminal points specified shall be kept shortest possible, consistent with the terrain that is encountered.

(vi) Marshy and low line areas, river beds and earth slip zones shall be avoided to minimum risk to the foundations.

(vii) It would be preferable to utilize level ground for the alignment.

(viii) Crossing of power line shall be minimal. Alignment will be kept at a minimum distance of 300 meters from power lines to avoid induction problems on the lower voltage lines.

(ix) Crossings of communication lines shall be minimized and it shall be preferably at right angle, proximity and paralyses with telecom lines shall be eliminated to avoid danger of induction to them.

(x) Area subjected to flooding searches streams shall be avoided.

(xi) Restricted areas such as civil and military airfield shall be avoided. Care shall also be taken to avoid the aircraft landing approaches.

(xii) All alignment should be easily accessible both in dry and rainy seasons to enable maintenance throughout the year.

(xiii) Certain areas such as query sites, tea, tobacco and saffron fields and rich plantation, gardens and nurseries that will present the owner problems in of right of way and leave clearance during construction and maintenance should be avoided.

(xiv) Angle point should be selected such that shifting of the point within 100 m radius is possible at the time of construction of the line.

(xv) The line routing should avoid large habitation densely populated areas to the extent possible

(xvi) The area requires special foundations and those prone to flooding should be avoided
For examination of the alternatives and identification of the most appropriate route, besides making use of information/data/details available/extracted through survey of India topographical maps and computer aided processing of NRSA satellite imagery, the contractor shall also carry out reconnaissance/preliminary survey as may be required for the verification and collection of additional information/data/details.

The contractor shall submit his preliminary observation and suggestion along with various information/data/details collected and also processed satellite imagery data, topographical map data marked with alternative routes etc. The final evaluation of the alternative routes shall be conducted by the contractor in consultation with owners’ representatives and optimal route alignment shall be proposed by the contractor. Digital terrain modeling using contour data from topographical maps as well as processed satellite data shall be done by the contractor for the selected route. A flythrough perspective using suitable software(s) shall be developed or further refinement of the selected route. If required site visit and field verification shall be conducted by the contractor jointly with the owners’ representatives for the proposed route alignment.

Final digitized route alignment drawing with the latest topographical and other details/features including all river railway lines, canals, roads etc. upto 8 Kms on both side of selected route alignment shall be submitted by the contractors for owners approval along with report containing other information / details as mentioned above.

Based on above the most optimum route alignments are finalized. In the instant project also such studies have been carried out and final route alignment has been finalized and chosen for construction. The major features of transmission line covered under this project are as follows;

1. **765 KV S/C Raichur-Solapur Line**

   The total length of line is 208 kms. Road Network is very good all along the route. The alignment is well connected with many pucca/moorum roads besides interconnection with major Distt. Roads and State Highway (SH-12,SH-20 etc.) respectively. The line corridor also involves 1 river crossing and 1 railway crossing. The nearest airport to the transmission line is Hyderabad which is 183 kms from Raichur.

   Both unskilled and semi-skilled labour for construction purposes are available locally in nearby villages along the line. Local labours are quite conversant with the normal construction activity. Route alignment map is placed as Annexure-II (A).

   **Details of Forest involvement:**

   The subject line does not involve any forest land.

   **Forest Clearance:**

   Since instant transmission line doesn’t involve any forest land, forest clearance under Forest (Conservation) Act, 1980 is not applicable.

   **(ENVIRONMENTAL IMPACT MATRIX)**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>PARAMETERS</th>
<th>EXTENT OF IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A.</td>
<td>Total Line length</td>
<td>- 208 km</td>
</tr>
<tr>
<td>S. No.</td>
<td>PARAMETERS</td>
<td>EXTENT OF IMPACT</td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>B.</td>
<td>Terrain: Plain - 100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hilly - 0%</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Type of line, 765 kV S/c</td>
<td>---</td>
</tr>
<tr>
<td>3.</td>
<td>Forest land traversed (km)</td>
<td>Nil</td>
</tr>
<tr>
<td>4.</td>
<td>Forest land traversed (ha.)</td>
<td>Nil</td>
</tr>
<tr>
<td>5.</td>
<td>Forest type</td>
<td>NA</td>
</tr>
<tr>
<td>6.</td>
<td>Forest density</td>
<td>NA</td>
</tr>
<tr>
<td>7.</td>
<td>Rare/ endangered flora</td>
<td>Nil</td>
</tr>
<tr>
<td>8.</td>
<td>Rare/ endangered fauna</td>
<td>Nil</td>
</tr>
<tr>
<td>9.</td>
<td>Migrating Wildlife/ breeding ground</td>
<td>None</td>
</tr>
<tr>
<td>10.</td>
<td>National Park / sanctuaries</td>
<td>None</td>
</tr>
<tr>
<td>11.</td>
<td>Amount of wet land traversed</td>
<td>Nil</td>
</tr>
<tr>
<td>12.</td>
<td>Soil erodability</td>
<td>Low</td>
</tr>
<tr>
<td>13.</td>
<td>Historical / Cultural Monument</td>
<td>None</td>
</tr>
<tr>
<td>14.</td>
<td>Relocation of villagers</td>
<td>None</td>
</tr>
<tr>
<td>15.</td>
<td>Loss/ Hindrance to Public Utilities</td>
<td>Negligible, restricted to construction phase only.</td>
</tr>
</tbody>
</table>

2. 765 KV S/C Solapur-Pune

The total length of line is 268 Kms. Road Network is very good all along the route. The alignment is well connected with many pucca/moorum roads besides interconnection with major Distt. Roads and State Highway respectively. The line corridor involves crossing through SH-68, NH-9,, SH-10, SH-67, SH-60 and NH-50. The line corridor also involves 14 river crossing and 3 railway crossing. The nearest airport to the transmission line is Pune at a distance of approx. 19 km.

Both unskilled and semi-skilled labour for construction purposes are available locally in nearby villages along the line. Local labours are quite conversant with the normal construction activity. Route alignment map is placed as Annexure-II (B).

Details of Forest involvement:

The subject line doesn’t involve any forest land.

Forest Clearance:

Since instant transmission line doesn’t involve any forest land, forest clearance under Forest (Conservation) Act, 1980 is not applicable.

(Environmental Impact Matrix)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>PARAMETERS</th>
<th>EXTENT OF IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A.</td>
<td>Total Line length - 268 Km</td>
<td>--</td>
</tr>
<tr>
<td>B.</td>
<td>Terrain: Plain : 225 km (84%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hilly : 43 km (16%)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Type of line, 765 kV S/C</td>
<td>---</td>
</tr>
<tr>
<td>3.</td>
<td>Forest land traversed (km)</td>
<td>Nil^2</td>
</tr>
</tbody>
</table>

---

Earlier route involved approx. 60.41 ha. of forest land. However, due to careful selection of substation site and due diligence in route alignment of proposed line the forest area involvement was completely avoided.
<table>
<thead>
<tr>
<th>S. No.</th>
<th>PARAMETERS</th>
<th>EXTENT OF IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Forest land traversed (ha.)</td>
<td>Nil</td>
</tr>
<tr>
<td>5.</td>
<td>Forest type</td>
<td>NA</td>
</tr>
<tr>
<td>6.</td>
<td>Forest density</td>
<td>NA</td>
</tr>
<tr>
<td>7.</td>
<td>Rare/ endangered flora</td>
<td>Nil</td>
</tr>
<tr>
<td>8.</td>
<td>Rare/ endangered fauna</td>
<td>Nil</td>
</tr>
<tr>
<td>9.</td>
<td>Migrating Wildlife/ breeding ground</td>
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</tr>
<tr>
<td>10.</td>
<td>National Park / sanctuaries</td>
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</tr>
<tr>
<td>11.</td>
<td>Amount of wet land traversed</td>
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</tr>
<tr>
<td>12.</td>
<td>Soil erodability</td>
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</tr>
<tr>
<td>13.</td>
<td>Historical / Cultural Monument</td>
<td>None</td>
</tr>
<tr>
<td>14.</td>
<td>Relocation of villagers</td>
<td>None</td>
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<tr>
<td>15.</td>
<td>Loss/ Hindrance to Public Utilities</td>
<td>Negligible, restricted to construction phase only.</td>
</tr>
</tbody>
</table>

3. LILO of 400 KV D/C Parli-Pune and Pune-Aurangabad at Pune & LILO of existing Raichur – Gooty 400 kV Quad D/C line at Raichur (New) substation

The proposed lines are meant to provide electricity to nearby areas connected to substation in the vicinity. These lines are shorter in line length and don’t have any forest area involvement. Moreover, no major environmental and social issues are envisaged, hence no alternative has been studied for these lines which require such studies. Route alignment map of LILO of Raichur – Gooty 400 kV Quad line at Raichur and LILO of 400 KV D/C Parli-Pune & Pune-Aurangabad at Pune are placed as Annexure-II (A) & Annexure-II (B) respectively.
SECTION V: POTENTIAL ENVIRONMENTAL IMPACT, ITS EVALUATION AND MANAGEMENT

5.0 IMPACT DUE TO PROJECT LOCATION

Although, all possible measures have been taken during the finalization of route alignment as described in the earlier chapter for the proposed transmission system but due to peculiarity of terrain and demography of the area where project is being implemented, some environmental impacts may be there. The explanations in brief with regard to possible environmental impact and measures taken to minimize the same are as follows:

(i) Resettlement

As described earlier all measures are undertaken by POWERGRID at line routing stage itself to avoid settlements such as cities, villages etc. It may be noted from the above description that final route alignments do not impact habitation. Moreover, keeping in mind that no land is acquired for tower foundation as per existing law, the project does not require any resettlement of villagers.

The proposed project involved construction of two new substations at Raichur & Solapur and extension of three substations at Kurnool Pune and Gooty. For extension of three existing substations at Kurnool, Pune and Gooty sufficient land is already available for proposed bays and hence there was no need to acquired fresh land. However, fresh land area measuring 37.54 ha. (Private land) acquired for Raichur through consent award where as for Solapur substation a total land area of 22.24 ha.(21.14 ha. private & 1.10 ha. govt. land) acquired for construction of substation. Hence fresh land acquisition and R&R issues are only involved in the Solapur and Raichur substations. As per the provisions of ESPP, Indian Institute of Management (IIM), Bangalore and M/s Center for Management & Social Research (CMSR), Hyderabad had been entrusted with the work of detailed social assessment. Based on outcome of such assessment, Rehabilitation Action Plan (RAP) for Raichur & Solapur were prepared & submitted to World Bank in Mar’11 and Jan’12 respectively and also disclosed on POWERGRID’s website. RAP implementation has been completed and various community development works proposed under RAP like construction of school building, community center, supply of computers in school etc. were undertaken for upliftment/ improvement of infrastructure of affected village.

(ii) Land value depreciation

Based on past experience land prices are generally expected to rise in the areas receiving power. Further, transmission lines generally pass through uninhabited area, agriculture fields and forests, where the land-use is not going to change in foreseeable future. Therefore, the value of land will not be adversely affected to a significant degree.

(iii) Historical/cultural monuments/value

As per the assessment carried out during finalization of route alignment in consultation with State Revenue Authorities and ASI, no such monuments are getting affected in the instant project.
(iv) **Encroachment into precious ecological areas**

As already explained all precautions have been taken to avoid routing of line through forest and ecological sensitive areas and National park/Sanctuaries. It is pertinent to mention that the earlier route of 765 KV S/C Solapur-Pune involved approx. 60.41 ha. of forest land. However, by careful route selection and shifting of substation location to Shikrapur, the route is so aligned that it doesn’t involve any forest land. Hence, in the instant project routes of all transmission lines so finalized that all such areas have been completely avoided.

(v) **Encroachment into other valuable lands**

Impacts on agricultural land will be restricted to the construction phase and when large-scale maintenance measures are required. Some stretch of the line will pass through Agricultural fields. Agricultural land will be lost at the base of the tower, which is estimated to be 0.2-1 sq. m per average farm holding (Fig-1).

In case of 765 kV S/C Raichur – Solapur & Sholapur – Pune line, a total of 1596 towers are erected which resulted in impact on land area of 0.1596 ha. Similarly in case of LILO of kV D/C Parli-Pune 400 and Pune-Aurangabad line at Pune & LILO of existing Raichur-Gooty 400 kV Quad D/C line at Raichur, a total land area 0.0111 ha & 0.0035 ha are impacted by erection 111 & 35 towers. Hence, the total land loss estimated to be about 0.1742 ha. which is negligible and not adversely affect the land holding.

However, in areas where lines traverse through agricultural land, compensation is paid to owners for any crop damage incurred as a result of construction activities. POWERGRID field staff consulted affected villagers and local revenue department and apprised them about the project and tower location, which are to be erected in the agricultural land, for compensation. Revenue department, after evaluating the loss due to construction activity and productivity of land, arrives at the compensation cost that is paid to farmer. Agricultural activities are allowed to continue following the construction period. If bunds or other on-farm works are disturbed during construction or maintenance, they are restored to the owner’s satisfaction following cessation of construction or maintenance activities. In the event that private trees are felled during construction or maintenance operations, compensation are paid to the owner in an amount determined by the estimated loss of products from the tree over an eight year period (for fruit bearing trees) and for other trees compensation is finalized in consultation with local forest authorities. Agricultural lands under private ownership are being identified, and in accordance with normal POWERGRID procedures compensation is paid to the affected villagers (Annexure-III). It is estimated that total compensation towards crops/trees shall be in the tune of Rs. 1401 Lakhs and budgetary provision for the same is made in the cost estimate to meet these expenses (Annexure-IV). In the instant project particular in Maharashtra, additional compensation towards land cost etc. has also been paid based on the DC order under Section 16(1) of Indian Telegraph Act, 1885.

