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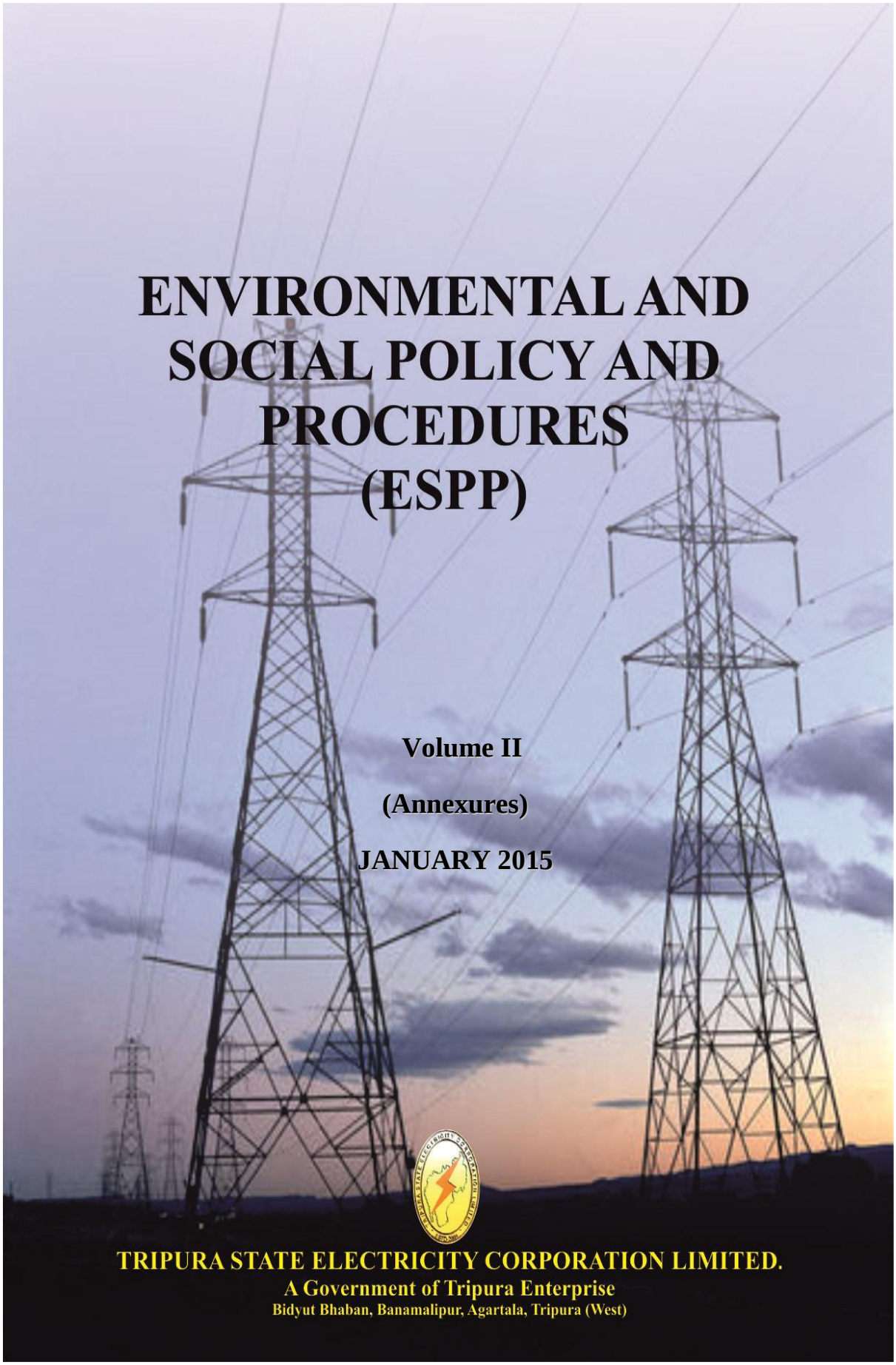

ENVIRONMENTAL AND SOCIAL POLICY AND PROCEDURES (ESPP)

Volume II

(Annexures)

JANUARY 2015

TRIPURA STATE ELECTRICITY CORPORATION LIMITED.
A Government of Tripura Enterprise
Bidyut Bhaban, Banamalipur, Agartala, Tripura (West)

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Annexure-1

Comprehensive details about Tripura State and its Environmental & Social Sensitivities'

1. Tripura State -Background

Tripura is located in the south-west extreme corner of the north-eastern region, between latitudes 22º56' and 24 º 32' N and longitudes 91º10' and 92º20' E. The state is land locked and situated between the river valley Myanmar and Bangladesh, and is bounded by Bangladesh on the north, west, south and southeast measuring length about 839 Km; in the east it has a common boundary with Assam and Mizoram measuring 53 Km and 109 Km respectively. The terrain largely consists of parallel hills and ridges running from the northwest to the southeast direction, with alternating narrow valleys.

The range of hills rises from the plains of Sylhet in Bangladesh at the north and proceeds southwards until they join the hills of the Chittagong hill tracts in Bangladesh. The elevation of hills gradually increases in the east. The eastern range of the Jampui is situated at an elevation of 914 meters above MSL and the western range of the Baramura, Deotamura with its elevation of 244 meters above MSL is the lowest.

The partition of India in 1947 and political upheavals that had preceded and followed the momentous development had brought an end to princely rule of Manikya dynasty in Tripura. After India became independent, Tripura acceded to the Central Union on 15 October, 1949 as a "C" category state and became a Union Territory in November 1956. A popularly elected ministry was formed in Tripura in July 1963 and since then; the State has had governments elected on the basis of universal adult franchise. Tripura attained full statehood on January 21, 1972. Tripura is also rich in its composite cultural heritage embodied in archaeological remains, architecture and sculpture.

At the time of Tripura's merger with effect from October 15, 1949 with the Central Union, the major mode of farming was shifting cultivation or 'jhum', which produced little surplus. A small proportion of the plain lands of the State were under settled agriculture undertaken by Bengalis, and the main crop was rice. Most of the plane lands of the State were not under cultivation and were covered with cane-brakes and marshes. Thus at the time of formation of the State, the economy was predominantly

agricultural and forest-based, with no industrial base, a low level of urbanization and limited infrastructure.

For administrative convenience and decentralisation of power Tripura which had once been a single district only is now divided into altogether eight districts, 23 subdivisions and 52 rural development blocksand 32 revenue circles. Besides, a special feature of the state is the vibrant existence of an Autonomous District Council (ADC) for tribals based on 6th schedule of the Central constitution. The ADC in Tripura encompasses 68.10% of the state's total geographical territory and is home to roughly one third of the state's population.

The administration in Tripura is distinguished by the existence of separate legislative, governance and judiciary systems for tribal areas. The Sixth Schedule of the Constitution applies to a large part of the state, which is under the jurisdiction of the Tripura Tribal Areas Autonomous District Council (TTAADC). Of the total geographical area of 10,491 sq. km, 7,133 sq. km (about 68%) is under the TTAADC. The Sixth Schedule areas are governed through autonomous District Councils (ADC) that has wide-ranging legislative and executive powers. As a result, they almost work like a “mini Parliaments.” They have complete freedom to allow village level bodies to run according to their customary laws. The verdicts of district and lower level courts can only be challenged in the high court.

The purpose of establishing the Autonomous District Council (ADC) is to provide for internal autonomy to the tribal people inhabiting these areas, and protect their social, cultural and economic interests, through granting them administrative and legal authority as per constitution of India.
The Constitution of India provided several types of safeguards amongst others to the tribal communities which are:

- The Protective Provisions to protect them from all forms of social injustice and exploitation.
- The Developmental Provisions promotes education and developmental activities.
- The Reservation Provisions to ensure their representation in legislative bodies and government jobs.

2. Environment Baseline

2.1 Land use in Tripura

The State of Tripura with 1.049 million hectare (mha) of land area (10,491.6 sq. km) has nearly 59.96% of total under forest area (0.629) mha

Land Use

Land Use	Area in `000 ha	Percentage
Total geographical area	1,049	-
Reporting area for land utilization	1,049	100.00
Forests	629	59.96

Not available for cultivation	141	13.44
Permanent pastures and other grazing lands	2	0.019
Land under misc. tree corps and groves	14	1.334
Cultivable wasteland	4	0.38
Fallow lands other than current fallows	2	0.19
Current fallows	2	0.19
Net area sown	256	24.31

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

2.2 Soil

The soil types of Tripura can be classified under five major groups, of which Red loam and sandy loam soil occupies 43.07 percent of the total area followed by Reddish yellow brown sandy soils (33.06%), the other three groups occupy less than 10 percent each (Table below).

Soil of Tripura

S. No.	Soil Group	Area		Soil taxonomic unit
		Sq. km	Percent	
1.	Reddish yellow brown sandy soils	3,468	33.06	▪ Ultic Hapludalfs ▪ Udic Ustochrepts ▪ Typic Udorthents
2.	Red loam and sandy loam soils	4,514	43.07	▪ Ultic HaplustaIfs ▪ Typic/Ultic Hapludalfs ▪ Typic PaleudaIfs ▪ Typic Ustochrepts ▪ Typic Drystochrepts ▪ Udic Ustochrepts ▪ Typic U.stochrepts
3.	Older alluvial soils	1,019	9.71	▪ Typic OchraquaJfs ▪ Typic Haplaquepts
4.	Younger alluvial soils	980	9.34	▪ Typic Udifluvents
5.	Lateritic soils	510	4.86	▪ Typic Palehumults ▪ Typic Plinthustults ▪ Typic Plinthudults ▪ Typic Paleudults
Total		**10,491**	**100.00**	

2.3 Geomorphology, Geology and mineral resources

- **Geomorphology**

Geomorphologically, the state of Tripura represents the western fringe of typical “ridge and valley” province of the late Tertiary fold mountain belt, commonly known as Indo-Burman ranges (Purbanchal range). The general elevation varies between 780 m in the north eastern part to 15 m in

the western part above mean sea level. Five prominent roughly north south trending anticlinal strike ridges traverse the state from east to west; these are Jampui, Sakhantlang, Longtarai, Athramura and Baramura. This strike ridges form the watershed of the Meghna basin of Bangladesh fed by Khowai, Haora, Juri, Manu, Dhalai, Deo, Longai, Muhuri, Feni and Gomoti rivers. Ten physiographic units have been identified by the Geological Survey of India (1999) in the State of Tripura.

- **Physiographic unit of Tripura**

Physiographic unit of Tripura	
Sl.No.	**Physiographic unit**
i.	Steeping slopping and slightly dissected high relief structural hills and ridges exemplified by areas like Kailashahar, Panisagar, Baramura, Teliamura, etc.
ii.	Moderately slopping with moderately dissected medium relief parallel ridges present in north and north eastern part of Tripura.
iii.	Moderately slopping and highly dissected, low relief structural hills and ridges found in the north-west and southern part of the state.
iv.	Moderately to gently sloping and moderately dissected flat topped denuded hill occurring in western, central and southern part of Tripura.
v.	Low lying residual hill with valley represented by Gonda charra area of south eastern part of Tripura.
vi.	Undulatory plain with low mounds and gently slopping valley situated mostly in the western and southern part of Tripura.
vii.	Moderately to gently slopping inter-hill valley with upland mostly occurring on the northern- eastern and southern part of the state.
viii.	Moderately to gently slopping inter-hill valleys with alluvial upland plains, represented by Kumarghat-Chailengta area as alluvial deposit of river Manu.
ix.	Rolling upland common in some pockets of the west and north-western part of Tripura.
x.	Flood plain constitutes important area rornled by rivers of Tripura. Studied area Krishnakishore nagar and Jampuri fall under this group.

- **Geology**

The state of Tripura exhibit an wide array of sedimentary rocks characteristics of marine-mixed-fluvia type origin ranging age from upper most Oligocene (38 million years from present time) to Recent period. These sediments, according to GSI, have been laid down in the Surma basin during Tertiary age (which lasted for 65 million years) in an wide range of environmental conditions governed by local tectonic movement. Tectonically, the region now comprises a series of sub-parallel arquate, elongated, doubly plunging folds arrange in north south direction. These folds for anticlines separated by wide flat sinclines.

The group of sediments during different geological age are shown in Table below on litho-stratigraphy.

Stratigraphy of Tripura		
Age	**Group**	**Formation**
Holocene		Khowai Formation Ghilatoli Formation Teliamura Formation Kalyanpur Formation
Quaternary	Dupitila	Dupitila Formation
Upper Pliocene to Pleistocene Pliocene	Tipam	Upper Tipam Formation Lower Tipam Formation
Micocene- Lr. Pliocene Upper most Oligocene	Surma	Bokabil Formation Upper Bhuban Formation Middle Bhuban Formation Lower Bhuban Formation (Not exposed in Tripura)

- **Mineral Resources**

In Tripura, the mineral resources are mainly glass sands, limestone, plastic clay and hard rock; all of these materials are being used to a variable degree. However, the single most important resource in the state is oil and natural gas. ONGC or Oil and Natural Gas Commission has initiated massive exploration programme in the State, details of which are dealt later.

Table below provides an account of locations of deposit, current uses, etc. of minerals in Tripura. Details of clay deposit in Tripura has been provided in the State of Environment Report for Tripura (1989). The impact of mining and quarrying of mineral resources in Tripura has so far been insignificant.

Mineral Resources		
Mineral	**Location**	**Uses**
Hard Rock	▪ Jampui Hills ▪ Longatari Hill	▪ Road metals
Limestone	▪ Sakhan & Jampui Range ▪ Manpui area ▪ (990,000 t. reserve)	▪ Not suitable Cement ▪ Suitable for inferior quality of Lime Puzzolana mix.
Clay	▪ All over the State generally in river bank deposit ▪ Good clay deposit in West and South region. ▪ Total 1.73 million ton deposit in four zone out of six zones* ▪ [* Mohanpur-Bamutia-Kamalghat; Bisramganj-Bagma; Champamura-Baldakhal-Jogendranagar; Khowai-Teliamura-Ampi; Shantirbazar-Udaipur; Kumarghat and Baidyathakurpara-Anadanagar- Maheshkhola-Dukli-Sonamura area]	▪ Sanitary ware ▪ Stone wares ▪ Sewerage pipes ▪ Electric insulator ▪ Refractory grade
Glass Sand	▪ Bishramganj (160,000t) ▪ Old Agartala (16,000t) ▪ Jogendranagar (3627t) ▪ Sekerkota (80,000t)	

Mineral Resources		
Mineral	**Location**	**Uses**
	▪ Dasharambari (5330t) ▪ Mohanpur (97,875t) ▪ Baidyathakurpara- Anadanagar Maheshkhola and Dukli (NA) ▪ Total Reserve 3,62,832 tonnes	

2.4 Climate

The State of Tripura experiences Humid Sub-tropical type of climate. The features of climate, however, vary between its different parts of the State. There are only two Meteorological Observatories at Agartala and Kailasahar in Tripura having the facility to record temperature and other weather information. Some of the important features of regional variation of climate with regard to temperature, rainfall, humidity and wind speed are described below.

2.5 Temperature

The normal temperature at Agratala and Kilasahar is 25.2°C and 25.0°C respectively. The temperature shows a declining trend from west to east. The daily maximum temperature and minimum mean temperatures are 30.70°C and 19.50°C respectively during summer months. The cold weather starts from about the end of November when the temperature of both day and night decreases steadily. January is the coldest month when mean daily minimum temperature is only 8.9°C and maximum temperature is 25.2°C.

2.6 Rainfall

The annual average rainfall being fairly high (2000-3000 millimeters), the process of chemical weathering and rapid erosion of the soils and bed rocks appear significant.

The occurrence of different soil groups can be correlated with topographical variations, land slope, climate, vegetation cover and present rock material. Dutta et.al. (1982) provided a detailed document of Soil of North Eastern Region including Tripura and showed the association of variable taxonomic units under each of the soil group, ranging between one to seven.

2.7 Humidity

Humidity is generally high throughout the year. In the summer season the relative humidity is between 50 percent to 74 percent whereas in the rainy season it is over 85 percent.