(vi) **Interference with other utilities and traffic**

As per regulations enacted by Government of India, it is mandatory for POWERGRID to seek clearance prior to construction from department of Railways, Telecommunications and wherever necessary from aviation authorities that are likely to be affected by the construction of transmission lines. The transmission lines affect nearby telecommunication circuits by causing electrical interference. A standing committee Power Telecom Co-ordination Committee (P.T.C.C) has been constituted by
Government of India to plan and implement the mitigating measures for the induced voltage which may occur to nearby telecom circuit and suggest necessary protection measures to be adopted. The committee suggests measures like rerouting of the telecom circuits, conversion of overhead telecom circuits into cables etc. to minimize the interference.

The cost of such measures is determined by the Committee and is shared by POWERGRID and Telecom Department on the basis of prevailing norms and guidelines. Though the exact cost to mitigate the impacts of induction in neighboring telecom circuits would vary from case to case, the cost on an average works out to be Rs.5000/- per km for POWERGRID. Provision to meet these expenses has been made in the cost estimate for the same.

Wherever transmission line crosses the railways, clearance is taken from that department. In general, the system is planned and executed in such a way that adequate clearance is maintained between transmission lines on the one hand, and railways, civil aviation and defense installations on the other. Wherever the transmission lines pass by the airports the towers beyond specified height are painted in alternate orange and white stripes for easy visibility and warning lights are placed atop these towers. All necessary clearance have already been obtained or in the advance stage of processing with relevant authorities.

(vii) Interference with drainage pattern

As the transmission lines are constructed aerially and the blockage of ground surface is limited to area of tower footings, which is very small, there is little possibility of affecting drainage pattern. Since in the instant project most of the line is being constructed mostly in the plain area no such impact is encountered. In case of substations, all drainage channels along or inside substations is trained and connected to main or existing drainage to avoid any erosion due to uncontrolled flow of water

5.1 ENVIRONMENTAL PROBLEMS DUE TO DESIGN

(i) Escape of polluting materials

The equipments installed on lines are static in nature and do not generate any fumes or waste materials. To avoid/minimize during construction phase a clause has been included in the contract document and is monitored regularly by the site engineers (Refer EMP).

(ii) Explosion/fire hazards

During the survey and site selection for transmission lines and substation, it has been ensured that these are kept away from oil/gas pipelines and other sites with potential for creating explosions or fires. Apart from this, state of art safety instruments are installed in the substations on both the ends so that line gets tripped within milliseconds in case of any fault.

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

Adequate measures are taken to re-surface the area where excavation works are done. Soil disturbed during the development of sites is stored separately and used to restore the surface (Exhibit-2). Infertile and rocky material dumped at carefully selected dumping areas and used as fill for tower foundations.
(iv) **Environmental aesthetics**

Since spacing between the towers in case of 765 kV & 400 kV lines is approx. 300-400 meters and it was ensured that route of the lines are far away from the localities as possible, there is any significant affect on visual aesthetics of the localities. POWERGRID also take up plantation of trees to buffer the visual effect around its substations and to provide better living conditions. Wherever POWERGRID feels it appropriate, discussions will be held with local Forest Department officials to determine feasibility of planting trees along roads running parallel to transmission lines to buffer visual effect in these areas.

(v) **Noise/vibration nuisances**

The equipment installed at substation are mostly static and are so designed that the noise level always remains within permissible limits i.e. 85 dB(A) as per Indian standards. The noise levels reported during normal operating conditions are about 60 to 70 dB(A) at 2 m. distance from the equipment. To contain the noise level within the permissible limits whenever noise level increases beyond permissible limits, measures like providing sound and vibration dampers and rectification of equipment are undertaken. In addition, plantations of sound absorbing species like Casuarinas, Tamarind, and Neem are raised at the substations that reduce the sound level appreciably. It is reported that 93 m$^3$ of woodland can reduce the noise level by 8 dB. Actual noise levels measured at perimeters of existing Substations are 25 to 35 dB(A).

Noise during construction phase is periodically monitored and due maintenance of equipments are ensured to keep the noise level well within the prescribed limit.

(vi) **Blockage of wildlife passage**

Since the line is passing through mostly agricultural, wasteland and no forest/protected area, migration path of wild life/bird etc. are getting involved, hence possibility of disturbance to wild life is not anticipated.

5.2 **ENVIRONMENTAL PROBLEMS DURING CONSTRUCTION PHASE**

(i) **Uncontrolled silt runoff**

The project involves only small scale excavation for tower foundations at scattered locations that are re-filled with excavated material as the major portion of the project area is in plain. In the hilly areas, excavation is avoided in rainy days. Hence uncontrolled silt run off is not expected.

(ii) **Nuisance to nearby properties**

As already described in preceding paras, during site selection due care is taken to keep the transmission line away from settlements. Further, all the construction activities are undertaken through the use of small mechanical devices e.g. tractors and manual labour therefore nuisance to the nearby properties is insignificant. The construction activities are normally undertaken in lean period/post harvesting to avoid/minimize such impact (Exhibit-3).

(iii) **Interference with utilities and traffic and blockage of access way**

Access to the site along existing roads or village paths, minor improvements to paths are made where ever necessary, but no major construction of roads are required either
during construction or as a part of maintenance procedures. Using details collected using GIS and GPS during route alignment, it may be noted that access road (Metalled /Non-metalled /Cart roads) are existing to access all angle points and construction of no new road is required (taking 250 m as buffer zone which can always be accessed through head load) for these lines. Even if at some places it is found that access road is not available than existing field/path is upgraded/augmented for utilization and compensation for any damage to crop or field is paid to the owner. In many areas such improvement in the access road is highly appreciated by the local population. As explained above, special care is taken to ensure that construction activities are conducted mostly during the lean period.

As and when a transmission line crosses any road/railways line, the short span angle (DT) towers are located at a distance so as not to cause any hindrance to the movement of traffic. Stringing at the construction stage is carried out during lean traffic period in consultation with the concerned authorities and angle towers are planted to facilitate execution of work in different stages. Apart from this, safety precaution like barricading of work area and placement of visible signage are undertaken to avoid any unforeseen incident.

(iv) Inadequate resurfacing for erosion control

The proposed lines are constructed mostly in plain area where erosion problem is not anticipated. But at some points due to terrain transmission towers are placed on slopes and erosion prone soils as internationally accepted engineering practices to prevent soil erosion. This includes cutting and filling slopes wherever necessary. The back cut slopes and downhill slopes are treated with revetments. As explained above adequate steps are taken to resurface the area after construction. Wherever sites are affected by active erosion or landslides, both biological and engineering treatment are being carried out, e.g. provision of breast walls and retaining walls, and sowing soil binding grasses around the site. Further, construction is generally undertaken in dry/non-monsoon period. As the proposed lines are mostly passing through plain areas no such problems encountered.

(v) Inadequate disposition of borrow area

As mentioned earlier the transmission tower foundations involve excavations on small scale basis and the excavated soil is utilized for back filling. In case of substations generally the sites are selected in such a manner that the volume of cutting is equal to volume of filling avoiding borrowing of the area. As such acquisition/opening of borrow area is not needed.

(vi) Protection of Worker’s health/safety

The Safety Regulations/Safety Manual published by POWERGRID, and included in tender documents are guiding provisions for workers’ health and safety. Various aspects such as, work and safety regulations, workmen's compensation, insurance are adequately covered under the Erection Conditions of Contract (ECC), a part of bidding documents (Annexure-V).

POWERGRID has a dedicated unit to oversee all health and safety aspects of its project under the Operation Service Deptt. POWERGRID has framed guidelines/checklist for workers' safety as its personnel are exposed to live EHV apparatus and transmission lines. This guidelines/checklist include work permits and
safety precautions for work on the transmission lines both during construction and operation and is monitored regularly by Site In-charge and Corporate Operation Services (Annexure-VI). In addition trainings are imparted to the workers on fire fighting and safety measures (Exhibit- 4). Safety tools like helmet, safety belt, gloves etc. are provided to them in accordance to the provisions of Safety Manual. First aid facilities are made available with the labour gangs, and doctors called in from nearby towns when necessary. The number of outside (skilled) labourers are quite small, of the order of 25-30 people per group. The remaining workforce of unskilled labourers are comprised of local people. Workers are also covered by the statutory Workmen (Compensation) Act. Regular health checkups are conducted for construction workers. The construction sites and construction workers’ houses are disinfected regularly if required. In order to minimize/checking of spread of socially transmitted diseases e.g. HIV/AIDS etc., POWERGRID/contractor conducted awareness programs on such issues for the construction workers (Annexure- VII).

5.3 ENVIRONMENTAL PROBLEMS RESULTING FROM OPERATION

(i) O&M Staff/Skills less than acceptable resulting in variety of adverse effects

The O&M program in POWERGRID is normally implemented by substation personnel for both, the lines as well as substations. However in respect of the long distance transmission lines there are monitoring offices that are located at various points en-route. Monitoring measures employed include patrolling and thermo-vision scanning. The supervisors and managers entrusted with O&M responsibilities are intensively trained for necessary skills and expertise for handling these aspects.

A monthly preventive maintenance program is being carried out to disclose problems related to cooling oil, gaskets, circuit breakers, vibration measurements, contact resistance, condensers, air handling units, electrical panels and compressors. Any sign of soil erosion is also reported and rectified. Monitoring results are published monthly, including a report of corrective action taken and a schedule for future action.

POWERGRID is following the approved international standards and design, which are absolutely safe. Based on the studies carried out by different countries on the safety of EHV lines in reference to EMF affect POWERGRID have also carried out such studies with the help of PTI, USA and CPRI, Bangalore on their design. The studies inferred that the POWERGRID design are safe and follow the required international standard. Because of issues relating to need to ensure health and safety relating to the line such as fire safety, safe voltages on metallic parts of buildings, and safety clearances to avoid flashover, the transmission lines are not passing directly over any residential properties and as such the potential for EMF effects to occur will be further diminished. It is also ensure that there are no properties in the ROW beneath and to the sides of the overhead line, automatic mitigation against EMF are provided between the source of potentially high strengths (the transmission line) and the residential properties.

Poly Chlorinated Biphenyls (PCBs) due to its high heat capacity, low flammability and low electrical conductivity was extensively used as insulating material in capacitors and transformers. But after the finding that these PCBs are non-biodegradable and has carcinogenic tendency, its use in electrical equipments as insulating medium has been banned all over the world long back. However, it has been reported in some studies that chances of contamination of oil with PCB is possible. Keeping that in mind,
POWERGRID has taken all possible steps in association with NGC, UK and setup Regional testing laboratories for testing of existing oil for PCB traces and results of this suggests that PCB contamination is not an issue with POWERGRID. The World Bank has also made following comments after a detailed study on Management of PCBs in India:

“Power Grid was the most advanced in testing for PCBs of the organizations visited for this project. They have established a procedure for identification of the presence of PCBs in transformer oil and more detailed analysis for positive identification sample. To date no significant concentrations of PCBs have been detected. Power Grid does not appear to have any significant issues regarding PCB management and have initiated a testing program. The experience & laboratories of Power Grid could be used to provide a national PCB auditing service”.

5.4 CRITICAL ENVIRONMENTAL REVIEW CRITERIA

(i) Loss of irreplaceable resources

The transmission projects do not involve any large scale excavation and land is lost to the extent of 0.2-1 sq. m. only for each foundation. In the instant project, none of the line is passing through forest area, hence the problem of losing natural resources is not envisaged.

(ii) Accelerated use of resources for short-term gains

The instant project doesn’t use of any natural resources occurring in the area during construction as well as maintenance phases. The construction material such as tower members, cement etc being used are coming from factories while the excavated soil is used for backfilling to restore the surface. To conserve precious water resource and enhance the ground water level, provision of rain water harvesting has been made in all proposed substations. Hence it may be seen that the activities associated with implementation of subject project shall not cause any accelerated use of resources for short term gains. Thus the project is not causing any accelerated use of resources for short-term gains.

(iii) Endangering of species

No endangered species of flora and fauna exist in the project area as well as no protected/reserve forest is getting affected. Hence, there is no possibility of endangering/causing extinction of any species.

(iv) Promoting undesirable rural-to urban migration

The instant project doesn’t involve any submergence or loss of land holdings that normally trigger migration. It also does not involve acquisition of any private land holdings. Hence, there is no rural to urban migration.

5.5 PUBLIC CONSULTATION:

Public consultation/information is an integral part of the project implementation. Public is informed about the project at every stage of execution. During survey also POWERGRID’s site officials meet people and inform them about the routing of
transmission lines. During the construction, every individual, on whose land tower is erected and people affected by ROW, are consulted.

Apart from this, public consultation using different technique like Public Meeting, Small Group Meeting, informal Meeting as per Environmental Social Policy & Procedures of POWERGRID (ESPP) also carried out during different activities of project cycle. During such consultation the public will be informed about the project in general and in particular about the following:

- Complete project plan (i.e. its route and terminating point and substations, if any, in between);
- POWERGRID design standards in relation to approved international standards;
- Health impacts in relation to EMF;
- Measures taken to avoid public utilities such as school, hospitals, etc.;
- Other impacts associated with transmission lines and POWERGRID’s approach to minimizing and solving them;
- Land acquisition details, proposed R&R measures and compensation packages in line with POWERGRID’s policy;
- Trees and crop compensation process.

Apart from organizing many informal group meetings in different villages (Table-5.1) public meeting were also organized in the routes of transmission lines. To get the maximum participation during the Public consultation Program a notice was served well in advance to the villagers. The details of line and its importance were explained to the villagers. The details of public consultation along with photographs are enclosed as Annexure-VIII. The programmes are arranged in interactive way and queries like crop compensation, route alignment etc. were replied. Most of the participants were small farmers and were worried about their land through which the line will pass. They were informed that POWERGRID will not acquire their land for construction of transmission lines. Only towers will be spotted in their fields where they can do farming without any fear because the tower height is very high and even tractor can pass below the tower. Moreover, there is no risk of passing current from the above line as there is foolproof system of earthing for tower. The consultation process was appreciated by the villagers. They were happy to know about the transparent policy of POWERGRID for execution of the project and promised to extend their cooperation during construction of the line. The process of such consultation and its documentation shall be continued even during O&M stage.

Table 5.1: PUBLIC CONSULTATION ENROUTE OF TRANSMISSION LINES

<table>
<thead>
<tr>
<th>S No.</th>
<th>Date</th>
<th>Village Name</th>
<th>Person attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>765 kV S/C Raichur-Solapur &amp; LILO of 400 kV D/C Raichur- Gooty Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>16th May 2009 Distt.- Raichur</td>
<td>J. Venketpura</td>
<td>Village Sarpanch / Panchayat Members and general/ interested resident of village</td>
</tr>
<tr>
<td>b.</td>
<td>27th May 2009 Distt.- Gulbarga</td>
<td>Gundrevula</td>
<td>-Do-</td>
</tr>
<tr>
<td>c.</td>
<td>03rd Dec. 2013 Distt. Raichur</td>
<td>Jagir Venkatapuram</td>
<td>-Do-</td>
</tr>
<tr>
<td>d.</td>
<td>04th Dec. 2013 Distt. Solapur</td>
<td>Udagi</td>
<td>-Do-</td>
</tr>
</tbody>
</table>
2. **765 kV S/C Solapur-Pune and LILO of 400 kV D/C Parti-Pune and 400kV D/C Pune-Aurangabad line at Pune**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>13th June 2009 Distt.- Pune</td>
<td>Kedgaon</td>
</tr>
<tr>
<td>b.</td>
<td>19th June 2009 Distt.- Pune</td>
<td>Jambud</td>
</tr>
<tr>
<td>c.</td>
<td>20th June 2009 Distt.- Pune</td>
<td>Hattur</td>
</tr>
</tbody>
</table>

5.6 **CONCLUSIONS:**

From the above discussion, it would seem that the area is rich in physical resources. But careful route selection has completely avoided involvement of any forest area and protected areas. The routes selected for detailed survey are the most optimum alignment and there are no major environment and social issues involved. Hence, the project is coming under the P2 category or non sensitive as the project does not involve any forest/protected area. The infrastructural constraints are very real and pose a limiting factor on the development of the area. The above facts while on the one hand underline the need for implementation of the project for overall development of the area and on another hand suggest that a detailed E.I.A. may not be necessary.
6. ENVIRONMENTAL MONITORING PROGRAM IN POWERGRID

Monitoring is a continuous process for POWERGRID projects at all the stages be it the site selection, construction or maintenance.

The success of POWERGRID lies in its strong monitoring systems. Apart from the site managers reviewing the progress on daily basis regular project review meetings are held at least on monthly basis which is chaired by Executive Director of the region wherein apart from construction issues the environmental aspects of the projects are discussed and remedial measures taken wherever required. The exceptions of these meetings are submitted to the Directors and Chairman and Managing Director of the Corporation. The progress of various on-going projects is also informed to the Board of Directors. Following is the organization support system for proper implementation and monitoring of Environmental & Social Management Plan:

6.1 Corporate Level

An Environmental Management Cell at corporate level was created within POWERGRID in 1992 and subsequently upgraded to an Environment Management Department (EMD) in 1993 and in 1997 it has been further upgraded to Environment & Social Management Deptt. (ESMD) by incorporating social aspects of project. Briefly, the ESMD’s responsibilities are as follows:

- Advising and coordinating RHQs and Site to carry out environmental and social surveys for new projects.
- Assisting RHQs and site to finalize routes of entire power transmission line considering environmental and social factors that could arise enroute.
- Help RHQs and Site to follow-up with the state forest offices and other state departments in expediting forest clearances and the land acquisition process of various ongoing and new projects.
- Act as a focal point for interaction with the MoEF for expediting forest clearances and follow-ups with the Ministry of Power.
- Imparts training to POWERGRID’s RHQs & Site Officials on environment and social issues and their management plan.

6.2 Regional Level

At its Regional Office POWERGRID has an Environmental and Social Management Cell (ESMC) to manage Environmental and Social issues and to coordinate between ESMD at the corporate level and the Construction Area Office (CAO). The key functions envisaged for ESMC are:

- Advising and coordinating field offices to carry out environmental and social surveys for new projects envisaged in the Corporate Investment Plan.
- Assisting the ESMD and CAO to finalize routes of entire power transmission lines considering the environmental and social factors that could arise en-route.
• To follow-up forest clearances and land acquisition processes with state forest offices and other state departments for various ongoing and new projects
• Acting as a focal point for interaction with the ESMD and CAOs on various environmental and social aspects.

6.3 Site Office

At the Site level, POWERGRID has made the head of the CAOs responsible for implementing the Environmental and Social aspect of project and are termed as Environmental and Social Management Team (ESMT). Key functions of the ESMT are:

• Conduct surveys on environmental and social aspects to finalize the route for the power transmission projects
• Conduct surveys for the sites to being considered for land acquisition
• Interact with the Forest Departments to make the forest proposal and follow it up for MOEF clearance
• Interact with Revenue Authorities for land acquisition and follow it up with Authorized Agencies for implementation of Social Management Plan (SMP)
• Implementation of Environment Management Plan (EMP) and SMP
• Monitoring of EMP and SMP and producing periodic reports on the same.

It may be noted that POWERGRID is well equipped to implement and monitor its environment and Social Management plans.

As regards monitoring of impacts on ecological resources particularly in Forest, Sanctuary or National Park, it is generally done by the concerned Divisional Forest Officer, Chief Wildlife Warden and their staff as a part of their normal duties. As no forest area is involved in the instant project such monitoring/provision shall not be applicable to proposed project. A detailed Environment Management Plan (EMP) including monitoring plan for all possible environmental and social impact and its proper management has been drawn and is being implemented at site during various stage of project execution. The updated EMP with compliance status for subject line is enclosed as Annexure-IX.

Apart from this, Bank’s environment and social experts have also visited Solapur and Raichur site in April’ 2009 & April’2015 respectively to oversee the implementation of RAP and environment management measures undertaken by POWERGRID. Some photograph of above site visits are placed as Annexure-X.

6.4 Environmental Review:

Periodic review by corporate ESMD and higher management including review by POWERGRID’s CMD of all environmental and social issues is under taken to ensure that EMP and other measures are implemented at site. Besides it’s annual review by independent Auditor under ISO: 14001 shall also be undertaken for compliance of agreed policy and management plan.
MAP-1 FOREST COVER IN ANDHRA PRADESH

**Forest Cover**

- Non-Forest: 80.28%
- Very Dense Forest: 8.80%
- Moderately Dense Forest: 7.28%
- Open Forest: 3.59%
- Scrub: 0.05%

**Project Area**
MAP-2 FOREST COVER IN MAHARASHTRA

Project Area

Forest Cover

Non-Forest 83.20%
Very Dense Forest 2.66%
Moderately Dense Forest 6.56%
Open Forest 6.20%
Scrub 1.38%
MAP-3 FOREST COVER IN KARNATAKA

Project Area

Forest Cover

Non-Forest 79.98%

Very Dense Forest 0.24%

Moderately Dense Forest 11.28%

Open Forest 6.86%

Scrub 1.64%
TYPICAL PLAN OF TRANSMISSION LINE TOWER FOOTINGS

INDICATIVE MEASURES

X & Y = 10-15 METERS

a = 300-450 mm
1. Evaluation of Alternatives Route Alignment of 765 KV S/C Raichur-Solapur Line

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Description</th>
<th>Alternative-I</th>
<th>Alternative-II</th>
<th>Alternative-III</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Route particulars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length in Kms</td>
<td>207.620</td>
<td>202.643</td>
<td>201.53</td>
</tr>
<tr>
<td></td>
<td>Terrain – (a) Plain</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>(b) Hilly</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2.</td>
<td>Environmental impact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Towns in alignment</td>
<td>The line is not passing through any town however major towns in vicinity are Shahapur, Ganganapur, Afzalpur &amp; Akalkot.</td>
<td>The line is not passing through any town however major towns in vicinity are Shahapur, Ganganapur, Afzalpur &amp; Akalkot</td>
<td>The line is not passing through any town however major towns in vicinity are Shahapur, Ganganapur, Afzalpur &amp; Akalkot</td>
</tr>
<tr>
<td></td>
<td>ii) Houses within ROW</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>iii) Forest involvement</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>iv) Historical/Cultural monument</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>v) Type of Flora &amp; Fauna</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>vi) Endangered species, if any</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>viii) Details of tribal areas, if any</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>3</td>
<td>Compensation Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Forest (CA, NPV)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>b) Tree/crop</td>
<td>6.16 Cr.</td>
<td>6.06 Cr.</td>
<td>6.04 Cr</td>
</tr>
<tr>
<td>4.</td>
<td>Major Crossings:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) River (Nos.)</td>
<td>01</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>ii) Power line (Nos.)</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>iii) Railway line (Nos.)</td>
<td>01</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>iv) National/State Highway (Nos.)</td>
<td>SH-12 &amp; 20</td>
<td>SH-12 &amp; 20</td>
<td>SH-12 &amp; 20</td>
</tr>
<tr>
<td>5.</td>
<td>Overall remarks</td>
<td>Though length is more, line route is easily approachable, Less width of Krishna Xing, Less RoW problems.</td>
<td>Relatively more Krishna X'ing &amp; RoW problems</td>
<td>Comparatively bigger Krishna X'ing, less approachability &amp; more RoW problems</td>
</tr>
</tbody>
</table>

It may be seen from above that although line length of Alternative-I is longer than other two alternatives but line route is easily approachable through existing road networks and involve less RoW problems and also less width of Krishna Xing. Hence Alternative –I has been found to be most optimum route.
2. Evaluation of alternatives Route Alignment of 765 KV S/C Solapur-Pune Line

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Description</th>
<th>Alternative-I</th>
<th>Alternative-II</th>
<th>Alternative-III</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Route particulars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Length in Kms</td>
<td>244.45</td>
<td>268</td>
<td>256.23</td>
</tr>
<tr>
<td></td>
<td>ii) Terrain – (a) Plain</td>
<td>66%</td>
<td>81%</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>(b) Hilly</td>
<td>34%</td>
<td>19%</td>
<td>48%</td>
</tr>
<tr>
<td>2</td>
<td>Environmental impact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Towns in alignment</td>
<td>The line is not passing through any town however major town in vicinity are South Solapur, Pandarpur, Malshiras, Indapur, Indapur, Baramati, Shirur, Daund, Haweli, Khed, Mawal</td>
<td>The line is not passing through any town however major town in vicinity are South Solapur, Mohol, Indapur, Baramati, Daund, Shirur, Khed, Mawal</td>
<td>The line is not passing through any town however major town in vicinity are South Solapur, North Solapur, Tuljapur, Barsi, Paranda, Jamkhed, Ashti, Nagar Parner, Shirur, Khed, Mawal</td>
</tr>
<tr>
<td></td>
<td>ii) Houses within ROW</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>iii) Forest involvement</td>
<td>39.4</td>
<td>52.288</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iv) Historical/Cultural monument</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>v) Type of Flora &amp; Fauna</td>
<td>Flora - Sassoon, Babul, Boor, Hinkle, Donora, Kula, Papaya, Shed, Marvel etc. Fauna - The Great Indian Bustard, Black Buck, Wolf, Indian Fox &amp; Jackle</td>
<td>NA</td>
<td>Flora - Sassoon, Babul, Boor, Hinkle, Donora, Kula, Papaya, Shed, Marvel etc. Fauna - Wolf, Indian Fox &amp; Jackle</td>
</tr>
<tr>
<td></td>
<td>vi) Endangered species, if any</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>vii) Details of tribal areas, if</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>any</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Compensation Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Forest (CA,NPV)</td>
<td>5.91 Cr.</td>
<td>Nil</td>
<td>7.84 Cr.</td>
</tr>
<tr>
<td></td>
<td>d) Tree/crop</td>
<td>6.16 Cr.</td>
<td>6.06 Cr.</td>
<td>6.04 Cr.</td>
</tr>
<tr>
<td>4</td>
<td>Major Crossings:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) River (Nos.)</td>
<td>06</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>ii) Power line (Nos.)</td>
<td>46</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>iii) Railway line (Nos.)</td>
<td>03</td>
<td>03</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>iv) NH/SH (Nos.)</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Overall remarks</td>
<td>Though least route length and easy approachability but it involve Great Indian Bustard Sanctuary</td>
<td>Although longer in line length but it is preferred as it completely avoid forest and wildlife sanctuary</td>
<td>Relatively less line length but line route is not easily approachable and involve forest area</td>
</tr>
</tbody>
</table>

It may be seen from above analysis that Alternative-II seems to be most optimum alignment as it completely avoid ecological/environmental sensitive like forest as well as sanctuary areas whereas other alternatives involve more ecological sensitive areas and
alternative-I involved GIB wildlife sanctuary. Hence Alternative-II has been found to be most optimum route due to environmental reasons.
In exercise of the powers vested with Power Grid Corporation of India Limited (POWERGRID) under Indian telegraph Act’1885, part 3, section 10 to 19 conferred under section 164 of the Electricity Act, 2003 through Gazette by India, extra ordinary dated 24th Dec. 2003, has the authority to place and maintain transmission lines under over along or across and posts in or upon, any immoveable property. As per the provisions of Indian Telegraph Act 1885 Part III Section 10 (b) which prohibits acquisition of any rights other than that of use only, land for tower and right of way is not acquired and agricultural activities are allowed to continue. However, as per clause 10 (d) of same act stipulates that the user agency shall pay full compensation to all interested for any damages sustained during the execution of said work. Accordingly, POWERGRID pays compensation to land owners towards damages if any to trees or crop during implementation of transmission project as well as during Operation and maintenance phase. The procedure followed for such compensation is as follows:

POWERGRID follows the principle of avoidance, minimization and mitigation in the construction of line in agricultural field having crop due to inherent flexibility in phasing the construction activity and tries to defer construction in cropped area to facilitate crop harvesting. However, if it is unavoidable and is likely to affect project schedule, compensation is given at market rate for standing crops. All efforts are also taken to minimize the crop damage to the extent possible in such cases. As regards trees coming in the Right Of Way (ROW) following procedure is adopted for enumeration:

i) All the trees which are coming within the clearance belt of ROW on either side of the center line are identified and marked/numbered from one AP to the other and documented.

ii) Type, Girth (Measured 1 m. above ground level), approximate height of the tree is also noted for each tree.

iii) Trees belonging Govt., Forest, Highways and other local bodies may be separately noted down or timely follow up with the concerned authorities for inspection and removal.

iv) Cashew, Guava, Lemon and other hybrid trees which are not of tall growing nature are not marked for cutting since these trees can be crossed using standard tower extensions if required.