2. 8 Wind Speed

The mean wind speed is 7.1 km per hour, with maximum of 13.1 km per hour in May and minimum of 3 km per hour in December.

2.9 Environment Sensitiveness

2.9.1 Recorded Forest Area:

Tripura has a geographical area of 10,490 square km. The recorded forest area of the state is 6,294 km² which constitutes 60.02% of its geographical area. Reserved Forests constitute 66.33%, Protected Forests 0.03% and Un-classed Forests constitute 33.64%. Tripura Forest map is placed in Fig:1 below. However, due to 856 km long international borders with Bangladesh, the trans-border-conservation is one of the most serious problems leading to degradation of existing forest. Tripura is divided into two major forest types. These are – (a) evergreen forest (b) moist deciduous forest. Moist deciduous forests are further divided in two district categories, namely (i) moist deciduous Sal forests and (ii) moist deciduous mixed forest. Moist deciduous Sal forest covers parts of Belonia, Udaipur, and Sonamura and Sadar sub-divisions.

The clean natural environment is dependent on the forest mostly. Plants, animals, rich bio-diversity, land, soil water, air, are the component of environment and any breach of the above affect the system and dislocate the human's need-habited and mode of life.

There are 266- species of medicinal plants and other important tree species accounts 379- tree species, 320- shrubs, 581- herbs, 165- climbers, 16- climbing shrubs, 35- ferns, 45- epiphytes and 4- parasites, there are 50- species restricted to Tripura only. 2- Primitive plants and 7- endangered plants are available in Tripura.

Table: District-wise Forest Cover

Sl. No.	New Districts	Old District	Geographical Area (GA)	2013 Assessment				% of GA	Scrub
				Very Dense Forest	Mod. Dense Forest	Open Forest	Total		
1.	Dhalai	Dhalai	2402	3	1255	640	1898	79.02	37
2.	Unakoti	North Tripura	2039	10	933	516	1459	71.55	11
3.	North Tripura								
4.	Gomati	South Tripura	3057	73	1388	1013	2474	80.93	15
5.	South Tripura								
6.	Sepahijala	West Tripura	2993	23	1065	947	2035	67.99	3
7.	Khowai								
8.	West Tripura								
Total			**10491**	**109**	**4641**	**3116**	**7866**	**76.98**	**66**

Source: India State of Forest Report, 2013

2.9.2 Tree Cover:

Tree cover of the state has been estimated using TOF inventory data collected over a period of six years, i.e. 2004-10. The estimated tree cover in the state is 184 km² which is 1.75% of the

geographical area of the state. Only one district of the state has been inventoried. The forest and tree cover of the state is presented in the following table:

i) Forest and Tree Cover

Table: Forest and Tree Cover

Category	**Area (in km^2)**	**Percentage of Geographical Area**
Tree Cover	184	1.75
Forest Cover	7,977	76.04
Forest and Tree Cover	**8,161**	**77.79**

ii) Growing Stock:

The growing stock in the recorded forest area has been estimated on the basis of current forest cover map, forest type map and forest inventory data. For trees outside forests (TOF), the same has been estimated using TOF inventory data. It is presented in the following table:

Table: Growing Stock

Forest	**TOF**(million cum)	**Total**
21.864	7.391	29.255

2.9.3 Protected Areas:

Tripura has two National Parks and four Wildlife Sanctuaries covering an area of 603.64 km², constituting 5.75% of the total geographical area of the state.

Sl. No.	**Name of the Wildlife Sanctuary/National Park**	**Area in km²**	**Location/ District**	**Important Flora and Fauna found**
1	Sepahijala Wildlife Sanctuary	13.45	Sepahijala	Birds and Primates, Migratory Birds in the winter
2	Gomati Wildlife Sanctuary	389.54	Dhalai, Gomati	Elephant, Samber, Barking Deer, Wild Goats, Serrow etc.
3	Trishna Wildlife Sanctuary	163.08	South Tripura	Bison, Leopard, Barking Deer, Wild Dog, Capped Langur, King Cobra, Spectacled Monkey, Slow Lorries, etc.
4	Rowa Wildlife Sanctuary	0.86	North Tripura	Many species of Birds and Primates
5	Bison (Rajbari) National Park	31.63	South Tripura	Bisons and many species of Birds
6	Clouded Leopard National Park	5.08	West Tripura	Clouded Leopard, Spectacled Langur and many Birds

2.9.4 Wetlands:

By virtue of being blessed with numerous rivers and streams, Tripura supports a rich diversity of inland wetland habitats. There are about 408 Wetlands in Tripura covering an area of 98.58 ha. These wetlands vary in sizes from 2.5 ha. and above. Of the total wetlands, following 7 Wetlands are important from the point of view of biodiversity conservation and as centers of socio-economic values (through water supply, fisheries, fuel wood, medicinal plants, livestock grazing, agriculture, energy resource, wildlife resource, transport, recreation and tourism, etc.) and potential sources for eco-tourism in the state.

Table: Wetlands by Rank

No.	Name of the Wetland	Rank	Use
1.	Gumati Reservoir (Dumbur Lake)	1	M
2.	Rudrasagar (Nirmahal)	1	M (Ramsar Site)
3.	Sepahijala Reservoir	2	M
4.	Trishna Wetlands	2	M
5.	Sttar Mia's Haor	2	M
6.	Batapara Lake(Agartala)	3	M
7.	College Tilla Lake	3	M

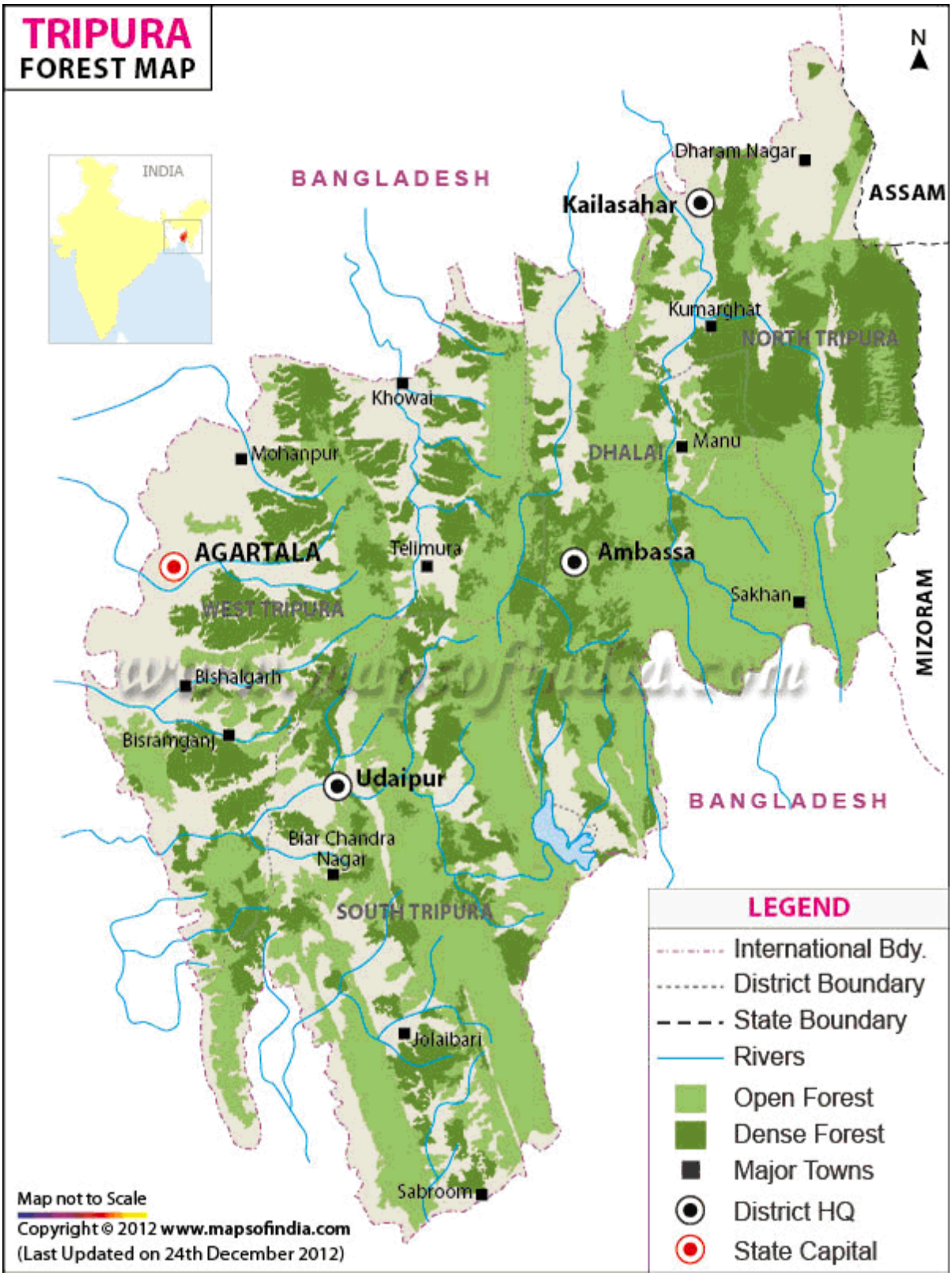
2.9.5 Biodiversity

The biological diversity of any geographical region is estimated at the level of ecosystem diversity, species diversity and genetic diversity. Tripura being a part of North-East India, belongs to one of the two "Hot Spot" of India amongst 18 identified in the World. Hot Spots are designated on the basis of evidences of present day distribution, diversity and linkages of crop plants/ horticultural plants, with the past; Hot Spots are the original homeland for evolution and distribution of such plants.

At the ecosystem level, the State exhibits a part of Mountain ecosystem with moderate hill ranges and forest ecosystem. In between these two dominant ecosystems lies the freshwater ecosystem comprising 10 major rivers, numerous wetlands. Undulating high lands of narrow and broken plates cover extensive areas (Deb, 1975)

The diversity at the species level is largely determined by ecosystem diversity, which in turn is closely, linked with soil and climatic condition. The species diversity of Tripura is largely known from Floral and Faunal diversity studies.

Fig:1 Tripura Forest Map



3.0 Social Baseline

3.1 Demographic Features

Tripura is the 2nd smallest state in terms of area, but the 2nd most populous state in the North Eastern Region. Although the state is small with a population of only over three million, the social composition of the population of Tripura is diverse. In particular, around one-third of the population comprises people belonging to the Scheduled Tribes.

Table 1: Basic features of Tripura	
Geographical location	Tripura lies between north latitudes 22°56' N and 24°32' N and east longitudes 91°10' E and 92°20'E.
Area	10,491.69 Sq, Km.
Population	36,73,917
Population density	350 per Sq. Km.
Sex ratio	960 Females per 1000 males
Literacy rate	76.34%
Decadal Growth percentage	14.75%

Source: Census 2011

3.2 Table below shows the total population of Tripura. Tripura has a population of 3673917. Out of these about 51% are males and remaining 49% are females. Out of these about 73.80% are settled in rural areas.

Table : Tripura State Population				
State	**TRU**	**Total Population**	**Total Male**	**Total Female**
Tripura	Total	3673917	1874376	1799541
	Rural	2712464	1387173	1325291
	Urban	961453	487203	474250

Source: Census 2011

3.3 Table below shows the literacy level of Tripura. As per census 2011, about 76.34% are literate. Out of these 76.34% literate population, 53.5% are males and remaining are females.

Table : Tripura State Literacy Level				
State	**TRU**	**Population Literate**	**Male Literate**	**Female Literate**
Tripura	Total	2804783	1501369	1303414
	Rural	1992773	1081503	911270
	Urban	812010	419866	392144

Source: Census 2011

3.4 Table below shows the SC and ST population of Tripura State as per census 2011. Schedule Caste population is 17.82% of the total population, whereas Schedule Tribe population is about 31.76% of the total population.

Table : Tripura State Population SC and ST			
State	**TRU**	**Population SC**	**Population ST**
Tripura	Total	654918	1166813
	Rural	437993	1117566
	Urban	216925	49247

Source: Census 2011

3.5 Table below shows the worker population of Tripura State. About 40% of the total population are working, out of these 40%, male work population account for about 71% and female work population around 29%.

Table : Tripura State Worker Population				
State	**TRU**	**Total Work Population**	**Total Male Worker**	**Total Female Worker**
Tripura	Total	1469521	1045326	424195
	Rural	1116076	767767	348309
	Urban	353445	277559	75886

Source: Census 2011

3.5. Health Care facilities

The Health and Family Welfare Department, Government of Tripura, delivers Preventive and Curative health care services to the people of the State. Tripura's health parameters are better than their National counterparts. Keeping in view the need for further upgradation of service , Improvement of Health Parameters to achieve the millennium Development Goal, development of Health infrastructure, development of human resources, accountability of service providers and gender balancing have been made the main approaches to the 11th Five Year Plan. The priority area to be addressed in the field of health care services is to bridge the gap in health manpower and infrastructure as also to develop manpower through medical education.

4.0 Agriculture

Agriculture of Tripura mainly comprises of horticulture products. Blessed with a salubrious climate and an average rainfall of 2100 mm, Tripura produces several delicious fruits that add to the economic strength of the state. The warm and humid climatic condition of Tripura is perfect for producing plenty of fruits, spices and vegetables. Rubber and tea are also produced in some parts of Tripura.

Agriculture is the backbone of the economy of Tripura. Most of the indigenous local inhabitants of the state are engaged in the traditional occupation of cultivating fruits, and vegetables. Some of the important agricultural productions of the state of Tripura are: Jackfruit, Orange, Pineapple, Banana, Mango, Litchi, Lemon, Kharif Vegetables, Potato, Rabi Vegetables, Cashew nut, Coconut, Areca-nut, Turmeric, Ginger and Chilly.

The farmers of the state practice organic cultivation of fruits, vegetables and spices. Most of the cultivators follow traditional methods of producing crops. Government of Tripura has taken special steps to improve the agricultural growth of the region.

5.0 Fisheries

Fisheries in Tripura form an integral part of the economy of the state. With the increase in the demand of fish in Tripura, GoT has taken adequate steps to increase the production of prawn seed, table fish and fish seed. More emphasis is laid towards creating more cultivable water areas, so the production of fish can be increased in the state.

Besides, GoT is also working towards increasing the productivity of the existing water areas. 3160.70 hectares of water area was created by the Fish Farmer Development Agencies (FFDA) since 1977-78. 4,364.54 hectares of water areas is brought by the FFDA during 1997-98, for the Dhalai District.

The first Co-operative Movement in Fisheries in Tripura was initiated in 1951 by Rudrasagar Udbastu Fishermen Co-operative Society at Melagarh (Sonamura Sub-division). The total number of Fishermen Co-operative Society reached 129 till 2000. The Co-operative societies in Tripura are supported by the Department of Fisheries for their proper growth.

6.0 Tourism Industry

Tripura tourism industry offers the tourists to explore the rich cultural traditions, religious legacies and vast reserve of unique flora and fauna of the north eastern state of India. Tourism has emerged as one of the important industries of Tripura. Endowed with natural scenic beauty, Tripura has immense potentialities to develop as the tourism hub of the north eastern region of the country.

Tourism has been recognized as an important industry of Tripura in the year of 1987. The tourism industry receives all the financial inducements that are offered to other industrial establishments of Tripura. Tripura draws several visitors from the plains who are enthralled and enchanted by the natural splendor and unique cultural heritage of the place.

The well developed infrastructural amenities of Tripura are an added advantage for the proliferation of the tourism industry. The well built roads enables easy and comfortable access to Tripura.

Tripura has several hotels of different categories that cater to tourists of all economic classes. The hotel industry of Tripura as further added to the financial strength of the state.

The tourists are required to pay road tax along with the cost of the mode of transportation which may be taxis or luxury buses. Like other industries, the tourism industry of Tripura also receives several subsidies on different grounds. GoT has taken numerous significant steps to improve the tourism

sector of the region. The tourism industry of Tripura is one of the potential sources of earning large chunks revenues for the state.