A notice under Indian Telegraph Act is served to the landowners informing that the proposed transmission line is being routed through the property of the individual concerned. The notice shall contain the particulars of the land, ownership details and the details of the trees/crops inevitably likely to be damaged during the course of the construction of the proposed transmission line and acknowledgement received from land owner. A copy of said notice is further issued to the Revenue Officer, who has been authorized by the State Govt. for the purpose of assessment/valuation and disbursement of compensation to the affected parties.

The revenue officer shall further issue a notice of intimation to the concerned landowner and inspect the site to verify the documents related to the proof of ownership and a detailed assessment sheet is prepared for the identified trees and crops inevitably damaged during the course of the construction. For assessing the true value of timber yielding trees help of forest officials is taken and for fruit bearing trees help of Horticulture department is taken.
The assessment sheet shall contain the land owner details type of tree/crop, its present age, variety, yielding pattern etc. and the same is prepared at site in the presence of the land owner. These assessment sheet are further compiled and a random verification is conducted by the concerned District Collector or his authorized representative in order to ascertain the assessment carried out by the revenue office is genuine and correct. After this process the District collector issues a tree cutting permit to Power Grid Corporation to enable removal / damage to the standing tree/crop identified in the line corridor.

Once the tree/crop is removed / damaged, POWERGRID shall issue a tree cutting/crop damaged notice to the land owner with a copy to the Revenue Officer to process the compensation payment. Based on the above the compensation payment is generated by means of a computerized programme developed by the National Informatics Center exclusively for this purpose. The detailed Valuation statement thus generated using this programme is verified at various levels and approval of payment of compensation is accorded by the concerned District Collectors.

On approval of compensation, the revenue officer shall further intimate the amount payable to the different landowners and POWERGRID arranges the payment by way of Demand Draft to the affected parties. The payment is further disbursed at the local village office after due verification of the documents in presence of other witnesses.
TREE / CROP COMPENSATION PROCESS

Walk over / preliminary survey of route alignment

Detailed / Check Survey of final route alignment to fix the angle point and tower spotting

Issue of Notice under Indian telegraph Act to the landowner

Preparation of assessment sheet by Revenue official at site in presence of land owner, POWERGRID and two witnesses.

Inspection / verification by DC or his authorized representative

Issue of tree cutting permit by DC

Cutting of trees by POWERGRID and issue of cutting certificate to land owner and revenue official by POWERGRID

Preparation of checklist and valuation statement by revenue official

Approval of valuation statement by DC

Disbursement of compensation to affected farmers and

Grievance Procedure
AP may represent if not satisfied with assessment to revenue or to DC for revision/review.

If he/she is still not satisfied may move to court.

Local Court

Association of Forest / Horticulture Deptt. for assessment of value of timber and fruit bearing trees respectively.
Notice under Indian Telegraph Act of 1885

Enforcement of the powers vested with Power Grid Corporation of India Limited, (a Government of India Enterprise) under the Indian Telegraph Act, 1885, section 10 to 19 read with section 68 and 164 of Electricity Act 2003, as amended up to date, notice is hereby given that 765 KV Single circuit Transmission line from Kurnool-Raichur-Sholapur will go through your property noted under. While due care will be taken to minimise the damage to existing trees and crops, certain minimum unavoidable damage is likely to take place during construction/erection of the aforesaid line. The trees so will be handed over to you. The compensation for the yield component of the trees so felled and the crops damaged will be paid to you as assessed by the Revenue Department or any other competent authority as may be decided/directed by the Revenue Department.

Name of the Owner

Address

File No.

Name of the village

Name of the Taluk

Particulars of Trees or crops to be

Received the Notice

Signature

Power Grid Corporation of India Limited

Technician/Supervisor/Engineer

Date: 21/04/13

Place:
Dear Sir / Madam,

Power Grid Corporation of India Ltd., has been entrusted with the Construction of 765 kV S/C line by Government of India its Letter No: 11/04/07 PE Dated 07/09/08 from Ministry of Power.

In exercise of the Powers under the Indian Telegraph Act 1885, Part-III Section 10 to 19 conferred under Section 164 of the Indian Electricity Act 2003, through the Gazette of India. Extraordinary dated 24th December, 2003, notice is hereby given that 765KV line will pass through your property as described below which may cause damage to the standing crops and the trees within in Right-Of-Way (ROW) are required to be cut. The crops damaged / trees cut may be taken over by you or your authorized representative. Reasonable compensation for the crops damaged / trees cut will be paid as per the assessment of the Revenue / Horticultural / Forest Department, Government of Andhra Pradesh / Karnataka/Maharashtra.

1. Name of the Owner: Basavaraj Surakant Fatale
2. Father / Husband Name: Surakant Fatale
3. Survey No.: 279/24
4. Name of the Village: Sevalal Nagar
5. Name of the Mandal / Taluk: Akkal Kot
6. Name of the District: Solapur

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Section</th>
<th>Name of the Crop / Tree</th>
<th>Area of the Crop damaged (Sq.Mtrs) / Girth &amp; Height of the trees cut (mtrs)</th>
<th>Crop damaged / Tree cut during (FDN/ERECC/STRG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>53/04</td>
<td>Green Gram</td>
<td>40\times 35 = 1400 120 \times 4 = 480 120 \times 4 = 480 120 \times 4 = 480 \frac{28}{40}</td>
<td></td>
</tr>
</tbody>
</table>

Received the Notice:
Signature: S.R. Phandel
Farmer / Authorized Representative

This is to certify that the Crops damaged / Trees cut as noted above have been handed over by POWERGRID and taken over by the former.

Signature: S.R. Phandel
Farmer / Authorized Representative

Signature: K. Srinivasa Rao
For Power Grid Corporation of India Ltd.

Signature: K. Srinivasa Rao
For Power Grid Corporation of India Ltd.
Dear Sir / Madam,

Power Grid Corporation of India Ltd., has been entrusted with the Construction of **765 KV S/C**

**Raichur - Solapur** line by Government of India its Letter No: 11/04/07 Pg dated 07/07/03 from Ministry of Power.

In exercise of the Powers under the Indian Telegraph Act 1885, Part-III Section 10 to 19 conferred under Section 164 of the Indian Electricity Act 2003, through the Gazette of India. Extraordinary dated 24th December, 2003, notice is hereby given that 765KV line will pass through your property as described below which may cause damage to the standing crops and the trees within in Right-Of-Way (ROW) are required to be cut. The crops damaged / trees cut may be taken over by you or your authorized representative. Reasonable compensation for the crops damaged / trees cut will be paid as per the assessment of the Revenue / Horticultural / Forest Department, Government of Andhra Pradesh / Karnataka/Maharashtra.

1. Name of the Owner
2. Father / Husband Name
3. Survey No.
4. Name of the Village
5. Name of the Mandal / Taluk
6. Name of the District

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Section</th>
<th>Name of the Crop / Tree</th>
<th>Area of the Crop damaged (Sq.Mtrs) / Girth &amp; Height of the trees cut (mtrs)</th>
<th>Crop damaged / Tree cut during (FDN/EREQ/STRGG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>53/04</td>
<td>Neem - 7</td>
<td>0.33, 1.28, 0.56, 0.68, 0.85, 0.77, 0.59</td>
<td>For stringing</td>
</tr>
<tr>
<td></td>
<td>+0</td>
<td>Jungal - 1</td>
<td>0.35</td>
<td></td>
</tr>
</tbody>
</table>

Received the Notice: 

Signature: S.R. Phatak  
Farmer / Authorized Representative

This is to certify that the Crops damaged / Trees cut as noted above have been handed over by POWERGRID and taken over by the farmer.

Signature: S.R. Phatak  
Farmer / Authorized Representative

Signature: K. Srinivas Rao  
For Power Grid Corporation of India Ltd.

Signature: K. Srinivas Rao  
For Power Grid Corporation of India Ltd.
NOTICE UNDER INDIAN TELEGRAPH ACT. 1885

Ref. No. Crop / Tree: No.: 586
To, BASAVARAJ SURYAKANT FATATE Date: 15.05.13
S/O: Suryakant Reunu Sidhada Fatate
Kadbagadh, AKKALKOT (TQ), SOLAPUR.

Dear Sir / Madam,

Power Grid Corporation of India Ltd., has been entrusted with the Construction of


In exercise of the Powers under the Indian Telegraph Act 1885, Part-III Section 10 to 19 conferred under Section 164 of the Indian Electricity Act 2003, through the Gazette of India. Extraordinary dated 24th December, 2003, notice is hereby given that 765KV line will pass through your property as described below which may cause damage to the standing crops and the trees within in Right-Of-Way (ROW) are required to be cut. The crops damaged / trees cut may be taken over by you or your authorized representative. Reasonable compensation for the crops damaged / trees cut will be paid as per the assessment of the Revenue / Horticultural / Forest Department, Government of Andhra Pradesh / Karnataka/Maharashtra.

1. Name of the Owner: BASAVARAJ SURYAKANT FATATE
   Father / Husband Name: Suryakant
   Survey No.: 24/24
   Name of the Village: AKKALKOT
   Mandal / Taluk: SOLAPUR
   District:

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Section</th>
<th>Name of the Crop / Tree</th>
<th>Area of the Crop damaged (Sq.Mtrs) / Girth &amp; Height of the trees cut (mtrs)</th>
<th>Crop damaged / Tree cut during (FDN/ERE/STR/FGG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>53/04</td>
<td>Bengal gram</td>
<td>49 x 46 = 2254</td>
<td>Foundation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>370 x 3.5 = 1295</td>
<td>Route for vehicles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total = 3549</td>
<td></td>
</tr>
</tbody>
</table>

Received the Notice:

Signature: 
Farmer / Authorized Representative: BASAVARAJ SURYAKANT FATATE
(4. B. Anjanevandali) E.

This is to certify that the Crops damaged / Trees cut as noted above have been handed over by POWERGRID and taken over by the former.

Signature: 
For Power Grid Corporation of India Ltd.
NOTICE UNDER INDIAN TELEGRAPH ACT OF 1885

Ref. No. Crop/Tree. No: 762
To: Basonalai Suryakant Fatale
Sr. Suryakant
Radalgaon, Akkalatet, Tel, Golapu District

Date: 15.09.13
Exaction

Dear Sir / Madam,
Power Grid Corporation of India Ltd., has been entrusted with the Construction of 765 KV SLC Raichur - Golapu line by Government of India its Letter No: 11/04/107 P & dated 07.07.08 from Ministry of Power.

In exercise of the Powers under the Indian Telegraph Act 1885, Part-III Section 10 to 19 conferred under Section 164 of the Indian Electricity Act 2003, through the Gazette of India. Extraordinary dated 24th December, 2003, notice is hereby given that 765KV line will pass through your property as described below which may cause damage to the standing crops and the trees within in Right-Of-Way (ROW) are required to be cut. The crops damaged / trees cut may be taken over by you or your authorized representative. Reasonable compensation for the crops damaged / trees cut will be paid as per the assessment of the Revenue / Horticultural / Forest Department, Government of Andhra Pradesh / Karnataka/Maharastra.

1. Name of the Owner: Basonalai Suryakant Fatale
2. Father / Husband Name: Suryakant
3. Survey No.: 27/27
4. Name of the Village: Radalgaon
5. Name of the Mandal / Taluk: Akkalatet
6. Name of the District: Golapu

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Section</th>
<th>Name of the Crop / Tree</th>
<th>Area of the Crop damaged (Sq.Mtrs) / Girth &amp; Height of the trees cut (mtrs)</th>
<th>Crop damaged / Tree cut during (FDN/ERE/STRGG)</th>
</tr>
</thead>
</table>
| 1     | 52/1014 | Chavangaro               | 50 x 50 = 2500
|       |         |                         | 7 x 1 x 70 = 490
|       |         |                         | 120 x 4 = 480
|       |         |                         | **3670**                                                                          |

Received the Notice:
Signature
Farmer / Authorized Representative
Suryakanth Raven Sidda Padate

This is to certify that the Crops damaged / Trees cut as noted above have been handed over by POWERGRID and taken over by the former.

Signature
Farmer / Authorized Representative
Date:

For Power Grid Corporation of India Ltd.

Signature
For Power Grid Corporation of India Ltd.
MONEY RECEIPT

No: 240  Date: 15/06/13

Received with thanks an amount of Rs. 16,183 (Rupees sixteen thousand one hundred and eighty three only) vide D.D./Cheque No. 893

Dated 10/06/13, drawn on HDFC from Power Grid Corporation of India Ltd., towards Compensation for crops damaged / trees cut vide notice No. 586

Dated 15/05/13 during Foundation / Tower Erection/Stringing works as full and final settlement of the compensation against damages and there are no claims whatsoever pending against the notice of damage mentioned hereinabove.

Signature of the Farmer/Owner

Witness:
1) Signature, Name & Address

2) Signature, Name & Address

Signature of POWERGRID Representative,

K. Srinivas Rao
MONEY RECEIPT

No. 537

Date: 24/09/13

Received with thanks an amount of Rs. 25,103,00 (Rupees Twenty Five Thousand One Hundred Thirty only) vide D.D./Cheque No. 1978 Dated 20/9/13 drawn on HDFC from Power Grid Corporation of India Ltd., towards Compensation for crops damaged/trees cut vide notice No. 762 Dated 15/09/13 during Foundation/Tower Erection/Stringing works as full and final settlement of the compensation against damages and there are no claims whatsoever pending against the notice of damage mentioned hereinafore.

[Signature]

Signature of the Farmer/Owner

Witness:

1) V.K. Phatate
   Signature, Name & Address

2) ____________________________
   Signature, Name & Address

[Signature]

Signature of POWERGRID Representative,

K. Srinivasa Rao
J.T.
POWER GRID CORPORATION OF INDIA LIMITED
(A Govt. of India Enterprise)

MONEY RECEIPT

No. 2014

Date: 5/11/13

Received with thanks an amount of Rs. 19,426.00 (Rupees Nineteen Thousand Four hundred twenty six only) vide D.D./Cheque No. 2616

Dated 1/11/13 drawn on HDFC from Power Grid Corporation of India Ltd., towards Compensation for crops damaged / trees cut vide notice No. __________

Dated __________ during Foundation / Tower Erection/Stringing works as full and final settlement of the compensation against damages and there are no claims whatsoever pending against the notice of damage mentioned hereinabove.

V.K. Phatate

Signature of the Farmer/Owner

Witness:

1) ____________________________
   Signature, Name & Address

2) ____________________________
   Signature, Name & Address

Signature of POWERGRID Representative,
K. Srinivasa Rao J.T.
POWER GRID CORPORATION OF INDIA LIMITED
(A Govt. of India Enterprise)

MONEY RECEIPT

No.: 2016
Date:

Received with thanks an amount of Rs. 9,830-00 (Rupees Nine Thousand two hundred Thirty only) vide D.D./Cheque No. 3650

Dated 11/13 drawn on HDFC from Power Grid Corporation of India Ltd., towards Compensation for crops damaged / trees cut vide notice No.

Dated during Foundation / Tower Erection/Stringing works as full and final settlement of the compensation against damages and there are no claims whatsoever pending against the notice of damage mentioned hereinabove.

V. K. Phalate
Signature of the Farmer/Owner

K. Srinivasa Rao
Signature of POWERGRID Representative,

Witness:
1) Signature, Name & Address

2) Signature, Name & Address
SYSTEM STRENGTHENING IN SR & WR FOR KRISHNAPATNAM UMPP

BUDGET ESTIMATE TOWARDS FOREST AND CROP/TREE COMPENSATION

Total line length - 535 Kms.
Total tower locations - 1742 nos.

A. Compensation

1. Forest
   - Line length in forest: - 0 Km.
   - Forest area involvement - 0 ha.

   Forest compensation - Nil

2. Crop & Trees
   - Line length in Private /Revenue land - 535 Kms.
   - Tower location in Private /Revenue land - 1742 Nos.
   - Crop/tree compensation-(535 x 2,50,000/-) = Rs.1337.50 lakhs

   Sub Total A (1+2) - Rs. 1337.50 lakhs

B. Implementation Monitoring & Audit

   i) Man-power involved for EMP implementation & Monitoring in entire route of Transmission lines (Rs.10, 000/-x 535 Km) = Rs. 53.50 lakhs
   ii) Independent Audit (LS) if needed = Rs. 10.00 lakhs

   Sub Total B - Rs. 63.50 lakhs

Grand Total (A+B) = Rs.1401.00 lakhs
not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registrar appointed by the government.

p) Factories Act 1948: The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

Addition of New Clause GC 22.4.1

Protection of Environment

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as consequence of his methods of operation.

During continuance of the Contract, the Contractor and his Sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974. This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. ‘Pollution’ means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.
The Air (Prevention and Control of Pollution) Act, 1981. This provides for prevention, control and abatement of air pollution. ‘Air Pollution’ means the presence in the atmosphere of any ‘air pollutant’, which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986. This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. ‘Environment’ includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991. This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under Environment (Protection) Act, 1986, and exceeding such quantity as may be specified by notification by the Central Government.

GC 22.4.2 Addition of New Sub Clause 22.4.2

(i) The Contractor shall (a) establish an operational system of managing environmental impacts, (b) carry out all the monitoring and mitigation measures set forth in the environment management plan attached to the Particular Conditions as Appendix-I, and (c) allocate the budget required to ensure that such measures are carried out. The Contractor shall submit to the Employer (quarterly) semi-annual) reports on the carrying out of such measures.

(ii) The Contractor shall adequately record the conditions of roads, agricultural land and other infrastructure prior to transport of material and construction commencement, and shall fully reinstate pathways, other local infrastructure and agricultural land to at least their pre-project condition upon construction completion.

(iii) The Contractor shall undertake detailed survey of the affected persons during transmission line alignment finalization under the Project, where applicable, and
(iv) The Contractor shall conduct health and safety programme for workers employed under the Contract and shall include information on the risk of sexually transmitted diseases, including HIV/AIDS in such programs.

GC 22.4.3 Addition of New Sub Clause 22.4.3 including its Sub-Clauses

Safety Precautions

GCC 22.4.3.1 The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until taking over, provide:

a) fencing, lighting, guarding and watching of the Works wherever required, and

b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.

GCC 22.4.3.2 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to POWERGRID or to others, working at the Site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and the Engineer, as he may deem necessary.

GCC 22.4.3.3 The Contractor will notify well in advance to the Engineer of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The Engineer shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such instructions. The Engineer shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the Owner and the Owner shall not entertain any claim of the Contractor
towards additional safety provisions/conditions to be provided or constructed as per the Engineer's instructions.

Further, any such decision of the Engineer shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site area is forbidden by the Engineer, the Contractor shall use alternative methods with the approval of the Engineer without any cost implication to POWERGRID or extension of work schedule.

GCC 22.4.3.4 Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act, 1948 and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Engineer. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

GCC 22.4.3.5 All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's Operation Manual and safety instructions and as per Guidelines/rules of POWERGRID in this regard.

GCC 22.4.3.6 Periodical examinations and all tests for all lifting/hoisting equipment & tackles shall be carried-out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Engineer or by the person authorised by him.

GCC 22.4.3.7 The Contractor shall be fully responsible for the safe storage of his and his Sub-Contractor's radioactive sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of
such material will be taken by the Contractor.

GCC 22.4.3.8 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by the Engineer who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.

GCC 22.4.3.9 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practice/Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.

GCC 22.4.3.10 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access; railings, stairs, ladders, scaffolding etc. The scaffolding shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the Contractor.

GCC 22.4.3.11 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Owner or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by POWERGRID to handle such fuses, wiring or electrical equipment.

GCC 22.4.3.12 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Owner, he shall:

a. Satisfy the Engineer that the appliance is in good working condition;

b. Inform the Engineer of the maximum current rating, voltage and phases of the appliances;

c. Obtain permission of the Engineer detailing the sockets to which the appliances may be connected.

GCC 22.4.3.13 The Engineer will not grant permission to connect until he is satisfied that;
a. The appliance is in good condition and is fitted with suitable plug;

b. The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

GCC 22.4.3.14 No electric cable in use by the Contractor/Owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.

GCC 22.4.3.15 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Engineer and a permit to work shall be issued by the Engineer before any repair work is carried out by the Contractor. While working on electric lines/equipment, whether live or dead, suitable type and sufficient quantity of tools will have to be provided by the Contractor to electricians/workmen/officers.

GCC 22.4.3.16 The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.

GCC 22.4.3.17 The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen, who will coordinate with the Project Safety Officer. In case of work being carried out through Sub-Contractors, the Sub-Contractor's workmen/employees will also be considered as the Contractor's employees/workmen for the above purpose.

The name and address of such Safety Officers of the Contractor will be promptly informed in writing to Engineer with a copy to Safety Officer-In-charge before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

GCC 22.4.3.18 In case any accident occurs during the construction/erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal
injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Engineer in prescribed form and also to all the authorities envisaged under the applicable laws.

GCC 22.4.3.19 The Engineer shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Engineer within 3 days of such stoppage of work and decision of the Engineer in this respect shall be conclusive and binding on the Contractor.

GCC 22.4.3.20 The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in para GCC 22.4.3.19 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.

GCC 22.4.3.21 It is mandatory for the Contractor to observe during the execution of the works, requirements of Safety Rules which would generally include but not limited to following:

Safety Rules

a) Each employee shall be provided with initial indoctrination regarding safety by the Contractor, so as to enable him to conduct his work in a safe manner.

b) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.

c) Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.
d) Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate fire fighting equipment shall be provided at crucial location.

e) Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.

f) There shall be a suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.

g) The staircases and passageways shall be adequately lighted.

h) The employees when working around moving machinery, must not be permitted to wear loose garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment.

i) The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used.

j) Requirements of ventilation in underwater working to licensed and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.

k) In case of rock excavation, blasting shall invariably be done through licensed blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

GCC 22.4.3.22 The Contractor shall follow and comply with all POWERGRID Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservations. In case of any discrepancy between statutory requirement and POWERGRID Safety Rules
referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent.

GCC 22.4.3.23 If the Contractor falls in providing safe working environment as per POWERGRID Safety Rules or continues the work even after being instructed to stop work by the Engineer as provided in para GCC 22.4.3.19 above, the Contractor shall promptly pay to POWERGRID, on demand by the Owner, compensation at the rate of Rs.5,000/- per day of part thereof till the instructions are complied with and so certified by the Engineer. However, in case of accident taking place causing injury to any individual, the provisions contained in para GCC 22.4.3.24 shall also apply in addition to compensation mentioned in this para.

GCC 22.4.3.24 If the Contractor does not take adequate safety precautions and/or fails to comply with the Safety Rules as prescribed by POWERGRID or under the applicable law for the safety of the equipment and plant or for the safety of personnel or the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors or POWERGRID employees or any other person who are at Site or adjacent thereto, then the Contractor shall be responsible for payment of a sum as indicated below to be deposited with POWERGRID, which will be passed on by POWERGRID to such person or next to kith and kin of the deceased:

<table>
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<th></th>
<th>Rs. 1,000,000/- per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Fatal injury or accident causing death</td>
<td></td>
</tr>
<tr>
<td>b. Major injuries or accident causing 25% or more permanent disablement</td>
<td>Rs. 100,000/- per person</td>
</tr>
</tbody>
</table>

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The amount to be deposited with POWERGRID and passed on to the person mentioned above shall be in addition to the compensation payable under the relevant provisions of the Workmen's Compensation Act and rules framed there under or any other applicable laws as applicable from
time to time. In case the Contractor does not deposit the above mentioned amount with POWERGRID, such amount shall be recovered by POWERGRID from any monies due or becoming due to the Contractor under the contract or any other on-going contract.

GCC22.4.3.25 If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract awarded by the Owner and no accident occurs then POWERGRID may consider the performance of the Contractor and award suitable 'ACCIDENT FREE SAFETY MERITIOUS AWARD' as per scheme as may be announced separately from time to time.

GC 22.6 Emergency Work (GC Clause 22.6)

Replace the words "Otherwise" with "In case such work is not in the scope of the Contractor", in the second last line of second paragraph of GC clause 22.6.

GC 23.3 Supplementing sub-clause GC 23.3

For notification of testing, four weeks shall be deemed as reasonable advance notice.

GC 23.7 Test and Inspection (GC Clause 23.7)

Replace the words "GC Sub-Clause 6.1" with "GC Sub-Clause 46.1", in the last line of GC clause 23.7.

GC 24.4 Replacing Sub-Clause GC 24.4

As soon as all works in respect of Precommissioning are completed and, in the opinion of the Contractor, the Facilities or any part thereof is ready for Commissioning, the Contractor shall commence Commissioning as per procedures stipulated in Technical Specification, and as soon as Commissioning is satisfactorily completed, the Contractor shall so notify the Project Manager in writing.

GC 24.5 Replacing Sub-Clause GC 24.5

The Project Manager shall, within fourteen (14) days after receipt of the Contractor’s notice under GC Sub-Clause 24.4, notify the Contractor in writing of any defects and/or deficiencies.
If the Project Manager notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies, and shall repeat the procedure described in GC Sub-Clause 24.4. If the Project Manager is satisfied that the Facilities or that part thereof have passed Precommissioning, the Project Manager shall, within fourteen (14) days after receipt of the Contractor’s notice, seven (7) days after receipt of the Contractor’s repeated notice, advise the Contractor to proceed with the Commissioning of the Facilities or that part thereof. If the Project Manager is not so satisfied, then it shall notify the Contractor in writing of any defects and/or deficiencies within seven (7) days after receipt of the Contractor’s repeated notice, and the above procedure shall be repeated.