7.0 Tea Industry

The Tripura Tea Industry is multiplying into one of the industries of the northeast Indian state. The hilly terrains, fertile soil and climatic conditions of Tripura are conducive to the growth of tea plantations. Nearly 67 tea gardens and 4,346 small estates that stretch across an expanse of 6,000 hectares have mushroomed in the state. The state also receives adequate rainfall of average 2100mm rains that is uniformly distributed throughout the year. Tripura thus ranks 5th amongst the 14 tea producing states in the Indian subcontinent. The production of tea in the state is currently estimated to 7.5 million kg. Some of the tea estates also produce the non toxic "Bio-tea" that has tremendous demand in the international market. GoT is currently attempting to increase the net tea production in the state. The fine blend of the tea leaves is what makes the Tripura tea special and augments its demand in the Indian as well as the international market. A couple of well known tea estates, namely the Fatikcherra Tea Estate and the Ludhah Tea Estate have broadened their horizons to venture into the production of organic tea.

8.0 Tripura Natural Gas Industry

Tripura Natural Gas Industry is one of the major industries that have sprung up in the northeastern state of India. The state is repository of natural gases that are in non-associate form. The gases are high in quality and have more than 97% methane content. However, H2S, sulfur and other noxious elements are almost entirely absent from these natural gases.

9.0 Education

Education in Tripura is compulsory and free for children between the ages of 6 and 14 through thousands of public primary and secondary schools. The Umakanta Academy, established in Agartala in the 19th century, is one of the oldest educational institutions in India's northeastern region. Higher educational facilities include Tripura University (2 nos.) and numerous general degree colleges, engineering colleges (2nos.), Medical college (2nos.), other professional and technical institutions, including nursing and Arts/Music/Dance schools/colleges.

10.0 Cultural life

Most of the population, adhering to Hinduism and speaking Bengali, shares in the broader cultural traditions of India, while the Muslim minority is closer in culture to Bangladesh. Traditions of the tribal peoples also are important elements of Tripura's cultural life, with each community possessing its own festivals, folklore, music, and dance.

Two of Tripura's largest festivals are the Kharchi Puja and the Garia. The Kharchi Puja—also known as the Festival of the 14 Gods—has its origins in tribal tradition but is now a major temple festival

celebrated within a predominantly Hindu framework by both tribal and nontribal peoples; it takes place in Agartala every July and they worship the deities and the Earth. The Garia celebration is a prominent festival of the indigenous population and is associated particularly with the Tripuri people. Garia is held each April following the planting of the fields to pray for a successful agricultural year. Tripura is also the abode of Goddess Tripuri Sundari, who is believed to be one of the 51 Shakti Peethas, as per the Hindu mythology.

Source/Ref:-http://www.mapsofindia.com/tripura/
http://www.britannica.com/EBchecked/topic/605863/Tripura
http://www.iloveindia.com/states/tripura

Annexure- 2

Tripura Investment Plan under NERPSIP (GoI & World Bank Funding)

A. Transmission System

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
A : Transmission Line			
1	Rokhia-Rabindranagar 132 KV D/C Line		1758.76
2	LILO of 132 KV S/C PK Bari-Ambasa Line at Manu	4	426.10
3	Kailasahar - Dharamnagar 132 KV D/C Line	24	1812.64
4	Rabindranagar - Belonia 132 KV D/C Line	40	2562.78
5	Udaipur - Bagafa 132 KV D/C Line	32	2105.34
6	Bagafa - Belonia 132 KV D/C Line	14	1135.06
7	Belonia - Sabroom 132 KV D/C Line	42	2544.51
8	LILO of 132KV S/C LINE Agartala 79 Tilla - Dhalabil (Khowai)	04	172.71
9	Bagafa - Satchand 132 KV D/C Line (On D/C Tower)	40	2515.84
10	Udaipur-Amarpur 132 KV D/C Line	30	3487.57
11	LILO of 132 KV D/C Surjamaninagar-Rokhia Line at Gokulnagar	10	496.03
Total		**264**	**19017.32**
B : Substation			
1	132/33 KV Rabindra Nagar	New	3764.39
2	132/33 KV Gokul Nagar	New	4000.09
3	132/33 KV Manu	New	3777.69

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
4	132/33 KV Belonia	New	3896.43
5	132/33 KV Bagafa	New	3748.43
6	132/33 KV Sabroom	New	3903.85
7	132/33 KV Mohanpur (Hezamara)	New	3630.12
8	132/33 KV Satchand	New	3647.85
9	132/33 KV Amarpur	New	3746.55
10	132/33 KV Kailashahar	Extension	1717.70
11	132/33 KV Rokhia	Extension	296.41
12	132/33 KV Dharamnagar	Extension	266.05
13	132/33 KV Udaipur	Extension	281.05
14	132/33 KV Ambasa	Augmentation	1045.65
15	132/33 KV Dhalabil(Khowai)	Augmentation	1502.50
16	132/33 KV JIRANIA	Augmentation	1328.00
Total			**40552.76**

B. Distribution System

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
A : Distribution Line			
1	Khowai-Dhalabil existing 132/33 kV S/S Line	08	215.68
2	Khowai- Ampura s/s (under RGGVY) Line	16	431.36
3	Simna-Hezamara existing 33/11 kV S/S Line	22	593.12
4	Simna to Tapping point on Mohanpur -Hezamara existing 33 kV feeder Line	16	431.36

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
5	Barkathal-Hezamara existing 33/11 kV S/S Line	12	323.52
6	Barkathal -Proposed Mohanpur 132/33 KV S/S Line	14	377.44
7	Bamutia -Durjoynagar existing 33/11 kV S/S Line	14	377.44
8	Bamutia-Proposed Lembucherra 33/11 kV S/S Line	06	161.76
9	Lembucherra to LILO of existing Agartala - Mohanpur Line	04	107.84
10	Champak Nagar to Jirania Existing 132/33 kV S/S Line	08	215.68
11	Ranirbazar to LILO of existing Khayerpur - Jirania Line	08	215.68
12	ADC Head Qtr - Jirania Existing 132/33 kV S/s Line	05	134.80
13	ADC Head Qtr - Proposed Champak Nagar 33/11 kV S/s Line	09	242.64
14	Dhalabill - Hezamara existing 33/11 kV S/s Line	22	593.12
15	Jampuijala - LILOof existing Suraj Mani Nagar -Takarjala Line	10	269.60
16	Jampuijala - Proposed ADC Head Qtr 33/11 kV S/s Line	12	323.52
17	Sekerkote to LILO of existing Badharghat - Jangalia Line	10	269.60
18	Golaghati -Proposed Gokul Nagar 132/33 kV S/S Line	15	404.40
19	Golaghati -Takarjala existing 33/11 kV S/s Line	15	404.40
20	Durganagar - Proposed Gokul Nagar 132/33 KV S/S Line	15	404.40
21	Durganagar -Madhupur existing 33/11 kV S/s Line	14	377.44
22	Nidaya - Kathalia Existing 33/11 kV S/s Line	12	323.52
23	Nidaya - Proposed Radhanagar 33/11 kV S/s Line	12	323.52
24	Nalchar - Melagarh Existing 33/11 kV S/s Line	10	269.60
25	Nalchar - Bishramganj Existing 33/11 kV S/s Line	10	269.60
26	Tapping at Madhupur-Jangalia line to Proposed Gokul Nagar 132/33 KV S/S Line	01	26.96
27	Jangalia - Bishramganj Line	15	404.40
28	Jawhar Nagar - Ambassa existing 132/33 kV s/s Line	13	350.48

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
29	Chailengta to LILO of existing Chhamanu-Manu line Line	08	215.68
30	Dhumachhera -Proposed Jawhar Nagar 33/11 kV S/s Line	20	539.20
31	Dhumachhera -Proposed Manu 132/33 KV S/S Line	25	674.00
32	82 mile -Proposed Manu 132/33 KV S/S Line	21	566.16
33	82 mile - P K Bari Existing 132/33 kV S/s Line	13	350.48
34	Tilla Bazar - Kalaisahar existing 132/33 kV s/s Line	14	377.44
35	Tapping at Chawmanu - Manu line to Proposed Manu 132/33 KV S/S Line	05	134.80
36	Manughat -Proposed Sabroom 132/33 KV S/S Line	10	269.60
37	Srinagar - Proposed Manughat 33/11 kV S/s Line	20	539.20
38	Srinagar - Proposed Satchand 132/33 KV S/S Line	22	593.12
39	Srinagar to Tapping point on existing Belonia - Hrishyamukh 33 kV Line	25	674.00
40	Harina - Proposed Sabroom 132/33 KV S/S Line	10	269.60
41	Harina - Proposed Rupaichari 33/11 kV S/s Line	22	593.12
42	Rupaichari - Proposed Satchand 132/33 KV Line	10	269.60
43	Ekinpur - Rajnagar Existing 33/11 kV S/s Line	20	539.20
44	Ratanpur to LILO of existing Belonia -Hrishyamukh Line	20	539.20
45	Barpathari to LILO of existing Belonia - Rajnagar Line	10	269.60
46	Silachari Existing 33/11 kV S/s - Jolaibari Existing 33/11 kV S/s Line	30	808.79
47	Proposed Satchand 132/33 KV S/S - Jolaibari Existing 33/11 kV S/s Line	18	485.28
48	Karbook to LILO of existing Tirthamukh - Silachari Line	06	161.76
49	Muhuripur to LILO of existing Jolaibari - Bagafa Line	16	431.36
50	Dalak(Chelagang) -Proposed Amarpur 132/33 KV S/S Line	15	404.40
51	Dalak(Chelagang) - Jatanbari Existing 33/11 kV S/s Line	12	323.52

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
52	BC Manu - Proposed Bagafa 132/33 KV S/S Line	10	269.60
53	Rangamati (Bampur) - Proposed Amarpur 132/33 KV S/S Line	10	269.60
54	Matabari - Proposed Garjee 33/11 kV S/s Line	15	404.40
55	Matabari - Udaipur 132/33 kV s/s Line	08	215.68
56	Garjee - Proposed BC Manu 33/11 kV S/s Line	15	404.40
57	Radhanagar -Rajnagar Existing 33/11 kV S/s Line	12	323.52
	Reconductoring of existing 33 KV Line		
58	Badharghat - Jangalia Line	20	275.80
59	Proposed Rabindranagar 132/33 KV S/S - Kathalia Line	20	275.80
60	Proposed Rabindranagar 132/33 KV S/S - Melaghar Line	26	358.54
61	Badharghat - SM Nagar Line	14	193.06
62	SM Nagar-Takarjala Line	27	372.33
63	Belonia - Hriyshmukh Line	20	275.80
64	Belonia - Rajnagar Line	25	344.75
65	Jolaibari - Bagafa Line	20	275.80
66	Silachari - Tirthamukh Line	40	551.60
67	Ambassa - Teliamura Line	35	482.65
68	Teliamura - Kalyanpur Line	15	206.85
69	Dhalabill - Kalyanpur Line	18	248.22
70	Mohanpur -Hezamara Line	12	165.48
71	Mohanpur -to Agartala Line	20	275.80
72	Khayerpur -Jiranai Line	14	193.06
Total		**1096**	**25254.93**
B: Substation			
1	33/11 KV Tilla Bazar	New	527.63

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
2	33/11 KV Ekinpur	New	527.63
3	33/11 KV Rangamati (Bampur)	New	527.63
4	33/11 KV Jampuijala	New	588.62
5	33/11 KV Srinagar	New	588.62
6	33/11 KV Khowai	New	607.42
7	33/11 KV Ranirbazar	New	607.42
8	33/11 KV Nalchar	New	607.42
9	33/11 KV ADC Head Qtr	New	646.05
10	33/11 KV Simna	New	554.25
11	33/11 KV Barkathal	New	554.25
12	33/11 KV Bamutia	New	554.25
13	33/11 KV Lembucherra	New	554.25
14	33/11 KV Champak Nagar	New	554.25
15	33/11 KV Sekerkote	New	554.25
16	33/11 KV Golaghati	New	554.25
17	33/11 KV Durganagar	New	554.25
18	33/11 KV Radhanagar	New	554.25
19	33/11 KV Nidaya	New	554.25
20	33/11 KV Jawhar Nagar	New	554.25
21	33/11 KV Chailengta	New	554.25
22	33/11 KV Dhumachhera	New	554.25
23	33/11 KV 82 mile	New	554.25
24	33/11 KV Manughat	New	554.25
25	33/11 KV Harina	New	554.25
26	33/11 KV Rupaichari	New	554.25

Sl. No	Name of the Project/Sub-project	Km	Project Cost In INR (Lakhs)*
27	33/11 KV Ratanpur	New	554.25
28	33/11 KV Barpathari	New	554.25
29	33/11 KV Karbook	New	554.25
30	33/11 KV Muhuripur	New	554.25
31	33/11 KV Dalak(Chelagang)	New	554.25
32	33/11 KV BC Manu	New	554.25
33	33/11 KV Matabari	New	554.25
34	33/11 KV Garjee	New	554.25
Total			**19084.69**

Total Investment Plan till 2019 is INR 103909.7 Lakhs*

(* The estimated cost does not include Overhead Charge, Consultancy and Contingency Charges etc.)

Details of cost (Transmission&Distribution) for NERPSIP-Tranche-I (Feb'14 level)

Sl.No.	Description	Tripura#		
		Trans.	Dist.	Total
A	Preliminary Survey & Soil Investigation	1.39	0.44	1.83
B	Cost of Compensation for Transmission Lines			
i	Compensation towards Crop, Tree & PTCC	10.39	3.85	14.24
ii	Compensation towards forest	18.13	15.28	33.41
C	Civil works			
i	Infrastructure for Substations	23.04	15.65	38.69
ii	Non Resident Buildings	13.57		13.57
iii	Colony for Transmission Lines & Substations	73.96		73.96
D	Equipment (Supply & Erection Cost)			
i	Transmission Lines	133.85	234.22	368.07
ii	Substations	243.14	224.53	467.67
iii	Voice & Data Connectivity	10.86	26.95	37.81
E	Sub Total A To D	528.32	520.92	1049.24
F	Contingency (@3% of E)	15.85	15.63	31.48
G	Sub Total (E+F)	544.17	536.55	1080.72
H	Cost for Consultancy fee(G-(B(I)+B(II))	515.65	517.42	1033.07
I	POWERGRID consultancy Fee @12% ON H and service tax thereon	69.53	69.76	139.29
J	Total Project Cost Incldg consultancy Fees(G+I)	613.70	606.31	1220.01
K	Interest During Construction(IDC)	39.10	37.94	77.04
L	Grand Total	**652.80**	**644.25**	**1297.05**
M	Capacity Building	7.42	7.42	14.83
N	Land Acquisition for Substation and R&R Cost to be borne by State(s)	38.14	17.00	55.14
O	TOTAL PROJECT COST	**698.35**	**668.67**	**1367.02**

ANNEXURE-3

SALIENT FEATURES of the Right to fair compensation and Transparency in Land Acquisition, Resettlement and Rehabilitation Act, 2013 (RFCTLARRA, 2013)

Scope of the RFCTLARRA, 2013: Both LA and R&R Provisions will apply when:

1. Government acquires land for its own use, hold and control
2. Government acquires land with the ultimate purpose to transfer it for the use of private companies for stated public purpose
3. Government acquires land for Public Private Partnership Projects

Note I: ***Public purpose for 2. & 3. above, once stated, cannot be changed***

Note II:

- ***Land Acquisition under 2. can take place provided that the consent of 80% of the affected families is obtained.***
- ***Land Acquisition under 3. can take place provided consent of 70 % of affected families is obtained.***

Only R&R provisions will apply when:

- Private companies purchase land for a project, and the same exceeds the area thresholds set by the State Governments for such purchase

Salient Features of LA, R & R, 2013

Definition of Public Purpose

1. Land for strategic purposes relating to armed forces, national security or defense, police, safety of the people;
2. Land for infrastructure:(i)items listed in circular of Government of India, Department of Economic Affairs (Infrastructure Section) number 13/6/2009-INF dated the 27th March, 2012 excluding private hospitals, private educational institutions and private hotels (ii)projects involving agro-processing, supply of inputs to agriculture, warehousing, cold storage facilities, marketing infrastructure for agriculture and allied activities such dairy, fisheries, and meat processing as set up or owned by the appropriate(iii)project for industrial corridors or mining activities, national investment and manufacturing zones as designated in the national manufacturing Policy;(iv)project for water harvesting and water conservation structures, sanitation;(v)project for Government administered and government aided educational and research schemes or institutions;(vi)project for sports, health care, tourism, transportation, space programme, (vii) Any infrastructure facility as may be notified in this regard by the Central Government and after tabling of such notification in Parliament;
3. Land for the project affected people
4. Land for planned development or improvement of village or urban sites or for residential purpose to weaker sections;

5. Land for persons residing in areas affected by natural calamities or displaced

Urgency Clause:

The Urgency Clause can only be invoked in the following cases:

1. National defense and security purposes

2. Resettlement & Rehabilitation needs in the event of natural calamities such as floods or earthquakes

In case there is doubled is placement of any individual they will receive an **additional compensation of up to 75% of the compensation already provided for under the new law.**

Definition of 'Affected Families'

- **Land Owners:**

  1. Family or company whose land/other immovable properties have been acquired;

  2. Those who are assigned land by the Governments under various schemes;

  3. Right holders under the Forest Rights Act, 2006

- **Livelihood Losers:**

  1. Over the last three years, a family whose livelihood is primarily dependent on the land being acquired, including agriculture labourers, tenants or sharecroppers

  2.Over the last three years, families which are dependent on forests or waterbodies for their livelihoods when these are acquired; including forest gatherers, hunters, fisher folk and boatmen

  3.Over the last three years, any family whose livelihood is dependent primarily on the land being acquired in the urban areas or any family who is residing on the land being acquired in the urban areas

Safeguarding Food Security

1. Multi-crop irrigated land will not be acquired except as a demonstrably last resort measure, which in no case should lead to acquisition of more than such limits as have been set by the State Government under this law.