**GC 24.6 Replacing Sub-Clause GC 24.6**

If the Project Manager fails to advise the Contractor to proceed with the Commissioning of the Facilities or the relevant part thereof or inform the Contractor of any defects and/or deficiencies within fourteen (14) days after receipt of the Contractor’s notice under GC Sub-Clause 24.4 or within seven (7) days after receipt of the Contractor’s repeated notice under GC Sub-Clause 24.5, then the Facilities or that part thereof shall be deemed to have passed Precommissioning, as of the date of the Contractor’s notice or repeated notice, as the case may be.

Existing Sub-clause GC 24.7 stands amended and renumbered as GC 24.9 and following Sub-Clauses stand added as new Sub-Clauses GC 24.7, 24.7.1, 24.7.2, 24.7.3, 24.7.4, 24.7.5, 24.7.5.1 & 24.7.6

**GC 24.7 GC 24.7 Commissioning**

Commissioning of the Facilities (or specific part thereof, where specific parts are specified in the GC 1.1) shall be commenced by the Contractor immediately after being advised by the Project manager, pursuant to GC sub-clause 24.5 or immediately after the deemed Completion except for Commissioning Precommissioning (including deemed Precommissioning) under GC sub-clause 24.6.

**GC 24.7.2**

The Employer shall, to the extent specified in Appendix-6 (scope of works and supply by the Employer), deploy the operating and maintenance personnel and supply raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other materials required for Commissioning.

**GC 24.7.3**

On passing of the Precommissioning and charging of the Facilities at rated voltage, Commissioning would be attained.
2.11.6 Wet locations shall be kept completely dewatered, both during and 24 hours after placing the concrete, without disturbance of the concrete.

2.11.7 If the concrete surface is found to be defective after the formwork has been removed, the damage shall be repaired with a rich cement sand mortar at the satisfaction of the Employer before the foundation is backfilled.

2.12 Backfilling and Removal of Stub Templates

2.12.1 After opening of formwork and removal of shoring, timbering, etc., backfilling shall be started after repairs, if any, to the foundation concrete. Backfilling shall normally be done with the excavated soil, unless it is a clay or it consists of large boulders/stone, in which case the boulders shall be broken to a maximum size of 80-mm. At locations where borrowed earth is required for backfilling, Contractor shall bear the cost irrespective of load & lift.

2.12.2 The backfilling materials shall be clean and free from organic or other foreign materials. A clay type soil with a grain size distribution of 50% or more passing the no. 200 sieve as well as a black cotton soil are unacceptable for backfilling. The earth shall be deposited in maximum 200 mm layer, levelled, wetted if necessary and compacted properly before another layer is deposited. The moisture content for compaction shall be based on the Proctor compaction test results given in the Geo-technical Report, Clause 3.6 of section III. The density of the compacted backfill material may further be verified to the satisfaction of the Employer based on the sand-cone method described in the ASTM D1556-82 standard.

2.12.3 The backfilling and grading shall be carried to an elevation of about 75-mm above the finished ground level to drain out water. After backfilling, a high earthen embankment (band) will be made along the sides of excavations and sufficient water will be poured in the backfilling earth for at least 24 hours. After the pits have been backfilled to full depth the stub templates shall be removed.

2.13 Curing

The concrete shall be cured by maintaining the concrete wet for a period of at least 10 days after placing. Once the concrete has set for 24 hours the pit may be backfilled with selected moistened soil and well consolidated layers not exceeding 200-mm thickness and thereafter both the backfill earth and exposed channys, shall be kept wet for the remainder of the prescribed 10 days. The exposed concrete channys shall also be kept wet by using empty gunny bags around it and wetting the bags continuously during the critical 10-day period.

2.14 Benching
When the line passes through hilly/undulated terrain, leveling the ground may be required for casting of tower footings. All such activities shall be termed benching and shall include cutting of excess earth and removing the same to a suitable point of disposal as required by Employer. Benching shall be resorted to only after approval from Employer. Volume of the earth to be cut shall be measured before cutting and approved by Employer for payment purposes. Further, to minimize benching, unequal leg extensions shall be considered and provided if found economical. If the levels of the pit centres be in sharp contrast with the level of tower centre, suitable leg extensions may be deployed as required. The proposal shall be submitted by the Contractor with detailed justification to the Employer.

2.15 Protection of Tower and Tower Footing

2.15.1 Tower spotting shall endeavor to minimise the quantity of revetment required.

2.15.2 The work shall include all necessary stone revetments, concreting and earth filling above ground level, the clearing from site of all surplus excavated soil, special measures for protection of foundation close to or in nulas, river bank / bed, undulated terrain, protection of up hill / down hill slopes required for protection of tower etc., including suitable revetment or galvanised wire netting and meshing packed with boulders. The top cover of stone revetment shall be sealed with M-15 concrete (1:2:4 mix). Contractor shall recommend protection at such locations wherever required. Details of protection of tower/tower footing are given in drawing enclosed with these specifications for reference purpose only.

2.15.3 Tower footings shall generally be backfilled using soil excavated at site unless deemed unsuitable for backfilling. In the latter case, backfilling shall be done with borrowed earth of suitable quality irrespective of leads and lift. The unit rate for backfilling quoted in BPS shall include the required lead and consolidation and leveling of earth after backfilling.

2.15.4 The provisional quantities for protection work of foundations are furnished in price schedule of Bid Proposal Sheet(BPS). The unit rates shall also be applicable for adjusting with the actual quantities of protection works done. These unit rates shall hold good for protection work carried out on down hills or up hills slopes applicable for the tower locations.

2.15.5 The unit rates for random rubble masonry revetment quoted in price schedule shall also include excavation & (1:5) random masonry and unit rate for top sealing with M-15 concrete. For payment purposes the volume of random rubble masonry revetment shall be measured from bottom to top sealing coat and paid at the quoted rates indicated in price schedule.

No extra rates shall be paid for allied work such as excavation, for revetment packed stone at head of weep holes etc. However, no deduction
The cases containing easily damageable material shall be very carefully packed and marked with appropriate caution symbols, i.e. fragile, handle with care, use no hook etc wherever applicable.

Each package shall be legibly marked by the Contractor at his expenses showing the details such as description and quantity of contents, the name of the consignee and address, the gross and net weights of the package, the name of the Contractor etc.

2.0 Employer's Environment and Social Policy and Its Implementation

2.1 Development and growth of mankind through industrialization and unwarranted use of natural resources has inflicted considerable impact on Environment and Society. As a result, Environmental and Social issues have emerged as the focal point of global debate.

Employer's activities by their inherent nature and flexibility have negligible impacts on environmental and social attributes. In order to address these issues and to match the rising expectations of a cleaner, safer and healthier environment, Employer has evolved its Environmental and Social Policy and Procedures (ESPP). The key principles of Employer Environmental and Social Policy are:

i) Avoidance of environmentally and socially sensitive areas while planning project activities.

ii) Minimisation of impacts when project activities occur in environmentally and socially sensitive areas.

iii) Mitigation of any unavoidable adverse impacts arising out of its projects.

2.2 Basic issues to be kept in mind while carrying out construction activities are to

i) Avoid socially sensitive areas with regard to human habitations and areas of cultural significance

ii) Secure the interest of people affected by Employer's projects

iii) Involve local people affected by transmission line projects as per requirement and suitability

iv) Consult affected people in decisions having implication to them if considered necessary

v) Apply efficient and safe technology/practices

vi) Keep abreast of all potential dangers to people's health, occupational safety and safety of environment and the respective mitigation measures.
vii) Establish preventive mechanisms to guarantee safety.

viii) Mitigation measures in case of accidents.

ix) Avoid unwarranted cutting of trees in forest area.

2.3 While constructing the lines through forest stretches the contractor will provide alternate fuel to its employee e.g., working labours/supervisors etc. in order to avoid cutting of forest woods.

2.4 Contractor will ensure safety to the wild life, during working/camping near to the National park.

2.5 Contractor during construction of lines in agricultural fields will ensure minimum damages to the crops, trees, bunds, irrigation etc. If the same is un-avoidable, the decision of Engineer-in-charge shall be final.

2.6 The waste/excess material/debris should be removed from the construction site including agricultural field, forest stretches, river etc. immediately after construction work.

2.7 The Contractor will ensure least disturbance to the hill slope and natural drainage so as to avoid soil erosion. Natural drainage in plain area is disturbed to be trained to the satisfaction of Engineer-in-charge.

2.8 As far as possible existing path/kutchha road/Approach shall be used for the construction.

2.9 The Contractor will ensure supply of stone chips/sand from authorised/approved quarry areas.

2.10 Proper documentation of above, if any.
WEEKLY REPORTING OF SAFETY SESSIONS TAKEN AT SITE

1) Name/Table: RAIHOR, SIKAPER, T.G.KV. 33/11 KV. LINE.

2) Name/Location No.: Raichor, A.A.D. C.E.R.

3) Name/Date of Training Session: Raichor, D.I.T.E.

4) Name/Designation of Power Grid Official taking session: SARKAR, K. GOVARDHAN - MANAGER FOUNDATION WORKS.

5) Name/Activity in progress at Site: Foundation works.

6) Name/No. of employees working at site:
   a) Departmental Executives: 3
   b) Contractor's Executives: 7
   c) Workmen: 18

7) Name/No. of employees attended in the session: 12
   a) Departmental Executives: 3
   b) Contractor's Executives: 7
   c) Workmen: 18

8) Name/Time covered in the session: 10:00 AM - 4:00 PM

9) Name/Nature of Topics covered in the session: Safety during foundation works, during transporting etc.

10) Name/Has the Official also checked the personal protective equipment and T&P: Yes/No?

11) Name/If Yes details thereof to be enclosed.

12) Name/When the session was given: 10/12/19

(Signature of Line In-charge)

(Signature of Official)

Forwarded to Chief Regional Safety Manager, SRTS-1 Secunderabad for kind information please.
घटना स्थल पर व्यक्तिगत संरक्षण उपकरण और उपकरण व संयंत्र की जाँच

Checking of personal protection equipment and T &P at site of Work.

दिनांक/Date: 09.08.2012
स्थल/Location: H 17 A & O DFZ
पैकेज/Package: P 260 Cen T RACFOR SHOLAPUR 7 65 (Km)

(टेक्षेता का नाम(जिनके वस्तु आंच किये गए)....NATIONAL CONTRACTORS CO. LTD
Contractor’s Name(whose items checked)
घटनास्थल पर कार्यकारी व्यक्तियों की संख्या No. Of Contractor’s persons working at site: 23
कार्यपालक/Executives............पर्यवेक्षक/Supervisors............. कामिंग/Workmen.........................

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<th>विनिमयाला का नाम Manufacturer’s Name</th>
<th>पहचान विन्ह Identification mark</th>
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<td>3</td>
<td>Gloves (5 nos)</td>
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</table>

(प्रवर्षिक के प्रतिनिधि का हस्ताक्षर)
(Signature of POWERGRID Rep.)
नाम/Name: G VEDAVELLA
पदनाम/Designation: Manager (Safety)
स्थल/Place: Re nidri
दिनांक/Date: 09/03/12

(टेक्षेता के प्रतिनिधि का हस्ताक्षर)
(Signature of Contractor’s Rep.)
नाम/Name: P B S ABHAR
पदनाम/Designation: Asst.P.M.

सुरक्षा एक अच्छी कारोबारी भावना है SAFETY IS A GOOD BUSINESS SENSE
POWER GRID CORPORATION OF INDIA LTD.  
CORPORATE OPERATION SERVICES  

SAFETY CHECK LIST PRIOR TO COMMENCEMENT OF WORK

Name of the Project: P-2600, TW 1  
Name of Transmission Line: RAIPUR- SHOLAPUR, 765 kV, 500 kV  
Name of the POWERGRID site In-charge: SHRI. M. VENKATESWARALU, CM.  
Name of Project Manager of Construction Agency: P. RAGHAVAN, SR. P.M.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Observation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contractor Safety Policy. (Copy)</td>
<td>Available / Not</td>
<td>SENT TO H.O. SIGNATURE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>available ✔</td>
<td>SHALL BE SUBMITTED.</td>
</tr>
<tr>
<td>2</td>
<td>Labour licence. (Copy)</td>
<td>Available / Not</td>
<td>COPY ENCLOSED.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>available ✔</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Explosive licence if required. (Copy)</td>
<td>Available / Not</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>available ✔</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Comprehensive Insurance Policy. (Copy)</td>
<td>Available / Not</td>
<td>COPY ENCLOSED.</td>
</tr>
<tr>
<td></td>
<td>(Workmen Compensation, General Liability, Automobile insurance)</td>
<td>available ✔</td>
<td></td>
</tr>
<tr>
<td>5a</td>
<td>Deployment of Manpower Plan:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Copy of the organization structure of contractor to be finalized during</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>preaward.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b</td>
<td>Manpower deployment plan activitywise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Deployment of Full time Safety officer of contractor at site :</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Name: F. B. FARAABZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Designation: SAFETY ENGR.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Availability of Communication facility:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Public Address system.</td>
<td>Nos.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Walky Talkie.</td>
<td>Nos.</td>
<td>MOBILE PHONES.</td>
</tr>
<tr>
<td></td>
<td>c) Red and Green Flags.</td>
<td>Nos.</td>
<td>AVAILABLE.</td>
</tr>
<tr>
<td>8</td>
<td>Personal Protective Equipment (PPE).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total quantity required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quantity available</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plan of PPE deployment for balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(i) Safety Helmets (IS marked, having Chin strap and nape strap).</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(ii) Safety Belts (IS:3521/EN 361) with shoulder, Waist &amp; thigh straps,</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>automatic locking of hook, shock absorber in life line and tool kit bag.</td>
<td>0</td>
<td>WILL BE ARRANGING</td>
</tr>
<tr>
<td></td>
<td>Serial No. / Batch number printed on the belts and supported with test</td>
<td></td>
<td>SHORTLY.</td>
</tr>
<tr>
<td></td>
<td>certificate).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. Comments from contractor in short, if any:

Briefing by Safety Manager at Public both for Supervision and Technical Staff was very much useful for the members. We would keep in mind all his instructions while executing the work.

10. Observations of POWERGRID in short, if any:

The agency has been observing all safety norms and procedures while executing the work.

Contractor Representative

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Representative</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. Baskar</td>
<td>Pr. Pan.</td>
<td>Markal</td>
</tr>
</tbody>
</table>

POWERGRID

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>K. G VARDHAN</td>
<td>Manager</td>
<td>9/4</td>
</tr>
</tbody>
</table>

Copy: ED (Region)
GM CMG / CC, Gurgaon.
GM (OS) / CC, Gurgaon
POWDER GRID CORPORATION OF INDIA LIMITED
CORPORATE OPERATION SERVICES

Safety Check List During Foundation Work

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Description</th>
<th>Observations</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Check whether Supervisor / Gang leader had issued instructions to workers before start of work on that day.</td>
<td>YES</td>
<td>BY NCC Safety Officer</td>
</tr>
<tr>
<td>2</td>
<td>a) All workers are using PPEs at site i.e. Safety Helmets, Rubber Gum Boots, Hand Gloves.</td>
<td>Safety helmet - No. in use / total worker = 18/18 Rubber Gum Boot - No. in use / total worker = 7/18 Hand Gloves - No. in use / total worker = 5/18</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) POWERGRID Officials are using PPEs at site.</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Distance of Dumped excavated soil of all four sides from the edge of the pit.</td>
<td>3 M/4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Slope of cutting edge of all four sides.</td>
<td>DRY HARD 5-11</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>a) De watering arrangement, if required.</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) If yes, Distance of disposal of water.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Installation of Shoring &amp; Shuttering, if required.</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Adequate warning &amp; Barricading of the pit for protection have been made.</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>The Blaster is valid license holder. Yes / No. Adequate arrangement made to inform public by caution marking (Red flag) / Public Notice and signal man posted.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Strong ladder provided in the pit.</td>
<td>YES</td>
<td>3.5 M / 3.2 M BSF</td>
</tr>
<tr>
<td>10</td>
<td>Jacks for supporting the template is placed at safe distance.</td>
<td>YES</td>
<td>1.5 M BSF</td>
</tr>
<tr>
<td>11</td>
<td>Distance of construction materials, Concrete Mixer / Compressor placed from edge of pit.</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Whether arrangements for electrical loose joints and barricading of electrical panels have been made.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Whether all Safety aspects taken care of for concreting.</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>First Aid Box with required items are available at site and (Name &amp; No.) of First Aid trained persons</td>
<td>YES</td>
<td>FARAAZ</td>
</tr>
<tr>
<td>15</td>
<td>Action taken for violation for safety norms, if any.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Any other points specific to location:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONSTRUCTION AGENCY OFFICIALS

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. Basak</td>
<td>SR. PM</td>
<td></td>
</tr>
<tr>
<td>M. M. Basak</td>
<td>SR. SR</td>
<td></td>
</tr>
<tr>
<td>F. R. Raiz</td>
<td>Safety Engr</td>
<td></td>
</tr>
</tbody>
</table>

POWERGRID OFFICIALS

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Ramana</td>
<td>Sr. Technical Engr</td>
<td></td>
</tr>
<tr>
<td>K. Guvendran</td>
<td>Manager</td>
<td></td>
</tr>
</tbody>
</table>

Copy: 1. Project Manager Const. Agency M/s.
2. GM of Const. Agency M/s.
3. Site In-charge POWERGRID
4. ED(Region)/ GM(Projects)/POWERGRID

- Safety Check list for Pile / Well Foundation will be issued separately.
No.46(38)/2012-RLC/BLY

Date: 24.05.2012.

To:

M/s National Contracting Co., Ltd.,
No.01-11-55/17,
First Floor, Venkateshwara Colony,
Linga sugar Road,
Raichur-584101

Sir,

Sub: Contract Labour (Regulation & Abolition) Act, 1970 and Central Rules, 1971
- Issue of Licence - Reg.

Ref: Your letter No. Nil dated

*****
1. The Licence bearing No.38/2012-RLC/BLY dated 24.05.2012 in respect of Foundation and Tower Erection and Transmission line etc., from Raichur to Sholapur
2. The licence is issued without any prejudice to any legal action that his department initiate against you for commencing the work without obtaining valid licence.
3. The maximum number of contract workers to be engaged in the above contract work should not exceed 150 (One hundred and fifty) on any day.
4. The contract labour should not be engaged in the prohibited categories of employment as per the Notification of the Govt. of India
5. Acknowledge the receipt and strictly adhere to the conditions of licence.
6. For renewal of licence, the application for renewal should be submitted one month in advance before the date of expiry of the licence.