2. Wherever multi-crop irrigated land is acquired an equivalent area of cultivable wasteland shall be developed for agricultural purposes (or an amount equivalent to the value of the land acquired shall be deposited with the appropriate Government for investment in agriculture for enhancing food-security).

3. States are also required to set a limit on the area of agricultural land that can be acquired in any given district.

1. and 2. above shall not apply in the case of linear projects (such as railways, highways, major district roads, power lines, and irrigation canals)

Minimum Compensation for Land Acquisition

A Comprehensive Compensation Package **(First Schedule)**

1. Market value of the land:

a) the minimum land value, if any, specified in the Indian Stamp Act, 1899 for the registration of sale deeds in the area, where the land is situated; or

b) the average of the sale price for similar type of land situated in the immediate areas adjoining the land being acquired, ascertained from fifty per cent of the sale deeds registered during the preceding three years, where higher price has been paid; or **whichever is higher: provided that the market value so calculated for rural areas shall be multiplied by a multiplier factor of up to 'two'.**

2. Value of the assets attached to land: Building/Trees/Wells/Crop etc as valued by relevant govt. authority;

Total compensation = 1+2. ,

3. Solatium: 100% of total compensation

4. Where land is acquired for urbanisation, 20% of the developed land will be reserved and offered to land owning project affected families, in proportion to their land acquired and at a price equal to cost of acquisition and the cost of development.

In case the project affected family wishes to avail of this offer, an equivalent amount will be deducted from the land acquisition compensation package payable to it .

5. The Company for whom land is being acquired may offer shares limited to 25% of the Compensation amount.

In case the project affected family wishes to avail of this offer, an equivalent amount will be deducted from the land acquisition compensation package payable to it.

Minimum Compensation for Land

Illustrative Sliding Scale:

The multiplier factor will gradually rise from 1 to 2 as we move away from Urban locations into Rural areas

The Precise slabs will be left to respective St. Govts.

Illustrative Sliding Scale

(Precise Scale to be determined by each State Government)

Radial Distance from Urban area (in Km)	**Multiplier Factor**
0 -10	1.00
10-20	1.20
20-30	1.40
30-40	1.80
40-50	2.00

MINIMUM R&R ENTITLEMENTS

A Comprehensive R&R Package (Second Schedule)

1. Subsistence allowance at Rs. 3000 per month per family for 12 months;

2. The affected families shall be entitled to:

(a) Where jobs are created through the project, mandatory employment for one member per affected family **or**

(b) Rupees 5 lakhs per family; or

(c) Rupees 2000 per month per family as annuity for 20 years, with appropriate index for inflation;

The option of availing (a) or (b) or (c) shall be that of the affected family

3. If a house is lost in rural areas, a constructed house shall be provided as per the Indira Awas Yojana specifications.

   If a house is lost in urban areas, a constructed house shall be provided, which will be not less than 50sqmts in plinth area.

   In either case the equivalent cost of the house may also be provided in lieu of the house as per the preference of the project affected family;

4. *One acre of land to each family in the command area, if land is acquired for an irrigation project if possible BUT the same shall be in lieu of Compensation;*

5. Rs 50,000 for transportation;

6. *A one-time „Resettlement Allowance" of Rs 50,000;*

Special Provisions for SCs/STs

In addition to the R&R package, *SC/ST families will be entitled to the following additional benefits:*

1. Land to be given to each family in every project even in the case of irrigation projects;

2. One time financial assistance of Rs. 50,000 per family;

3. Families settled outside the district shall be entitled to an additional 25% R&R benefits;

4. Payment of one third of the compensation amount at very outset;

5. Preference in relocation and resettlement in area in same compact block;

6. Free land for community and social gatherings;

7. In case of displacement, a *Development Plan is to be prepared*

.8. Continuation of reservation and other Schedule V and Schedule VI area benefits from displaced area to resettlement area.

ENHANCED ROLE FOR PANCHAYATI RAJ INSITUTIONS ESP. GRAM SABHAS

SIA in consultation with PRIs:

The Social Impact Assessment (SIA) has to be carried out in consultation with the representatives of the Panchayati Raj Institutions (PRI)

SIA Reports To Be Shared:

Reports prepared under the Social Impact Assessment are to be shared with these individuals in their local language along with a summary.

Representation in Expert Group:

The Expert Group has to have two members belonging to the Panchayati Raj Institutions. This is a powerful body that has the power to reject a project. Hearings in All Gram Sabhas: In case where an affected area involves more than one Gram Panchayat or Municipality, public hearings shall be conducted in every Gram Sabha where more than twenty five per cent of land belonging to that Gram Sabha is being acquired. Consent of Gram Sabha : The Consent of Gram Sabha is mandatory for acquisitions in Scheduled Areas under the Fifth Schedule referred to in the Constitution Representation of Panchayat Chairpersons on R&R Committee at Project Level: The Rehabilitation and Resettlement Committee at Project Level has to have the Chairpersons of the Panchayats located in the affected area or their nominees as representatives. Panchayat Ghars have to be provided as per the list of Infrastructural amenities given in the Third Schedule.

Special Provisions for Farmers:

Acquisition only if necessary: The Collector has to make sure that no other unutilised lands are available before he moves to acquire farm land. Enhanced Compensation: All farmers in rural areas will get up to 4 times the highest sales prices in a given area. Strict Restrictions on Multi-Crop Acquisition: The acquisition of agricultural land and multi-crop land has to be carried out as a last resort. Consent: shall be prior-consent required from 70 per cent of land losers and those working on government assigned lands only in the case of Public-Private Partnership projects and 80 per cent in the case of private companies. This consent also includes consent to the amount of compensation that shall be paid. Return of Unutilized land: Land not used can now be returned to the original owners if the State so decides. Share in Sale of Acquired Land Increased: The share that has to be distributed amongst farmers in the increased land value (when the acquired land is sold off to another party) has been set at 40%.Income Tax Exemption: All amounts accruing under this act have been exempted from Income tax and from Stamp duty.

Special Safeguards for Farmers :

Damage to crops to be included in price:

The final award has to include damage to any standing crops which might have been harmed due to the process of acquisition (including the preliminary inspection).

Share in Developed Land: In case their land is acquired for urbanization purposes twenty per cent of the developed land will be reserved and offered to these farmers in proportion to the area of their land acquired and at a price equal to the cost of acquisition and the cost of development.

Fishing Rights: In the case of irrigation or hydel projects, affected families may be allowed fishing rights in the reservoirs, in such manner as may be prescribed by the appropriate Government.

Reduced Role for Collector

There has been a significant reduction of the powers that the Collector enjoyed under the 1894 Act: Under the 1894 Act, the Collector had complete authority to decide what activity constituted 'public purpose'. Under the new law he has been completely stripped of this function. Public purpose must fall strictly within the parameters prescribed under this law. The Collector cannot add or subtract to the list given. Under the 1894 Act, the Collector could decide what quantum of compensation could be paid to those displaced. Under the new law, there is a formula that does not require the Collector to exercise any discretion. All he has to do is make sure that the rate is calculated as directed. Under the 1894 Act; the Collector could decide when to take possession. He could dispossess any family by giving a moment’s notice. Now possession can only be taken once all the requirements under the law relating to the payment of compensation, rehabilitation and resettlement have been discharged. Under the 1894 Act, the Collector had sweeping powers to invoke the urgency clause. What constituted an urgent situation was entirely af unction of the Collector's interpretation. This loop hole has been plugged conclusively by limiting urgency to only two cases-natural disasters and national defence. The Collector can no longer acquire land citing 'urgent' reasons.

Benefits for Tenants and Sharecroppers:

The Law also covers all **Tenants** who may not own any land but are engaged in any form of tenancy or holding a usufructury right and;

Share-croppers Artisans who have been working in the affected area for three years prior to the acquisition and whose primary source of livelihood stands affected by the acquisition of land . They will receive not just the Rehabilitation and Resettlement Benefits but also a share in the compensation to be provided.

Infrastructural Amenities under R&R (Third Schedule)

25 infrastructural amenities to be provided in the Resettlement area, including:

- Schools and playgrounds;
- Health Centres;
- Roads and electric connections;
- Assured sources of safe drinking water for each family as per Govt. norms;
- Panchayat Ghars as appropriate;
- Anganwadi‟s providing child and mother supplemental nutritional services as per Govt. norms;
- Places of worship and burial and/or cremation ground depending on the caste-communities at the site and their practices;
- Village level Post Offices, as appropriate, with facilities for opening saving accounts;
- Fair price shops and seed-cum-fertilizer storage facilities if needed

Retrospective Effect Clause

Retrospective operation:

- Where no award under Section 11 of the 1894 Act has been made, the new law will apply with regard to compensation;
- Where an award has been made but the affected individuals have not accepted compensation or have not yet given up possession, and the proceedings have been pending for 5years or more, provisions of the new law will apply.
- Where a majority of individuals in an affected area have not received compensation then the new law will apply.

Compliance with other Laws

The Provisions of the New Law shall be fully compliant with other laws such as:

- The Panchayats (Extension to the Scheduled Areas) Act, 1996;

- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006;

- Land Transfer Regulations in Schedule V Areas. *In fact, while the above legislations provide for 'consultation' with Gram Sabhas, the new law goes one step ahead and provides for 'consent'.*

Safeguards against indiscriminate acquisition

Social Impact Assessment made mandatory except for Irrigation Projects. To be concluded in 6 months;

•**Draft Notification** to include:

–Summary of SIA

–Particulars of Administrator for R&R who prepares R&R scheme

•**Draft Declaration** to include:

–Summary of R&R package

•**No Change of Purpose:** No change from the purposes specified in the Land Use Plan submitted at the time of land acquisition will be allowed.

•**Change of Ownership:** No change of ownership without specific permission of Appropriate Government is allowed;

•**Land not Used:** Land that is not used within 5 years in accordance with the purposes for which it was acquired at the time of acquisition, shall be transferred to the State Government‟s Land Bank OR to the original land owner**.**

•**Sharing appreciated value:** Upon every transfer of land without development, 40% of the appreciated land value shall be mandatorily shared with the original owner whose land has been acquired

Transparency Provisions

Social Impact Assessment

–Gram Sabha to be consulted

–Summary of SIA notified along with Draft Notification

–SIA document made available for public scrutiny

R&R Scheme

–Summary notified along with Draft declaration

–Made available for public scrutiny

•Individual Awards passed

•Public Disclosure

–All documents mandatorily to be made available in the public domain and on the website

Penalties:

Stringent and Comprehensive Penalties Regime for Companies and Government:

- Punishment for false information, mala fide action, etc.

- Penalty for contravention of provisions of Act.

Awards:

Collector passes 2 types of Awards:

1. **Award for Land Acquisition**

   - Award made in respect of every affected family whose land is being acquired (this will include landless tenants as well) and containing details of LA compensation as listed in the First Schedule;

2. **Award for R&R**

   - Award made in respect of every affected family, regardless of whether they may be losing land or not, containing details of R&R entitlements as listed in the Second Schedule.

Timelines:

1. Compensation will be given within a period of **three months** from the date of the award;

2. Monetary R&R entitlements will be provided within a period of **six months** from the date of the award;

3. Infrastructure R&R entitlements will be provided within a period of **eighteen months** from the date of the award;

4. **No involuntary displacement will take place without completion of R&R;**

5. In irrigation or hydel projects, R&R shall be completed **six months** prior to submergence

Impact of the new law on Existing Legislations related to Land Acquisition

1. There are 13 Acts of the Central Government in force that allow for land acquisition. These are listed in the Fourth Schedule of the Act (and include legislations relating to National Defence, National Highways, Railways etc).The new law does not apply to the activities covered under these Acts.

2. However, within one year, the provisions of the new Law which relate to compensation, rehabilitation and resettlement will be applied to the 13 Acts by a notification of the Central Government.

Flexibility given to States:

1. The sliding scale on the basis of which compensation is to be calculated (2-4 times market value) has been left to the discretion of the State Governments

2. Thresholds for multi-crop irrigated lands

3. Thresholds at which R&R provisions apply to private purchases

4. States are encouraged to adopt the option of "lease" instead of acquisition.

5. States are also empowered by this law to provide for benefits and safeguards that go over and above the provisions of this law.

Annexure-4

SALIENT FEATURES OF THE ELECTRICITY ACT, 2003

Objective: An Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal and for matters connected therewith or incidental thereto

PART-I: This part deals with the jurisdiction of the law and important definitions

PART-II: This part deals about National Policy and Plan to be prepared by Central Govt. in consultation with state Govt. National Policy and National Electricity plan needs to be published in Gazette / News paper once in 5 years.

PART-III: This part deals about generation of electricity

- Generating company and requirement for setting up of generating station
- Hydro-electric generation
- Captive generation
- Duties of generating companies
- Directions to generating companies

PART-IV: This part deals licensing for transmission of electricity, distribution and undertaking trading in electricity.

1. Authorised persons to transmit, supply, etc. electricity
2. Power to exempt
3. Grant of license
4. Procedure for grant of license
5. Conditions of license
6. Licensee not to do certain things
7. Amendment lf license
8. Revocation of license
9. Sale of utilities of licensees
10. Vesting of utility in purchaser
11. Provisions where no purchase takes place
12. Directions to licensees
13. Suspension of distribution license and sale of utility

PART V: This part deals transmission of electricity including inter-state, regional and inter-regional transmission system.

14. Inter-State, regional and inter-regional transmission
15. National Load Despatch Centre
16. Constitution of Regional Load Despatch Centre
17. Functions of Regional Load Despatch Centre
18. Compliance of directions
19. Intra-State transmission
20. Transmission within a State
21. Constitution of State Load Despatch Centres

22. Functions of State Load Despatch Centres
23. Compliance of directions
24. Grid Standards
25. Intervening transmission facilities
26. Charges for intervening transmission facilities
27. Directions by Appropriate Government
28. Central Transmission Utility and functions
29. State Transmission Utility and functions
30. Duties of transmission licensees
31. Other business of transmission licensee

PART-VI: This deals with provisions of distribution of electricity with respect to distribution licensee

32. Duties of distribution licensee and open access
33. Duty to supply on request
34. Exceptions from duty to supply electricity
35. Power to recover charges
36. Power to recover expenditure
37. Power to require security
38. Additional terms of supply
39. Agreements with respect to supply or purchase of electricity
40. The Electricity Supply Code
41. Other businesses of distribution licensees
42. Provisions with respect to electricity trader
43. Control of transmission and use of electricity
44. Use, etc. of meters
45. Disconnection of supply in default of payment
46. Standards of performance of licensee
47. Different standards of performance by licensee
48. Information with respect to levels of performance
49. Market domination

PART-VII: This chapter deals about terms and conditions for the determination of tariff.

50. Tariff regulations
51. Determination of tariff
52. Determination of tariff by bidding process
53. Procedure for tariff order
54. Provision of subsidy by State Government
55. Development of market

PART-VIII: This part deals work of licensees includes provision as to opening up of streets, railways etc., overhead lines, notice to telegraph authority.

56. Provision as to opening up of streets, railways, etc
57. Overhead lines
58. Notice to telegraph authority

PART-IX: This part deals about constitution and functions of Central Electricity Authority

PART-X: This part deals about Regulatory Commissions and its constitution, power and functions of central commission

PART-XI: This part deals about appellate tribunal for electricity

PART XII: This part deals about investigation, enforcement of assessment for electricity consumed by consumer by State Govt. or board or licensee.
PART XIII: This part deals about reorganization of Electricity Board
PART XIV: This part deals mainly about offences and penalties for misusing/theft of electricity.
PART XV: This part deals constitution of special courts for the purpose of providing speedy trial of offences referred to in sections 135 to 139

PART XVI: This part deals mainly resolution of dispute by arbitration under this Act.
PART XVII: This part deals mainly protection of railways, highways, airports and canals, docks, wharfs and piers, protection of telegraphic, telephonic and electric signalling lines, amendment of sections 40 and 41 of Act 1 of 1894

PART XVIII: This part mainly deals miscellaneous matter includes following:

59. Coordination Forum
60. Exemption of electric lines or electrical plants from attachment in certain cases
61. Protection of action taken in good faith
62. Members, officers, etc., of Appellate Tribunal, Appropriate Commission to be public servants
63. Recovery of penalty payable under this Act
64. Services of notices, orders or documents
65. Transitional provisions
66. Inconsistency in laws
67. Act to have overriding effect
68. Provisions of this Act to be in addition to and not in derogation of other laws
69. Power of Central Government to make rules
70. Powers of Authority to make regulations
71. Powers of Central Commission to make regulations
72. Rules and regulations to be laid before Parliament
73. Powers of State Governments to make rules
74. Powers of State Commissions to make regulations
75. Rules and regulations to be laid before State Legislature
76. Power to remove difficulties
77. Provisions of Act not to apply in certain cases
78. Repeal and saving

The Electricity Act, 2003 does not explicitly deal with environmental/social implications of activities related to power transmission/distribution project other than, section 68 (5 & 6) and or Section 67 of the Electricity Act 2003 which provides the basis for compensation to be paid for any damages.

However, the applicable legal provisions under Section 68 of EA, 2003

i) Prior approval of the Govt. of Tripura (GoT) u/s 68(1) of EA, 2003 is a mandatory requirement to undertake any new transmission project (66kV & upward-in Tripura)

ii) For distribution project, Sec-68(1) shall not apply to 11kV and downward but for 33kV system (distribution project in Tripura), section 68(1) is applicable as **i)** above.

and under Section 164 EA Act, 2003 is desirable as TSECL is a deemed licensee after corporatization

Annexure-5

TREE / CROP/ TOWER FOOTING COMPENSATION PROCESS
(OTHER THAN FOREST LAND COMPENSATION)

As per the provisions of Electricity Act, 2003 and Indian Telegraph Act1885, land for tower and right of way is not acquired and agricultural activities are allowed to continue. However, the acts also stipulate that licensee shall pay full compensation to all interested for any damages sustained during the execution of said work. Accordingly, TSECL pays compensation to land owners towards damages if any during implementation of transmission project as well as during operation and maintenance phase.

TSECL 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: 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 (Affected Person) to the other and documented. Type, Girth (Measured 1 m. above ground level), approximate height o the tree is also noted for each tree. Trees belonging to Govt., Forest, Highways and other local bodies may be separately noted down or timely follow up with the concerned authorities for inspection and removal. 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.

TSECL also pay compensation to affected land owners for utilization of their land for tower footing.

A notice under Electricity Act, 2003/ Indian Telegraph Act, 1885 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/land inevitability likely to be damaged during the course of the construction of the proposed transmission line and acknowledgement received from land owners. A copy of said notice is further issued to the Revenue Officer/SDM, who has been authorized by the Tripura 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 land owner and inspect the site to verify the documents related to the proof of ownership and a detailed Mouja list is

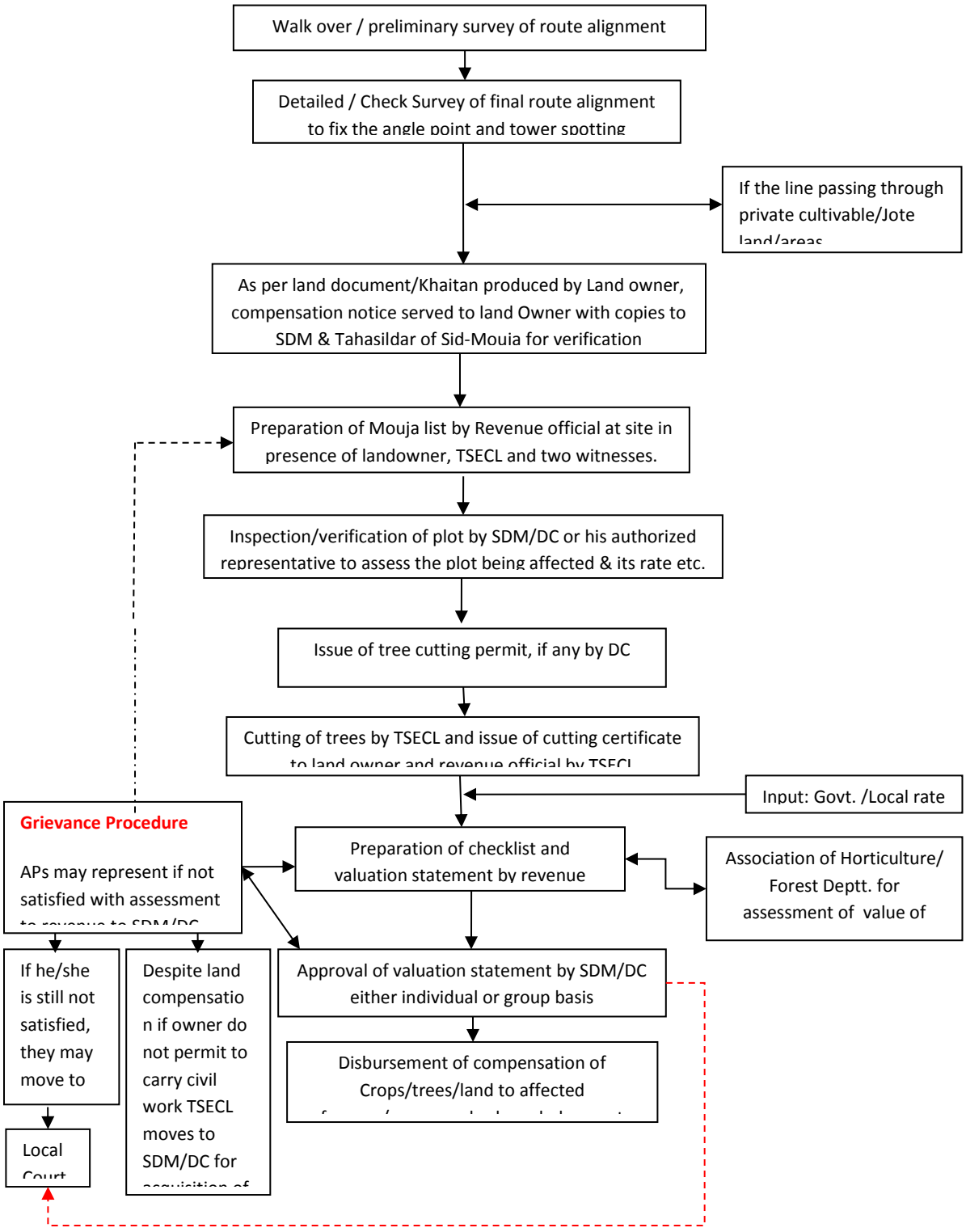
prepared for the identified trees/ crops/ land for tower footing inevitability damaged during the course of the construction. For assessing the true value of timber yielding trees help of forest officials is taken and for fruit bearing trees help of Horticulture department is taken.

The Mouja list shall contain the land owner details including extent land area utilization for tower footing, 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 Mouja lists are further compiled and a random verification is conducted by the concerned DC 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/ a tree cutting permit to TSECL to enable removal / damage to the standing tree/crop identified in the line corridor. Similarly on the basis of enqiry reort received from concerned Tehsildar, SDM issue land valuation certificate to TSECL for payment of compensaton to land owner.

Once the tree/crop is removed / damaged, TSECL 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.

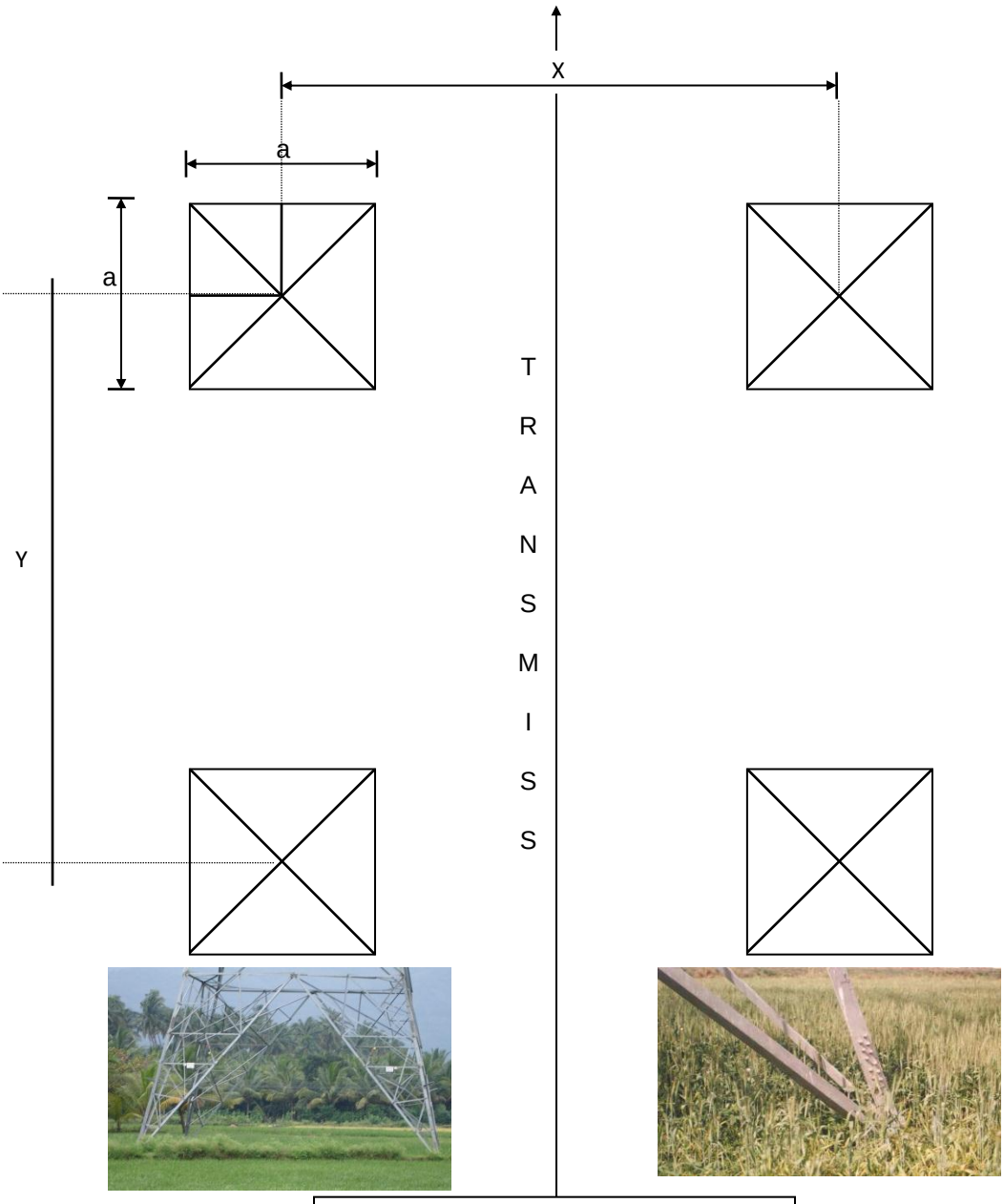
On approval of compensation, the revenue officer shall further intimate the amount payable to the different landowners and TSECL arranges the payment by way of Demand Draft to the affected parties. The payment is further disbursed at the local village office after due verification of the documents in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

TREE / CROP/TOWER FOOTING COMPENSATION PROCESS



Annexure-5 a

TYPICAL PLAN OF TRANSMISSION LINE TOWER FOOTINGS



INDICATIVE MEASURES

X & Y = 5-10 METERS

a = 200- 300 mm

Annexure – 5 b

A Sample Case of Tower Footing Compensation to Affected Persons

Notice Served to Affected Persons

TRIPURA STATE ELECTRICITY CORPORATION LIMITED
(A GOVT. OF TRIPURA ENTERPRISE)
OFFICE OF THE SENIOR MANAGER
RGGVY SUBDIVISION No.-I, AMBASSA, DHALAI.

No. F.3 (1) SM/RGGVY/SD-I/ 988-86 Date: - 21.11.12

To
Sri/Smt. Sulesuar Chakma
S/O, W/O Late Kala Chakma
Address..... Machmara
Kanchanpur

Subject: - Utilization of land for tower footing at Loc. No. 51, type of tower D1/3 related to Construction of 132KV Single circuit line from 132KV Sub-station P.K. Bari, Kumarghat to Kanchanpur.

Dear Sir / Madam,

As per section 67 of the Electricity Act.2003, We require a portion of your land having the area mentioned below for construction of tower footings etc. The Sub-Divisional Magistrate, Kailashahar/ Kanchanpur will assess necessary compensation in this respect.

Sl. No.	Name of Owner as per document and other.	Area of land Utilization	Name of present Occupier and relation.
1	Name: - Sulesuar Chakma	12×12 = 144 sqm	Sulesuar Chakma (self)
2	C.S. plot No.: - 1963		
3	Khatian No.: - 586		
4	Mouza: - Uttar Machmara.		

Signature of Site In-charge
Manager
RGGVY Sub-Division No.-I
Ambassa, Dhalai.

Signature/Thumb impression of land
Owner/Present Occupier.
Address: -

Witness: - 1.
2.

Yours faithfully,

Senior Manager
RGGVY Sub-Division No.-I,
Ambassa, Dhalai.

Copy to:-

1. The Dy. General Manager, RGGVY Division, Dhalai, Ambassa for favour of kind information.
2. The S.D.M., Kailashahar / Kanchampur for information. With a requested to assess the value of said land from his kind end and inform this office for payment of compensation.
3. The Tahashildar, Kumarghat/ Machmara/ Kanchanpur T.K.

Senior Manager
RGGVY Sub-Division No.-I
Ambassa, Dhalai.

Assessment/Evaluation of Damages

GOVERNMENT OF TRIPURA
OFFICE OF THE SUB-DIVISIONAL MAGISTRATE
KUMARGHAT, UNAKOTI DISTRICT.
(REVENUE SECTION)

No.F.8(16)/SDM/KGT/REV/2013-14/ ~~9579~~ 9601 Dated, 24 /02/2014.

LAND VALUATION CERTIFICATE

Tripura State Electricity Corporation Limited
(A Government of Tripura Enterprise),
RGGVY Sub-Division No. – I,
Ambassa, Dhalai.

(A)

Name of Mouja : - Dhanicherra,

Name of Tehsil Kachari : - Machmarra

Name of Sub-Division : - Kumarghat

Name of District : - Unakoti

Khatian No. –438

R/S Plot No : - 1816/P

Classification of Land : - Nal

Land Utilized for tower footing in Acres : - 0.02 acres.