Yours faithfully,

(Y.V.N.CHARI)
LICENSED OFFICER AND
REGIONAL LABOUR COMMISSIONER (CENTRAL), BELLARY

Encl As above.
Copy together with copy of application for licence is forwarded to
1. The LEO(C), Bellary/Gulbarga,
2. The Chief Manager, Power Grid Corporation of India Ltd., No.1-4-1495, Ganga Parameshwari Layout, Raichur
PUBLIC CONSULTATION HELD AT JAGIR VENKATAPURAM VILLAGE ON 03.12.2013
PUBLIC CONSULTATION HELD AT UDAGI VILLAGE ON 04.12.2013
GENERAL HEALTH CHECK-UP
GENERAL HEALTH CHECK-UP
GENERAL HEALTH CHECK-UP
Quiz & prize distribution
<table>
<thead>
<tr>
<th>Project Activity / Stage</th>
<th>Potential Impact</th>
<th>Proposed Mitigation Measures</th>
<th>Parameter to be Monitored</th>
<th>Measurement and Frequency</th>
<th>Institutional Responsibility</th>
<th>Implementation Schedule</th>
<th>Compliance Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of transmission towers and transmission line alignment and design</td>
<td>Exposure to safety related risks</td>
<td>Setback of dwelling to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.</td>
<td>Tower location and line alignment selection with respect to nearest dwellings</td>
<td>Setback distance to nearest houses – once</td>
<td>POWERGRID</td>
<td>Part of tower sitting survey and detailed alignment survey and design</td>
<td>Careful route alignment had ensured that no house/dwelling unit is coming in the ROW.</td>
</tr>
<tr>
<td>Equipment specifications and design parameters</td>
<td>Release of chemicals and gases in receptors (air, water, land)</td>
<td>PCBs not used in substation transformers or other project facilities or equipment.</td>
<td>Transformer design</td>
<td>Exclusion of PCBs in transformer stated in tender specifications – Once</td>
<td>POWERGRID</td>
<td>Part of tender specifications for the equipment</td>
<td>Compiled and included in tender document</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Process, equipment and system not to use chlorofluorocarbons (CFCs), including halon, and their use, if any, in existing processes and systems should be phased out and to be disposed of in a manner consistent with the requirement of the Government</td>
<td>Process, equipment and system design</td>
<td>Exclusion of CFCs stated in tender specification – Once</td>
<td>POWERGRID</td>
<td>Part of tender specifications for the equipment</td>
<td>Compiled and included in tender document</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmission line design</td>
<td>Exposure to electromagnetic</td>
<td>Transmission line design to comply with the limits of electromagnetic interference from overhead power lines</td>
<td>Electromagnetic field strength for proposed line design</td>
<td>Line design compliance with relevant standards – Once</td>
<td>POWERGRID</td>
<td>Part of detailed alignment survey and design</td>
<td>Designs are in compliance with international standards as certified by PTI, USA, CPRI Bangalore</td>
</tr>
<tr>
<td>Location of transmission towers and transmission line alignment and design</td>
<td>Impact on water bodies and land</td>
<td>Consideration of tower location where they could be located to avoid water bodies</td>
<td>Tower location and line alignment selection (distance) to water bodies</td>
<td>Consultation with local authorities and avoiding tower foundation in water bodies.</td>
<td>POWERGRID</td>
<td>Part of tower sitting survey and detailed alignment survey and design</td>
<td>Compiled and no tower is placed in water bodies.</td>
</tr>
<tr>
<td>Social inequities</td>
<td>Careful route selection to avoid existing settlements</td>
<td>Tower location and line alignment selection (distance to nearest dwelling or social institutions)</td>
<td>Consultation with local authorities and land owners – ONCE</td>
<td>POWERGRID</td>
<td>Part of tower sitting survey and detailed alignment survey and design</td>
<td>Careful route selection and provision of adequate extensions has avoided the habituated area to the extent possible.</td>
<td></td>
</tr>
<tr>
<td>Minimize need to acquire agriculture land</td>
<td>Tower location and line alignment selection (distance to agricultural land)</td>
<td>Consultation with local authorities and land owners – once</td>
<td>POWERGRID</td>
<td>Part of tower sitting survey and detailed alignment survey and design</td>
<td>No agricultural land is acquired for tower location and people are consulted at every stage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Activity /Stage</td>
<td>Potential Impact</td>
<td>Proposed Mitigation Measures</td>
<td>Parameter to be Monitored</td>
<td>Measurement and Frequency</td>
<td>Institutional Responsibility</td>
<td>Implementation Schedule</td>
<td>Compliance Report</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Encroachment into precious ecological area</td>
<td>Loss of precious ecological values/damages to precious species</td>
<td>Avoid encroachment by careful site and alignment selection</td>
<td>Tower location and line alignment selection (distance to nearest designated ecological protection area)</td>
<td>Consultation with local forest authorities to avoid/minimize forest involvement – once</td>
<td>POWERGRID</td>
<td>Part of detailed siting and alignment survey /design</td>
<td>Lines into precious ecological area like forest, eco sensitive area etc. was completely avoided</td>
</tr>
<tr>
<td>Transmission line through forestland</td>
<td>Deforestation and loss of biodiversity</td>
<td>Avoid encroachment by careful site and alignment selection</td>
<td>Tower location and line alignment selection (distance to nearest protected or reserved forest)</td>
<td>Consultation with local authorities and design engineers- once</td>
<td>POWERGRID</td>
<td>Part of detailed siting and alignment survey /design</td>
<td>NA since there is no forest involve.</td>
</tr>
<tr>
<td>Encroachment into farmland</td>
<td>Loss of agricultural productivity</td>
<td>Use existing tower footings/towers wherever possible</td>
<td>Tower location and line alignment selection</td>
<td>Consultation with local authorities and design engineer- once</td>
<td>POWERGRID</td>
<td>Part of detailed alignment survey and design</td>
<td>Foundations cast during lean period to avoid damage to the crops during harvest.</td>
</tr>
<tr>
<td>Farmers compensated for any permanent loss of productive land</td>
<td>Design of Implementation of Crop Compensation (based on affected area)</td>
<td>Consultation with affected parties – once in a quarter</td>
<td>Prior to construction phase</td>
<td>Compensation being paid as per Indian Telegraph Act 1885 for all damages if any.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmers / land owners compensated for significant trees that need to be trimmed / removed along ROW.</td>
<td>Design of implementation of Tree compensation (estimated area to be trimmed / removed)</td>
<td>Consultation with affected parties – once in a quarter</td>
<td>Prior to construction phase</td>
<td>Tree compensation paid for all damages during construction.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interference with drainage patterns/Irrigation channels</td>
<td>Flooding hazards / loss of agricultural production</td>
<td>Appropriate siting of towers to avoid channel interference</td>
<td>Tower location and line alignment selection (distance to nearest flood zone)</td>
<td>Consultation with authorities and design engineers- once</td>
<td>POWERGRID</td>
<td>Part of detailed alignment survey and design</td>
<td>Being complied regularly.</td>
</tr>
<tr>
<td>Construction</td>
<td>Equipment layout and installation</td>
<td>Noise and vibration</td>
<td>Construction techniques and machinery selection seeking to minimize ground disturbance</td>
<td>Construction techniques and machinery</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Complied and periodic monitoring of machinery is done.</td>
</tr>
<tr>
<td>Construction</td>
<td>Equipment layout and installation</td>
<td>Noise and vibration</td>
<td>Construction techniques and machinery selection seeking to minimize ground disturbance</td>
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<td>Project Activity /Stage</td>
<td>Potential Impact</td>
<td>Proposed Mitigation Measures</td>
<td>Parameter to be Monitored</td>
<td>Measurement and Frequency</td>
<td>Institutional Responsibility</td>
<td>Implementation Schedule</td>
<td>Compliance Report</td>
</tr>
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</tr>
<tr>
<td>Physical construction</td>
<td>Disturbed farming activity</td>
<td>Construction activities on cropping land timed to avoid disturbance of field crops (within one month of harvest wherever possible)</td>
<td>Timing of start of construction</td>
<td>Crop disturbance – Post harvest as soon as possible but before next crop- once par site</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Foundation being planned in lean period or avoided during harvest. <em>(Exhibit-3)</em></td>
</tr>
<tr>
<td>Mechanized construction</td>
<td>Noise, vibration and operator safety, efficient operation</td>
<td>Construction equipment to be well maintained.</td>
<td>Construction equipment-estimated noise emissions</td>
<td>Complaints received by local authorities – every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Complied.</td>
</tr>
<tr>
<td></td>
<td>Noise vibration, equipment wear and tear</td>
<td>Turning off plant not in use</td>
<td>Construction equipment – estimated noise emissions and operating schedules</td>
<td>Complaints received by local authorities – every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Complied.</td>
</tr>
<tr>
<td>Construction of roads for accessibility</td>
<td>Increase in airborne dust particles</td>
<td>Existing roads and tracks used for construction and maintenance access to the line wherever possible</td>
<td>Access roads, routes (length and width of new access roads to be constructed)</td>
<td>Use of established roads wherever possible – every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Existing Road used to access the line route</td>
</tr>
<tr>
<td>Temporary blockage of utilities</td>
<td>Over flows, reduced discharge</td>
<td>Temporary placement of fill in drains/canals not permitted</td>
<td>Temporary fill placement</td>
<td>Absence of fill in sensitive drainage areas – every 4 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Nil</td>
</tr>
<tr>
<td>Site clearance</td>
<td>Vegetation</td>
<td>Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance</td>
<td>Vegetation marking and clearance control (area in m2)</td>
<td>Clearance strictly limited to target vegetation – every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Included in contract provisions and being monitored regularly. An area of 400 m² is being cleared tower foundation at each location depending on the type of tower. In rest of ROW trees that are coming in the electrical clearance zone are cleared.</td>
</tr>
<tr>
<td>Temporary blockage of utilities</td>
<td>Fire Hazards</td>
<td>Trees allowed growing up to a height within the ROW by maintaining adequate clearance between the top of tree and the conductor as per the Species – specific tree retention as approved by statutory authorities (average and maximum tree height at maturity in meters)</td>
<td>.Presence of target species in ROW following vegetation clearance – once per site</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Parameter is being monitored and taken care during const.</td>
<td></td>
</tr>
<tr>
<td>Trimming/cutting of trees within ROW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Exhibit-3*
<table>
<thead>
<tr>
<th>Project Activity / Stage</th>
<th>Potential Impact</th>
<th>Proposed Mitigation Measures</th>
<th>Parameter to be Monitored</th>
<th>Measurement and Frequency</th>
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<th>Implementation Schedule</th>
<th>Compliance Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood / vegetation harvesting</td>
<td>Loss of vegetation and deforestation</td>
<td>Construction workers prohibited from harvesting wood in the project area during their employment (apart from locally employed staff continuing current legal activities)</td>
<td>Illegal wood / vegetation harvesting (area in m3 number of incident reported)</td>
<td>Complaints by local people or other evidence of illegal harvesting every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Provision for providing fire wood/ fuels etc. are included in contract. All such provisions are complied by contractor and taken care during const. by the site In-charge.</td>
</tr>
<tr>
<td>Surplus earthwork / soil</td>
<td>Runoff to cause water pollution, solid waste disposal</td>
<td>Soil excavated from tower footings disposed of by placement along roadside, or at nearby house blocks if requested by landowners.</td>
<td>Soil disposal locations and volume (m3)</td>
<td>Acceptable soil disposal sites – every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Excavated earth is used for refilling. The top/fertile soil is kept separately for resurfacing and other earth is used for refilling. Approx. 100-300 m³ earth is excavated at each tower location and 90-95% of this is used for refilling/resurfacing and rest is being disposed off along with other debris at selected location with landowners request.</td>
</tr>
<tr>
<td>Tower construction- disposal of surplus earthwork/fill</td>
<td>Waste disposal</td>
<td>Excess fill from tower foundations excavation disposed of next to roads or around houses, in agreement with the local community or landowner</td>
<td>Location and amount (m3) of fill disposal</td>
<td>Appropriate fill disposal locations- every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>--Do-- These provisions are strictly complied and recorded during construction.</td>
</tr>
<tr>
<td>Storage of chemicals and materials</td>
<td>Contamination of receptors (land, water, air)</td>
<td>Fuel and other hazardous materials securely stored above high flood level.</td>
<td>Location of hazardous material storage; spill reports &amp; type of material spilled, amount (kg or m3) and action taken to control and clean up spill)</td>
<td>Fuel storage in appropriate locations and receptacles – every 2 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Complied and condition is taken care during storage.</td>
</tr>
<tr>
<td>Construction schedule</td>
<td>Noise nuisance to neighboring properties</td>
<td>Construction activities only undertaken during the day and local communities informed of the construction schedule</td>
<td>Timing of construction (Noise level in dB(A))</td>
<td>Day time construction –every 2 Weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>It is ensured by site In-charge that construction activities takes place during day time and villagers are informed in advance and affected villagers are even served notice in advance.</td>
</tr>
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</tr>
<tr>
<td>Provision of facilities for construction workers</td>
<td>Contamination of receptors(land, water, air)</td>
<td>Construction work force facilities to include proper sanitation, water supply and waste disposal facilities.</td>
<td>Amenities for workforce facilities</td>
<td>Presence of proper sanitation, water supply and waste disposal facilities - once each new facility</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Complied and included in the contract provision. Adequate sanitation facilities are provided in the labour camp.</td>
</tr>
<tr>
<td>Encroachment into farmland</td>
<td>Loss of agricultural productivity</td>
<td>Use existing access roads wherever possible</td>
<td>Usage of existing utilities</td>
<td>Complaints received by local people / authorities every 4 weeks</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>During construction existing road are used. No irrigation facilities is affected or blocked.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure existing irrigation facilities are maintained in working condition</td>
<td>Status of existing facilities</td>
<td></td>
<td></td>
<td></td>
<td>All measures to resurface the excavated area by top soil is adopted as described above.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Protect/ preserve topsoil and reinstate after construction completed</td>
<td>Status of facilities (earthwork in m3)</td>
<td></td>
<td></td>
<td></td>
<td>Damaged bunds were repaired to normal stage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Repair/reinstate damaged bunds etc after construction completed</td>
<td>Status of facilities (earthwork in m3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social inequities</td>
<td>Compensation for temporary loss in agricultural production</td>
<td>Implementation of crop compensation (amount paid, dates, etc)</td>
<td>Consultation with affected parties – once in a quarter</td>
<td></td>
<td>POWERGRID Prior to construction</td>
<td></td>
<td>Compensation towards crop damage paid to affected person.</td>
</tr>
<tr>
<td>Uncontrolled erosion / silt runoff</td>
<td>Soil loss, downstream siltation</td>
<td>Need for access tracks minimized, use of existing roads. Limit site clearing to work areas.</td>
<td>Design basis and construction procedure</td>
<td>Incorporating good design and construction management practices – once for each site</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>All necessary measured undertaken during construction. Regeneration/cultivation is allowed in the complete ROW and even in the area below tower after completion of construction activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regeneration of vegetation to stabilize works areas on completion (where applicable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>It is ensured by the site In-charge that no excavation is carried out during monsoon/rainy season.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Avoidance of excavation in wet seasons</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Water courses protected form siltation through use of bunds and sediment ponds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuisance to near by properties</td>
<td>Losses to neighboring land uses/ values</td>
<td>Contract clauses specifying careful construction practices.</td>
<td>Contract clauses</td>
<td>Incorporating good construction management practices- once for each site</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Complied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>As much as possible existing access ways will be used</td>
<td>Design basis and layout</td>
<td>Incorporating good design engineering practice- once for each site</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
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<tr>
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<tr>
<td></td>
<td>Productivity land will be reinstated following completion of construction</td>
<td>Reinstatement of land status (area affected, m²)</td>
<td>Consultation with affected parties - twice immediately after completion of construction and after the first harvest</td>
<td></td>
<td></td>
<td></td>
<td>Complied</td>
</tr>
<tr>
<td>Social inequities</td>
<td>Compensation will be paid for loss of production, if any</td>
<td>Implementation of Tree/crops compensation (amount paid)</td>
<td>Consultation with affected parties - Once in a quarter</td>
<td>POWERGRID</td>
<td>Prior to construction</td>
<td>Crop and tree compensation paid to affected persons.</td>
<td></td>
</tr>
<tr>
<td>Health and safety</td>
<td>Injury and sickness of workers and members of the public</td>
<td>Contract provisions specifying minimum requirements for construction camps</td>
<td>Contract clauses (number of incidents and total lost-work day caused by injuries and sickness)</td>
<td>Contract clauses compliance – once every quarter</td>
<td>POWERGRID (Contractor through contract provisions)</td>
<td>Construction period</td>
<td>Complied. No incident of accident/injury reported</td>
</tr>
<tr>
<td></td>
<td>Contractor to prepare and implement a health and safety plan.</td>
<td>Contractor to arrange for health and safety training sessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>All health and safety plan are in place and monitored regularly</td>
</tr>
<tr>
<td></td>
<td>Inadequate construction stage monitoring</td>
<td>Training of POWERGRID environmental monitoring personnel.</td>
<td>Number of program attended by each person – once a year</td>
<td>POWERGRID</td>
<td>Routinely throughout construction period</td>
<td>Periodic training programs are organized for such persons.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Likely to maximize damages</td>
<td>Implementation of effective environmental monitoring and reporting system using check list of all contractual environmental requirements</td>
<td>Respective contract checklists and remedial actions taken thereof</td>
<td>Submission of duly completed checklists of all contracts for each site – once</td>
<td></td>
<td></td>
<td>Compiled. Regular monitoring by site, RHQ and Corporate is organized.</td>
</tr>
<tr>
<td></td>
<td>Appropriate contact clauses to ensure satisfactory implementation of contractual environmental mitigation measures</td>
<td>Compliance report related to environmental aspect for the contract</td>
<td>Submission of duly completed checklists of all contracts for each site – once</td>
<td></td>
<td></td>
<td></td>
<td>All provisions are compiled and monitored regularly by Site/RHQ.</td>
</tr>
</tbody>
</table>

### Operation and Maintenance

<table>
<thead>
<tr>
<th>Location of transmission towers and transmission line alignment and design</th>
<th>Exposure to safety related risks</th>
<th>Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.</th>
<th>Compliance with setback distance (&quot;as built&quot; diagram)</th>
<th>Setback distances to nearest houses – once in quarter</th>
<th>POWERGRID</th>
<th>During operation</th>
<th>Designed as per guidelines of ICNIRP and ACGIH and checked by CPRI and M/s PTI, USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil spillage</td>
<td>Contamination of land / nearby water bodies</td>
<td>Substation transformers located within secure and impervious sump areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks</td>
<td>Substain bundign (oil sump) (&quot;as built&quot; diagram)</td>
<td>Bunding (Oil sump) capacity and permeability – once</td>
<td>POWERGRID</td>
<td>During operation</td>
<td>Oil sump of sufficient capacity (200% by volume of oil tank in transformer) is provided for every transformer.</td>
</tr>
<tr>
<td>Inadequate Provision of</td>
<td>Injury and sickness of staff / Careful design using appropriate technologies to</td>
<td>Usage of appropriate technologies (lost Preparedness level for using these</td>
<td></td>
<td></td>
<td>POWERGRID</td>
<td>Design and operation</td>
<td>Being Complied. In design and operation</td>
</tr>
<tr>
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</tr>
<tr>
<td>staff/workers health and safety during operations</td>
<td>workers</td>
<td>minimize hazards</td>
<td>work days due to illness and injuries</td>
<td>technologies in crisis – once each year</td>
<td>POWERGRID</td>
<td>Design and Operation</td>
<td>Being Complied.</td>
</tr>
<tr>
<td>Electric shock hazards</td>
<td>Injury / mortality to staff and public</td>
<td>Careful design using appropriate technologies to minimize hazards</td>
<td>Usage of appropriate technologies (number of injury incidents, lost work days)</td>
<td>Preparedness level for using these technologies in crisis – once a month</td>
<td>POWERGRID</td>
<td>Operations</td>
<td>Being Complied.</td>
</tr>
<tr>
<td>Equipment specifications and design parameters</td>
<td>Release of chemicals and gases in receptor(air, water, land)</td>
<td>Processes, equipment and systems using chlorofluorocarbons(CFCs), including halon, should be phased out and to be disposed of in a manner consistent with the requirements of the Government</td>
<td>Process, equipment and system design</td>
<td>Phase out schedule to be prepared in case still in use – once in a quarter</td>
<td>POWERGRID</td>
<td>Operations</td>
<td>Being Complied.</td>
</tr>
<tr>
<td>Transmission line maintenance</td>
<td>Exposure to electromagnetic interference</td>
<td>Transmission line design to comply with the limits of electromagnetic interference overhead power lines</td>
<td>Required ground clearance(meters)</td>
<td>Ground clearance – once</td>
<td>POWERGRID</td>
<td>Operations</td>
<td>Designed as per guidelines of ICNIRP and ACGIH and checked by CPRI and M/s PTI, USA.</td>
</tr>
<tr>
<td>Noise related</td>
<td>Nuisance to neighboring properties</td>
<td>Substation sited and designed to ensure noise will not be a nuisance</td>
<td>Noise level (dB(A))</td>
<td>Noise level at boundary nearest to properties and consultation with affected parties if any – once</td>
<td>POWERGRID</td>
<td>Operations</td>
<td>Being Complied.</td>
</tr>
</tbody>
</table>
Bank’s Safeguard Team Site Visit to Solapur
Bank’s Safeguard Expert Site Visit to Raichur