Value per Kani : -Rs. 45000/=

Total value of land :- Rs. 2250/= (Rupees, two thousand two hundred fifty) only.

Name of Jotedar : - Smt. Parul Balan Roy W/O; Thakurdhan Roy.

Present Possession: - Binoy Roy S/O; Haridhan Roy.

(B)

Name of Mouja : - Uttar Machmara.

Name of Tehsil Kachari : - Machmarra

Name of Sub-Division : - Kumarghat

Name of District : - Unakoti

Khatian No. – 313

R/S Plot No : - 2026/P

Classification of Land : - Lunga

Land Utilized for tower footing in Acres : - 0.02 acres.

Value per Kani : -Rs. 95000/=

Total value of land :- Rs. 4750/= (Rupees, Four thousand seven hundred fifty) only.

Name of Jotedar : - Bimal Kanti Chakma S/O; Bijoy Mohan Chakma.

Verified

(C)

Name of Mouja : - Uttar Machmara.

Name of Tehsil Kachari : - Machmarra

Name of Sub-Division : - Kumarghat

Name of District : - Unakoti

Khatian No. –729

R/S Plot No : - 1963/P

Classification of Land : - Cherra(Nal)

Land Utilized for tower footing in Acres : - 0.04 acres.

Value per Kani : -Rs. 105000/= Kani.

value of land :- Rs. 10500/=

Name of Jotedar : - Fuleshwar Chakma S/O; Chit Kala Chakma.

This certificate is issued on the basis of the enquire report received from the Tehsilder, Machmarra T.K., Kumarghat, Unakoti District vide his No.106/TDR/MCM/TK dated, 15/02/2014 (photocopy enclosed) for the utilization of land for tower footing 132 KV.

Yours faithfully,

11/2014

Sub-Divisional Magistrate
Kumarghat, Unakoti District.

Enclo: - As Stated.

Verified.

18/03/2014

Assessment/Evaluation of Damages

Passed for Rs 9293/-
(Rupees nine thousand two hundred ninety three) only

PAYMENT VOUCHER

TRIPURA STATE ELECTRICITY CORPORATION LIMITED
OFFICE OF THE DEPUTY GENERAL MANAGER
RGGVY DIVISION
DHALAI, AMBASSA.

Dy. General Manager,
RGGVY Division,
Dhalai, Ambassa.

VOUCHER NO :		DATE:-
DEBIT :		PAID BY **CASH/CHEQUE**
PAY TO : **Sri Puleswar Chakma, S/O Chit Kala Chakma, Machmara, Kumarghat.**		
ON ACCOUNT OF:	DETAILS	AMOUNT
Being the cost of land utilisation for tower Loc. No. 51(B + 3) related to construction of 132KV Single circuit line from P.K. Bari, Kumarghat to Kanchanpur.	**As below**	**9,293.00**
TOTAL AMOUNT		**9,293.00**
CHEQUE NO:	DATE:-	
REMARKS BY (APPROVING AUTHORITY) :		
Received By	**Approved By**	**Paid By**
Signature	**Dy.General Manager** **RGGVY Division** **Dhalai, Ambassa.**	**Cashier**

Details

1. C.S Plot No. :- 1963/P
2. Khatian No. :- 729
3. Area of land utilised:- 144Sqm.
4. Ref. Notice No.:- F.3(1)/SM/RGGVY/SD-I/383 - 86 Dated:- 21.12.2011
5. Rate per Kani :- Rs. 105,000.00
6. Mouja :- ~~Dhanichera~~ Ullon Machmara .

:- Compensation amount payable :-Rs.105000.00/1627 X 144 = **Rs. 9293.00**

Rupees Nine thousand two hundred & **ninety three) only.**

Rate based on:-. No.F.8(6)/SDM/KGT/REV/2013-14/9601 dated:- 24.02.14 of SDM, Kumarghat Sub-Division.

Recorded in MB-DGM/RGGVY/DHL/ 26 at page 11

Manager (E)
RGGVY Sub-Division No.-I
Ambassa, Dhalai.

Senior Manager
RGGVY Sub-Division No.-I
Ambassa, Dhalai.

18/3/2014

Annexure-6

HEALTH AND SAFETY CHECKLIST

Safety Related Check List during Construction of Transmission Lines

Name of the Circle: ..... Date of Safety Audit:.....

Name of Tr. Line: .....

Loc. No: .....Voltage Level: .....

Name of Contractor: .....

Name of Sub Contractor: .....

A. DURING TOWER FOUNDATION :

SN	Description of Activity	Feed back	Remarks
I) EXCAVATION :			
1.	Dumping of Excavated soil. (Minimum 1.5 Mts. or half the depth of the pit whichever is more)	Yes / No.	
2.	Whether angle of repose of soil as per design in the foundation is maintained or not.	Yes / No.	
3.	De-watering arrangement is available (If necessary)	Yes / No.	
4.	Working area has been protected properly to avoid against fall of passerby or animal in the excavated pit.	Yes / No.	
5	Shoring & Shuttering to protect the loose rock / soil against fall exists.	Yes / No.	
6	Arrangement of illumination at construction site is available. (if required)	Yes / No.	
7	Check proper/adequate arrangement is made for extension of electric supply. (Proper size of cable, Use of fuse, No loose connection for De-watering Pumps/ Illumination / Electric compressors etc. if applicable).	Yes / No.	
8	Check for damage / Uneven settlement of foundation.	Yes / No.	
9	Ensure Life saver arrangements have been made during construction of well foundation in river bed. (Where necessary)	Yes / No.	
10	Check that the adequate arrangement is made for the storage of blasting material at safe place. (if required)	Yes / No.	
11	Check that the blasting materials is handled with due care at site. (If required)	Yes / No.	
12	Check that during blasting operation, Labour / Workmen /		

SN	Description of Activity	Feed back	Remarks
	Passerby are at safe places and arrangement is made to inform public by caution markings (Red Flag) / Public Notices.	Yes / No.	
13	Check that the Blaster is holding the proper license issued by the appropriate authority as per the Indian Explosive Act.	Yes / No.	
14	Check that the length of the fuse wire used during blasting operation is adequate.	Yes / No.	
15	Ensure Laying of temporary cable used for operation of Machines used during construction should not cause any danger for electrocution of workmen.	Yes / No.	
16	Check that PPEs i.e. Safety helmets, Safety Shoes, is used by blaster and their gang members during blasting.	Yes / No.	
17	Ensure that Shuttering and timbering has been made as detailed in I:S: 3764.	Yes / No.	
18	Ensure that before undertaking excavation, the soil has been tested and in case of availability of any explosive / dangerous gas, necessary arrangement must be made to remove / dilute such gases.	Yes / No.	
19	The positions of underground installations such as sewers, water pipes and electrical cables have been verified and in case of their existence, they must be isolated.	Yes / No.	
20	Arrangement shall be made to prevent external vibrations due to rail / road traffic (If required).	Yes / No.	
21	Safety is ensured during the construction of Tr. Lines for buildings, structures etc. which are coming in the vicinity of the excavated area from collapse. (If required)	Yes / No.	
22	Check that sufficient strong ladder of suitable length is available for ingress / outgress of persons in the pit	Yes / No.	
23	Lone worker should not be allowed to work in the excavated area beyond shoulder level.	Yes / No.	
24	Check for any possibility of seepage of water from nearby pond / river should be estimated and taken care of.	Yes / No.	
25	After excavation the work has been completed speedily and back filling done at the earliest.	Yes / No.	
II) CASTING OF FOUNDATION / CONCRETING :			
1	Check construction materials are stacked at safe place and also does not cause any danger. (Away from pit by 1.5 Mtrs. Or half the depth of pit, whichever is more.)	Yes / No.	
2	Check arrangement of illumination at Construction Site. (If required).	Yes / No.	
3	Ensure life saver arrangements have been made during construction of Well foundation in River Bed.	Yes / No.	

SN	Description of Activity	Feed back	Remarks
4	Check that the Concreting Mixer machine is placed at a safe place. (Not very near to pit.)	Yes / No.	
5	Check proper / adequate arrangement is made for extension of electric supply. (Proper size of cable, Use of fuse, No loose connection for De-watering Pumps / Illumination / Electric compressors etc. if applicable).	Yes / No.	
6	Check that laying of temporary cables used during construction activities should not cause any danger for electrocution to workmen.	Yes / No.	
7	Inspection of excavations shall be made by a Competent Person every day. In case, possible cave in or slide is apparent, all working in the excavation shall be seized until the necessary precautions have been taken to safeguard the possible cave in or slide.	Yes / No.	
8	Jacks and vertical supports shall be positioned in such a manner that the vertical loads are distributed equally and do not exceed the capacity of the jacks and the jacks are placed away from pit edge etc.	Yes / No.	
9	Proper Jacking arrangement is made to take the entire load of template.	Yes / No.	
10	In case of long template in stub setting, more jacks have been provided and check that the Jacks are placed on levelled and hard surface to avoid the unbalancing and fallen.	Yes / No.	
11	Wire mesh rolls shall be secured in order to prevent dangerous recoiling action.	Yes / No.	
12	Lone worker should not be allowed to work in the excavated area.	Yes / No.	
13	Check that sufficient strong ladder of suitable length is available for ingress / outgress of persons in the pit	Yes / No.	

B. TOWER ERECTION :

SN	Description of Activity	Feed back	Remarks
1	Check proper communication facility is available at site during Tower erection. (If required)	Yes / No.	
2.	Check damages or uneven settlement of foundation.	Yes / No.	
3.	Ensure the derrick used before tower erection has been checked for adequate strength/ size. Ensure for copy of test certificate for all the lifting machines and tackles.	Yes / No.	
4.	Ensure that the pulleys used before tower erection has been checked for adequate strength / proper size (diameter). Also in	Yes / No.	

SN	Description of Activity	Feed back	Remarks
	case of open type pulleys proper locking arrangements like providing of Safety Pin is made. Ensure for copy of test certificate for all the lifting machines and tackles.		
5.	Ensure that the ropes used before tower erection has been checked for adequate strength / physical condition (Free from break of strands and knots etc.	Yes / No.	
6.	Check that the lifting tools and tackles i.e. Winch Machine, Chain Pulley Block, Trifor, D - Shackle etc. are in healthy condition and has been tested periodically. (Attach copy of test certificate).	Yes / No.	
7.	Ensure that permission has been obtained from Aviation Authority for erection of special towers. (Where necessary).	Yes / No.	
8.	Ensure that permission has been obtained from Aviation Authority for erection of towers which comes in the vicinity of flying zone. (Where necessary)	Yes / No.	
9.	Check that the safety measures has been taken before undertaking for the Road / Rail / River Xing jobs involving likewise stretches.	Yes / No.	
10.	For rail or road crossing check whether written working plan is available at site with specific reference to safety e.g. local earthing, skilled & experience manpower, proper T&P, strength and height of scaffolding to maintain the required clearance etc.	Yes / No.	
11.	Ensure that all the members and proper size of Nuts and Bolts of lower section are fitted properly before erection of the upper section of tower is taken up.	Yes / No.	
12.	Check that the anti climbing devices are provided in the tower after erection job.	Yes / No.	
13.	Check that the danger plates have been provided.	Yes / No.	
14.	Check that only erection team members are allowed to stand near the tower while erection is in process and should wear the safety helmet / Safety Shoes.	Yes / No.	
15.	Working area of the tower has been demarcated during erection.	Yes / No.	
16	Check that proper guying arrangement has been made. And also to see that proper size of the crow bars has been used which has been fixed at hard surface in case of sandy soil or loose soil.	Yes / No.	
17	Check that proper arrangement is made while lifting the tower members and fixing them at height i.e. Proper size and strength of the hook used for lifting the tower members.	Yes / No.	
18	Check sufficient numbers of guys are made while lifting the assembled cross arm and also avoiding use of single sheeve pulleys while lifting the assembled cross arm / heavy load.	Yes / No.	

C. CONDUCTOR STRINGING:

SN	Description of Activity	Feed back	Remarks
1.	All drivers and plant operators are holding the valid driving license.	Yes / No.	
2.	Check that the permit has been obtained from the Competent		

SN	Description of Activity	Feed back	Remarks
	Authority for stringing of conductor while crossing through Road / Rail / River / Venerable areas etc. (Where necessary)	Yes / No.	
3.	Check that required painting has been made on tower falling in the vicinity of aviation zones. (Where necessary.)	Yes / No.	
4.	Check that all safety measures have been taken during stringing of conductor crossing the HV / LT lines (Earthing of existing lines etc.)	Yes / No.	
5.	Ensure that proper size of Nuts and Bolts is rigidly tightened and punching / tacking / tack welding is done in towers before undertaking stringing job.	Yes / No.	
6.	Ensure that proper scaffolding arrangements made during stringing of conductor (While Road Xing / Power Line Xing etc.	Yes / No.	
7.	Ensure that all members are fitted in tower before undertaking conductor stringing work.	Yes / No.	
8.	Check that the back filling of the foundation has been done as per specification.	Yes / No.	
9.	Ensure that the discharge rod is electrically tested before use.	Yes / No.	
10.	Stringing Machine / Tension puller Machine are properly earthed.	Yes / No.	
11.	Check the brake arrangement of the TSE Machines is working.	Yes / No.	
12.	Ensure that the pulleys used before conductor stringing has been checked for adequate strength / proper size (diameter), also in case of open type pulleys proper locking arrangements like providing of Safety Pin is made Ensure for copy of test certificate for all the lifting machines and tackles.	Yes / No.	
13.	Ensure the ropes used before conductor stringing has been checked for adequate strength / physical condition (Free from break of strands and knots etc.	Yes / No.	
14.	Check that the lifting tools and tackles i.e. Winch Machine, Chain Pulley Block, Trifor, D - Shackle etc. are in healthy condition and has been tested periodically. (Attach copy of test certificate).	Yes / No.	
15.	Check for the brake arrangement of the Drum reel of conductor during laying / paying out of conductor.	Yes / No.	
16.	Check that proper communication facility is available at site during of stringing of conductor (If required)	Yes / No.	
17.	Whether the tower has been permanently earthed.	Yes / No.	
18.	Check that Sag Board is provided at two locations.	Yes / No.	
19.	Check that the Sag Board arrangement is made by the experienced / trained persons.	Yes / No.	
20.	Check approved Sag tension chart is available and followed at site.	Yes / No.	
21.	While clamping of conductor / EW to be done, check for earthing.	Yes / No.	
22.	Ensure sending signal to puller to stop when last layer of conductor / EW being pulled.	Yes / No.	
23.	Check tension applied on the dynamo meter dial and check values with approved data.	Yes / No.	

SN	Description of Activity	Feed back	Remarks
24.	Before stringing starts check that the villagers do not come underneath the job of the concerned section.	Yes / No.	
25.	Only nylon or polypropylene ropes should be used during conductor stringing in vicinity of live overhead lines.	Yes / No.	
26.	Ensure that PTW has been taken from the concerned authority.	Yes / No.	
27.	Ensure that Winch, Pulleys etc. are properly earthed.	Yes / No.	
28.	For LT lines, whether special persons are posted at each point of isolation till return of permit (PTW).	Yes / No.	
29.	Whether the network of LT lines has been thoroughly checked and precautions taken Against inadvertent charging.	Yes / No.	
30.	Check that proper arrangement is made / available for development and use of a Portable Earthing and Short – Circuiting Devices which can be engaged and disengaged to and from the LT lines, keeping away from the LT lines, until all operations on the same are completed and all men and materials are removed from LT lines.	Yes / No.	
31.	Check the provision and proper positioning for the guying and back staying (Where necessary).	Yes / No.	
32.	Check demarcation of feeder is done for D/c Line.	Yes / No.	
33.	Ensure that all the insulator strings are thoroughly checked for availability and proper fixing of cotter / split pins before hoisting the same.	Yes / No.	

General Points common for all activities during Excavation, Casting of Foundation

A. ERECTION OF TOWER AND STRINGING OF CONDUCTOR :

SN	Description of Activity	Feed back	Remarks
1.	Check whether the contractor had procured required quantity of PPEs considering maximum numbers of erection gangs deployed at one time.	Yes / No.	
2.	Supervisors/ Workmen have been provided with required healthy PPEs, like Safety helmet / Safety Belts / Safety Shoes / Gum Boot etc. as applicable.	Yes / No.	
3.	Availability of First Aid Box with required medicines at site.	Yes / No.	
4.	Instruction register is available at site.	Yes / No.	
5.	Ensure that Supervisor / Gang Leader always issues instruction to the Workmen before start of work.	Yes / No.	
6.	Ensure that supervisory staff from Power Grid is available at site during construction.	Yes / No.	
7.	All driver and plant operators are holding valid driving license.	Yes / No.	
8.	Check the vehicle for rescue is available at site.	Yes / No.	
9.	Ensure engaged labour are aware of the job.	Yes / No.	
10.	Check that the unskilled labourers are not engaged in skilled job.	Yes / No.	
11.	Ensure that supervisor / workmen engaged in the field are aware of First Aid Techniques (Such as in case of Electric Shock, Fall from the height, Snake bite and the person rescued from buried under the debris etc.	Yes / No.	
12.	Check for nearby Hospital / Doctor in case of emergencies arises.	Yes / No.	
13.	While transporting heavy consignment of conductor / EW drums from central store to site by the use of Cranes, Truck, and Tractor. The safety aspect for construction and failure of brake system of moving machinery is to be checked.	Yes / No.	
14.	At least one dry powder type of portable fire extinguisher shall be provided especially where explosive or blasting agents are used for excavation.	Yes / No.	
15.	Check the competence (Qualification / Experience) of supervisor / gang leader of contractor.	Yes / No.	

REMARKS IF ANY:

Signature Name : Designation : Representative of Contractor	Signature Name : Designation: TSECL Rep. from Site.	Signature Name : Designation: TSECL Rep. from Circle office

Safety Related Check List during Construction of Sub - Station

Name of the Circle : ..... Date of Safety Audit:.....

Name of Sub Stn. / Switching Stn.: .....……

Name of Contractor: .....……

Contractor License / Registration No.:…….....Validity.....…….....

Name of Sub Contractor : .....……

A. SUB- STATION CIVIL WORKS :

SN	Description of Activity	Feed back	Remarks
I): SAFETY DURING EXCAVATION :			
1.	Check Substation area has been protected by constructing boundary wall all around the substation to avoid entry of passerby / unauthorized person or animal in the substation.	Yes / No.	
2.	De watering arrangement is available (If necessary)	Yes / No.	
3.	Check proper / adequate arrangement is made for extension of electric supply. (Proper size of cable, Use of fuse, No loose connection and no naked wire connection to Pumps / Illumination / Electric compressors etc. if applicable).	Yes / No.	
4.	Check arrangement of illumination at construction site is available.	Yes / No.	
5.	Check dumping of Excavated soil (Minimum 1.5 Mts. Or half the depth of the pit whichever is more from the edge of the pit.)	Yes / No.	
6.	Check Shoring & Shuttering to protect the loose rock / soil against fall. (if required).	Yes / No.	
7.	Check lone worker is not allowed to work in the excavated area.	Yes / No.	
8.	Ensure Laying of temporary cables used for operation of Machines used during construction should not cause any danger for electrocution of persons / animals.	Yes / No.	
9.	Ensure that before undertaking excavation, the soil has been tested and in case of availability of any explosive / dangerous gas, necessary arrangement must be made to remove / dilute such gases.	Yes / No.	
10.	The positions of underground installations such as sewers, water pipes and electrical cables has been verified and in case of their existence, they must be isolated before further excavation works to ensure Human Safety.	Yes / No.	
11.	Check that the scaffolds are not overloaded in any case. Scaffolds are to be erected and supported properly.	Yes / No.	
12.	Stability of the soil of the excavated pit for safe working is to		

SN	Description of Activity	Feed back	Remarks
	be checked and certified by a competent person daily before start of work. A register at site is maintained where competent person can certify accordingly. No manhole should remain uncovered during night & off days.	Yes / No.	
13.	Check the provision of sufficient strong ladder of suitable length is available near the working place during excavation.	Yes / No.	
14.	Check if any permission is required from local statutory body before excavation.	Yes / No.	
15.	Check for No undercutting / toe cutting in soil.	Yes / No.	
16.	Check after excavation the work should be speedily completed without delay and back filling done at the earliest.	Yes / No.	
17.	Check for any possibility of seepage of water from nearby pond / river has been estimated and taken care of.	Yes / No	
18.	Check to avoid slide / collapse of side walls of excavated pit, the excavation is to be done in trapezoidal cross – section.	Yes / No.	
OF BLASTING II): SAFETY PRECAUTION DURING STORAGE, HANDLING AND USE MATERIAL:			
1	Check that the adequate arrangement is made for the storage of blasting material at safe place. (Temporary Magazine is to be installed observing all norms) as per Indian Explosive Act.	Yes / No.	
2.	Check that the blasting materials is handled by licensed blaster with due care at site. (If applicable)	Yes / No.	
3.	Check smoking is prohibited in the vehicle carrying explosives.	Yes / No.	
4.	Check that the Blaster is holding proper license issued by the appropriate authority. As per Indian Explosive Act.	Yes / No.	
5.	Check that the length of the fuse wire used during blasting operation is adequate.	Yes / No.	
6.	Check while transportation, no unauthorized person is allowed in vehicle carrying explosives.	Yes / No.	
7.	Check that the loading and unloading of explosives is being done carefully.	Yes / No.	
8.	Check explosives and detonators or blasting caps is not being transported in the same vehicle.	Yes / No.	
9.	Check while transportation the detonators and explosives are not carried loose or mixed with other materials.	Yes / No.	
10	Check surplus explosives shall not be stacked near working area during loading / unloading.	Yes / No.	
11.	Check explosives shall not be held in hands when lightening the fuse.	Yes / No.	
12.	Check that blasting in the open has been carried out during the fixed hours every day or on fixed days in the week so that the public at large should know about this.	Yes / No.	
13.	Check that arrangement has been made to display sufficient warnings / sign board to enable the people to get out of the	Yes / No.	

SN	Description of Activity	Feed back	Remarks
	blasting area to get off the danger zone		
14.	Check that the danger zone has been suitably cordoned off.	Yes / No.	
15.	Check during blasting operations begin / after the firing of explosives shall follow the loud siren.	Yes / No.	
16.	Check that during blasting operation, Labour / Workmen / Passerby are at safe places and arrangement is made to inform public by caution markings (Red Flag) / Public Notices etc.	Yes / No.	
17.	Check that PPEs i.e. Safety helmets, Safety Shoes, is used by blaster and their gang members during blasting and also the persons supervising the blasting operations.	Yes / No.	
18.	For covered blasting ensure placement of cover plates of proper thickness and sufficient numbers of sand filled bags.	Yes / No.	
19.	Ensure that permission for blasting has been obtained from the appropriate authority.	Yes / No.	
III) SAFETY DURING CASTING OF FOUNDATION / CONCRETING :			
1.	Check construction materials are stacked at safe place and also does not cause any danger. (Away from pit) i.e. 1.5 Mtrs. or half the depth of the pit whichever is more.)	Yes / No.	
2.	Check proper arrangement of illumination at Construction Site of Sub station is available.	Yes / No.	
3.	Check that the Concreting Mixer/ Vibrator machines etc are placed at a safe place (Not very near to any pit at least 1.5 Mtr. from the edge of the pit) to avoid transfer of vibrations and should be operated by skilled persons.	Yes / No.	
4.	Check proper / adequate arrangement is made for extension of electric supply. (Proper size of cable, Use of fuse, No loose connection for De watering Pumps / Illumination / Electric compressors etc. if applicable).	Yes / No.	
5.	Check for laying of temporary cables used during construction activities should not cause any danger for electrocution to persons / animals.	Yes / No.	
6.	All bracing, struts and shuttering in excavations shall be adequately secured so as to prevent their accidental displacement.	Yes / No.	
7.	Ensure Shuttering and timbering has been made as detailed in I:S: 3764 for protecting the loose rock / soil against fall.	Yes / No.	
8.	Check for proper placing of Hydraulic jacks with stability and constant watch of these instruments (which are continuously loaded) to avoid any danger of displacement causing sever accident.	Yes / No.	

B. SAFETY DURING STRUCTURE, EQUIPMENT ERECTION & CABLE LAYING ETC. :

SN	Description of Activity	Feedback	Remarks
1.	Check Back filling done prior to erection activity.	Yes / No.	
2.	Check the derrick used before structure erection has been checked for adequate strength / size and no joints are permitted.	Yes / No.	Test certificate is required apart from visual inspection.
3.	Check that the pulleys used before structure erection / Equipment Erection has been checked for adequate strength / proper size (diameter), also in case of open type pulleys proper locking arrangements like providing of Safety Pin is made Safe working load should be punched.	Yes / No.	Test certificate is required apart from visual inspection.
4.	Check the ropes used before structure erection / Equipment Erection has been checked for adequate strength / physical condition (free from break of strands and knots etc.	Yes / No.	Test certificate is required apart from visual inspection.
5.	Check that the lifting tools and tackles are in healthy condition and has been tested periodically.	Yes / No.	Test certificate is required apart from visual inspection.
6.	Check permission has been obtained from Aviation Authority for erection of Lightning Mast which comes in the vicinity of flying zone. (Where necessary)	Yes / No.	
7.	Check that all Nuts and Bolts are fitted in the structure before undertaking the job of other section of the structure and are tightened.	Yes / No.	
8.	Check area has been cordoned off to prevent injuries to unauthorized persons from hitting against structural component or falling in the excavated pits.	Yes / No.	
9.	Check that danger plates are available on all the equipment & structures in the switchyard.	Yes / No.	
10.	Check demarcation of feeder is done for Double Circuit Line.	Yes / No.	
11.	Check only erection team members are allowed to stand near the structure / Equipment while erection is in process and should wear the safety helmet / Safety Shoes.	Yes / No.	
12.	Check proper guying arrangement has been made while lifting structure / Equipment, if necessary.	Yes / No.	
13.	Check that proper arrangement is made while lifting the structure members and fixing them at height i.e. Proper size and strength of the hook used for lifting the structure	Yes / No.	

SN	Description of Activity	Feedback	Remarks
	members.		
14.	Check sufficient numbers of guys are made while lifting the assembled structure / heavy loads and also avoiding use of single sheeve pulleys while lifting the assembled structure / heavy load.	Yes / No.	
15.	Check arrangement has been made for equipment identification.	Yes / No.	
16.	Check that required painting made on tower falling in the vicinity of aviation zones. (Where necessary.)	Yes / No.	
17	Check no live wires nearby. Take shut down if necessary.	Yes / No.	
18.	Check the structure has been permanently earthed.	Yes / No.	
19.	Check crane are preferably be used for erection of pipe structure in the substation building works (if required.)	Yes / No.	
20.	Check all safety procedures for erection work like use of safety helmets, Safety belts, use of guy wires, lowering / lifting of tools by rope etc. are strictly adhered to during structure erection works is in progress in the switchyard.	Yes / No.	
21.	Check that correct size of spanner (Box or ring type) as well as DE spanners is being used.	Yes / No.	
22.	Check working area of the structure has been demarcated during erection.	Yes / No.	
23.	Check heavy structures are lifted with crane with proper safety.	Yes / No.	
24.	Only polypropylene ropes are to be used to tie the aluminium tube / Bus bar since this is soft material and will not damage aluminium tube / Bus bar during erection.	Yes / No.	
25.	Ensure that R clips in insulator caps are fixed properly to avoid disconnection of insulator discs.	Yes / No.	
26.	Ensure that all the necessary security pins (split pins) are fixed.	Yes / No.	
27.	Check all nuts of jumper fittings are properly tightened and live metal clearance have been maintained as per TSECL specification.	Yes / No.	

SN	Description of Activity	Feedback	Remarks
28.	In case of tension fitting dead end joint dimensions before & after the compression are checked and recorded.	Yes / No.	
29.	No damaged component of any hardware fitting should be used on works.	Yes / No.	
30.	Length of jumpers has been measured properly to give it a parabolic shape. No sharp bend should exist.	Yes / No.	
31.	Check surge counter erection facilitates proper reading and that earthing is done with minimum bends.	Yes / No.	
32.	Check Surge monitor has been earthed by connecting it to main earth mat with (G I Flat 75 x 12 mm) and earth pit separately as per drawing.	Yes / No.	
33.	Check the alignment of earth switch with isolator, earth switch of isolator is put into operation and the contacts are cleaned. After completion of pre commissioning checks and formats are dully filled and signed.	Yes / No.	
34.	Ensure that the rubber beedings are kept in good condition.	Yes / No.	
35.	Check CT has been placed on the support structure very carefully and all nuts have been tightened. Earthing is done as per drawing.	Yes / No.	
36.	Ensure the lattice structure of CT has been earthed at two points.	Yes / No.	
37.	Check the marshalling box in the switchyard has proper illumination arrangement.	Yes / No.	
38.	Check the capacitor unit is short circuited & earthed, until erection and commissioning works are being done on CVT. (The capacitor get charged by the electrical fields in the vicinity and they keep these charges for a long time, which can be dangerous to human life. Hence the shorting of capacitor unit is necessary). It should be removed before tests / use.	Yes / No.	
39.	Check Fuses in the marshalling box are OK.	Yes / No.	
40.	Check proper earthing of CVT tank has been done.	Yes / No.	
41.	Check all housing accessories, mounting stools including bolts / Nuts for fixing Line Trap and insulators are of non magnetic material.	Yes /	

SN	Description of Activity	Feedback	Remarks
		No.	
42.	Check H.F. point of CVTs on which the coupling device is not mounted has been earthed.	Yes / No.	
43.	Check the remaining CVTs have been earthed thro' coupling device.	Yes / No.	
44.	Cable drums after visual inspection should be stored preferably in the covered area. Cable ends should be clamped.	Yes / No.	
45.	Ensure each cable and conduit run should be tagged with cable identity numbering as per the approved that appear in the cable and conduit schedule.	Yes / No.	
46.	The tag should be of aluminium plate with ID number punched on it and securely attached to the cable conduit by not less than two turns. Cable tags should of rectangular shape for power cables and of circular shape for control cables.	Yes / No.	
47.	Check underground cable markers should project 150 mm above ground and spaced at an interval of 30 Mts. They shall be located on both sides of road and drain crossing and also at every change in direction.	Yes / No.	
48.	Check cable tags should be provided inside the switchgear, motor control centres, control and relay panels etc. wherever required for cable identification, where a number of cables enter together through a gland plate.	Yes / No.	
49.	The cable (power and control) between LT stations, Control room, DG set building and fire fighting pump house should be laid in the buried cable trenches. In addition to the above, for lighting purpose also, buried cable trench can be used in outdoor area.(as per Technical specification of specific contract)	Yes / No.	
50.	Cable route and joint markers and RCC warning covers should be provided wherever required. The voltage grade of cables should be engraved on the marker.	Yes / No.	
51.	Tray Identification Number on each run of trays at an interval of 10 Mtrs should be painted.	Yes / No.	
52.	In case the outer sheath of a cable is damaged during handling / installation, the same should be repaired to the satisfaction of the site. In case any other part of a cable is damaged, the same should be replaced by a healthy cable. Power cables should be at the top most layers. The	Yes / No.	

SN	Description of Activity	Feedback	Remarks
	armour of control cable is to be earthed.		
53.	All cable termination should be appropriately tightened to ensure secure and reliable connections. All the exposed parts of cable lugs should be covered with tape, sleeve or paint.	Yes / No.	
54.	Power and control cables are laid on separate cable trays	Yes / No.	
55.	Co-axial cable is laid separately from power cable.	Yes / No.	
56.	All cable trays, racks and metallic ducts have been grounded by connecting each to earth / mat. (As per Scheme)	Yes / No.	
57.	Check sections of cable trays have been bridged by copper jumpers/ G I to retain continuity of earthing. (As per Scheme)	Yes / No.	
58.	Check earthing of panel is done by the erection contractor for connecting it with switchyard earth mat. (As per Scheme)	Yes / No.	
59.	Auxiliary bus wiring for AC and DC supplies, Voltage Transformer circuits, annunciation circuits and other common services is provided near the top of the panels running through out the entire length of the panels.	Yes / No.	
60.	All internal wiring to be connected to external equipment is terminated on terminal blocks, preferably vertically mounted on the side of each panel.	Yes / No.	
61.	Check whether Mimic Diagram is available preferably made of anodized aluminium or plastic of approved fast colour material and screwed on to the panel that can be easily cleaned.	Yes / No.	
62.	Check the panels all equipment mounted on front and rear side as well as equipment mounted inside are provided with individual name plates with equipment designated engraved.	Yes / No.	
63.	Check on top of each panel on front as well as rear side, large and bold name plates are provided for circuit / feeder designation.	Yes / No.	
64.	Check all front mounted equipments are provided at the rear with individual name plates engraved with tag numbers corresponding to panel internal wiring to facilitate easy tracing of the wiring.	Yes / No.	
65.	Check the name plates mounted directly by the side of the respective equipments should not be hidden by equipment	Yes /	

SN	Description of Activity	Feedback	Remarks
	wiring.	No.	
66.	Check availability of 240V single phase 50 HZ, AC socket with switch suitable to accept 5 Amps and !5 Amps pin round standard plug, is provided in the interior of each cubicle with ON-OFF switch for connection of hand lamps.	Yes / No.	
67.	Check that panels are provided with a fluorescent lighting fixture rated with 240 Volts single phase, 50 Hz supply for the interior illumination of the panel during maintenance. The fittings are complete with switch fuse unit and switching of the lighting is controlled by the respective panel door switch. Adequate lighting with fuse unit is also provided for the corridor in control panels.	Yes / No.	
68.	Check control panels are provided with necessary arrangements for receiving, distributing, isolating and fusing of DC and AC supplies for various control, signalling, lighting and space heater circuits. The incoming and sub circuits are separately with switch fuse units.	Yes / No.	
69.	Check panels are provided with a space heater rated for 240 V, single phase, 50 Hz, AC supply for the internal heating of the panel to prevent condensation of moisture.	Yes / No.	
70.	Check all panels are equipped with an earth bus securely fixed	Yes / No.	
71.	Check when several panels are mounted adjoining each other, the earth bus is made continuous with necessary connectors and clamps for this purpose.	Yes / No.	
72.	Check provision is made for extending the earth bus bars to adjoining panels on either side.	Yes / No.	
73.	Check provision is made on each bus bar of the end panels for connecting earthing grid.	Yes / No.	
74.	Check all metallic cases of relays, instruments and panel mounted equipment including gland plates are connected to the earth bus by copper wires of specified size.	Yes / No.	
75.	Check the colour code of the earthing wire is green.	Yes / No.	
76.	Check that earthing made with equipment is with Nuts and Bolts i.e. For such connection lugs should be pressed and tightened to the terminals through Nuts and Bolts.	Yes / No.	
77.	Check that no equipment is mounted on the panel doors.	Yes /	

SN	Description of Activity	Feedback	Remarks
		No.	
78.	Check each switch should bear clear inscription identifying its function.	Yes / No.	
79.	Check those who have sufficient knowledge of steel structural job have been employed in steel structural works only.	Yes / No.	
80.	Check necessary instruction has been communicated by supervisor before start of the day's works to workmen under his control.	Yes / No.	
81.	Storing of equipments is to be made properly to avoid any accident during handling.	Yes / No.	
82.	Check all Nuts and bolts are properly raised or lowered preferably using closed loop pulleys and gully bags / hand bags tied at the end for carrying nuts and bolts.	Yes / No.	
83.	Check that Fire resistant sheets are used before entrance of control cable in control room.	Yes / No.	
84.	Check air compressor tubing properly tightened.	Yes / No.	
85.	Check all carrying connectors / clamps properly tightened.	Yes / No.	

C. CONDUCTOR LAYOUT DURING CONSTRUCTION STAGE :

SN	Description of Activity	Feed back	Remarks
1.	Check all members are fixed in structure and ensure proper size of Nuts and Bolts are rigidly tightened and punching / tacking / tack welding is done in towers / structures before undertaking conductor laying job.	Yes / No.	
2.	Ensure proper scaffolding arrangements made during laying of conductor (While Power/Distribution Line crossing etc).	Yes / No.	
3.	Ensure that all members are fitted in structure before undertaking conductor laying work.	Yes / No.	
4.	Ensure that the discharge rod is electrically tested before use.	Yes / No.	
5.	Ensure whether the structure is properly earthed.	Yes / No.	
6.	Only nylon or polypropylene ropes should be used during conductor laying in vicinity of live overhead lines.	Yes / No.	
7.	Ensure that PTW has been taken from the concerned authority when extension of existing substation is under execution.	Yes / No.	
8.	Ensure that Winch, Pulleys etc. are properly earthed.	Yes / No.	

SN	Description of Activity	Feed back	Remarks
9.	For LT lines, check whether special persons are posted at each point of isolation till return of permit (PTW) if positioning of person is not possible then it is to be seen that all the point of isolation has been kept in the locked position till the work is in progress.	Yes / No.	
10.	Whether the network of LT lines has been thoroughly checked and precautions taken against inadvertent charging.	Yes / No.	
11.	Check that proper arrangement is made / available for grounding LT lines coming across during conductor laying. (This can be done by way of portable earthing and short circuiting devices which cab be engaged to and disengaged from LT lines, keeping away from the LT lines until all operations on the same are completed and all man and materials are removed from the LT lines).	Yes / No.	
12.	Check the provision and proper positioning for the guying and back staying (Where necessary).	Yes / No.	
13.	Check working of hydraulic crimping machine.	Yes / No.	
14.	Check before and after crimping, dimensional changes in clamps and are in accordance with the drawings and specifications.	Yes / No.	

D SWITCHYARD EARTHING DURING CONSTRUCTION STAGE:

SN	Description of Activity	Feed back	Remarks
1.	Check that while earthing conductor crossing the road is laid 300 mm below the road or at greater depth depending upon the site conditions.	Yes / No.	
2.	Check that while laying the Earthing conductor in outside area is buried at least 600 mm below the furnished ground level.	Yes / No.	
3.	Check that the earthing pads have been provided for the apparatus / equipments at accessible position.	Yes / No.	
4.	Check all steel columns, metallic stairs are connected to nearby earthing grid conductor by two earthing leads.	Yes / No.	
5.	Check of earthing of lightening fixtures, receptacles switches, junction boxes lighting conduits has been done by a separate earthing conductor.	Yes / No.	
6.	Check that the railway tracks within switchyard area has been earthed at a spacing of 30 Mts. / specified distance and also at both ends.	Yes / No.	
7.	Check cable trays has been connected to earthing flat of 50X6 mm / specified sized earthing flat at intervals specified in approved drawing.	Yes / No.	
8.	Check that this earthed flat is earthed at about 30 Mts. distance.	Yes / No.	
9.	All accessories in transformer and reactor like radiators tank,		

SN	Description of Activity	Feed back	Remarks
	cooling banks etc are connected to the earthing grid at minimum two points.	Yes / No.	
10.	Check metallic conduits are not used as earth continuity conductor.	Yes / No.	
11.	Check flexible earthing connectors should be provided for the moving parts.	Yes / No.	
12.	Check sheath and armor of single core power cable is earthed at switchgear end and equipment side.	Yes / No.	
13.	Check contact surface of earthing pads for jointing free from scale, paint, enamel, grease, rust or dust.	Yes / No.	
14.	Check that light poles, junction boxes on the poles, cable and cable boxes / glands, lockout switches etc. are connected to the earthing conductor running along with the supply cable which intern is connected to the earthing grid conductor at a minimum two points.	Yes / No.	
15.	Check earthing conductor which is generally buried 2000 mm outside the switchyard fence. All the gates and every alternate post of the fence are to be connected to earthing grid.	Yes / No.	
16.	Check megger used for measuring soil resistivity is calibrated with desired accuracy.	Yes / No.	
17.	The earth resistivity has been measured in dry weather condition.	Yes / No.	
18.	Check the earthing of Transformers and Shunt reactor, earth pits are constructed as per relevant standard / approved drawing.	Yes / No.	
19.	Check that the measured value of combined earth resistance should be less than 1 Ohm.	Yes / No.	
20.	Check that for earth electrode and individual earth pits, this value should not be more than one Ohm.	Yes / No.	
21.	Check all non current carrying metal parts shall be effectively earthed by two separate and distinct earth connections (Indian Electricity Rule 61,67)	Yes / No.	
22.	Check that all pylon supports in the Fire Fighting HVSW system has been earthed to the earthmat.	Yes / No.	

E: GENERAL POINTS COMMON FOR ALL ACTIVITIES DURING EXCAVATION, CASTING OF FOUNDATION

Erection of structures, laying of Conductor, storage and transportation of material:

SN	Description of Activity	Feed back	Remarks
1.	Check Supervisors / Workmen have been provided with required healthy PPEs. Like (Safety helmet / Safety Belts / Safety Shoes / Gum Boot etc. as applicable)	Yes / No.	
2.	Check availability of First Aid Box with required medicines at site.	Yes / No.	
3.	Check Site Instruction register is available at site.	Yes / No.	
4.	Ensure Supervisor / Gang Leader always issues instruction to the Workmen including contractor labour before start of work.	Yes / No.	
5.	Ensure supervisory staff from Power Grid is available at site during construction.	Yes / No.	
6.	Check all driver and plant operators are holding valid driving license.	Yes / No.	
7.	Check the vehicle for rescue is available at site.	Yes / No.	
8.	Ensure engaged labour are aware of the job.	Yes / No	
9.	Ensure supervisor / workmen engaged in the field are aware of First Aid Techniques (Such as in case of Electric Shock, Fall from the height, Snake bite and the person rescued from buried under the debris, rescue of person from drowning etc.	Yes / No.	
10.	Check for availability and to keep a record of nearby Hospital / Doctor in case of emergencies arises.	Yes / No.	
11.	While transporting heavy consignment of conductor / EW drums from central store to site by the use of Cranes, Truck, Tractor. The safety aspect for construction and failure of brake system of moving machinery is to be checked.	Yes / No.	
12.	At least one dry powder type of portable fire extinguisher shall be provided especially where explosive or blasting agents are used for excavation. (If applicable)	Yes / No.	
13.	Check the competence (Qualification / experience) of supervisor / gang leader of contractor.	Yes / No.	
14.	Wire mesh rolls shall be secured in order to prevent dangerous recoiling action.	Yes / No.	
15.	Proper unloading arrangement has been made at site (Preferably with crane) to unload the material.	Yes / No.	
16.	After unloading the material visual inspection of the materials has been carried out along with the erection contractor to check that the material has not been damaged or not (Galvanizing is proper or not) As per approved Field Quality Plan etc.	Yes / No.	
17.	While transporting the heavy laden equipment like transformer		

SN	Description of Activity	Feed back	Remarks
	/ Reactor by road from Rly Stn to Sub station check whether for all safety precaution taken. Like safe lifting capacity of crane, safe load on culvert / Bridge / Nala / Drain etc.and working plan is available at site with specific reference to safety e.g. local earthing, skilled & experience manpower, proper T&P, strength and LT wires / HT wires interrupting the height of equipment and the required clearance maintained etc. Permission to be obtained from concerned authority if required. "Impact recorder on the equipment like Reactor / Transformer must be installed during transportation"	Yes / No.	
18.	Check that the adequate and safe means of access and aggress has been provided for all work places as far as reasonably practicable and is being used by the workers.	Yes / No.	
19.	Check proper illumination is provided at the work places and their approaches including passage ways.	Yes / No.	
20.	Check that the lamps have been protected by suitable guards where necessary to prevent danger, in case the lamp breaks.	Yes / No.	
21.	Check loose materials which are not required for use shall not be placed or left so as dangerously to obstruct work places or passage ways.	Yes / No.	
22.	Check all projected nails has been removed or bent over to prevent injury.	Yes / No.	
23.	Check scrap, waste and rubbish has not been allowed to accommodate on the site or the scrap materials has been stored at the isolated place.	Yes / No.	
24.	Check that the worker while working at height scaffold materials, waste materials and tools are not being thrown by them to cause injury to any person.	Yes / No.	
25.	Check whether contractor has procured required quantity of PPE considering maximum number of erection gangs deployed at one time. Check the quantity of PPEs.	Yes / No.	
26.	Check that the PPEs required by the workmen are being utilized by them always.	Yes / No.	
27.	Check the worker is under constant surveillance by the other person while working at height.	Yes / No.	
28.	Check construction site has been barricaded for unauthorized persons / animals.	Yes / No.	
29.	Check that lifting appliances and machines and vehicles used on the construction site is of sound material and good quality and is free from patent defects and is strong enough to with safely the load and stresses to which they will be subjected.	Yes / No.	
30.	Check structures and equipment is being used only for the purpose for which they were intended.	Yes / No.	

SN	Description of Activity	Feed back	Remarks
31.	Check equipment has been operated by the competent person.	Yes / No.	
32.	Check portable ladders shall not exceed 9 Mts. in length, otherwise may cause danger while climbing of person and back legs shall be equally braced.	Yes / No.	
33.	Check unskilled labour are not utilized for skilled jobs and only experience persons are deployed for erection.	Yes / No.	
34.	Check a well planed and documented procedure for the entire Construction works of Substation shall be prepared by contractor and get approved from TSECL for distribution to Contractors' field staff and TSECL for follow up.	Yes / No.	
35.	Check no metallic measuring tapes are being used during expansion of charged bays.	Yes / No.	
36.	Check metal ladders are not being used in the vicinity of exposed live electrical equipment.	Yes / No.	
37.	Check one bore well is available for water supply in case Municipal Construction supply is not available	Yes / No.	
38.	Check charged area of a yard should be properly fenced off.	Yes / No.	
39.	Check ladders / lengthy articles / lengthy equipments etc. should always be carried in horizontal position.	Yes / No.	
40.	Check insurance by contractor for the labour to provide adequate coverage for any accident etc.	Yes / No.	

REMARKS IF ANY:

Signature Name : Designation: TSECL Rep.	Signature Name : Designation: Rep. from Contractor	Signature Name : Designation : Rep. from

Annexure-7

CENTRAL ELECTRICITY AUTHORITY

NOTIFICATION

New Delhi, the 20th September, 2010

No. CEI/1/59/CEA/EI.—In exercise of the powers conferred by section 177 of the Electricity Act, 2003 (36 of 2003), the Central Electricity Authority hereby makes the following regulations for Measures relating to Safety and Electric Supply, namely:-

Chapter I

1. **Short title and Commencement.-** (1) These regulations may be called the Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010.

(2) They shall come into force on the date of their final publication in the Official Gazette.

2. **Definitions.-** (1) In these regulations, unless the context otherwise requires,

(a) "Act" means the Electricity Act,2003;

(b) "accessible" means within physical reach without the use of any appliance or special effort;

(c) "ampere" means a unit of electric current and is a constant current which, flowing in two parallel straight conductors of infinite length of negligible cross section and placed at a distance of one meter apart in a vacuum will produce a force of $2x10^{-7}$ Newton per meter length between the conductors;

(d) "apparatus "means electrical apparatus and includes all machines, fittings, accessories and appliances in which conductors are used;

(e) "bare" means not covered with insulating materials;

(f) "cable" means a length of insulated single conductor(solid or stranded) or of two or more such conductors each provided with its own insulation, which are laid up together. Such insulated conductor or conductors may or may not be provided with an overall mechanical protective covering;

(g) "circuit" means an arrangement of conductor or conductors for the purpose of conveying electricity and forming a system or a branch of a system;

(h) "circuit breaker" means a device, capable of making and breaking the circuit under all conditions, and unless otherwise specified, so designed as to break the current automatically under abnormal conditions;

(i) "concentric cable" means a composite cable comprising an inner conductor which is insulated and one or more outer conductors which are

insulated from one another and are disposed over the insulation of, and more or less around, the inner conductor;

(j) "conductor" means any wire, cable, bar, tube, rail or plate used for conducting electricity and so arranged as to be electrically connected to a system;

(k) "conduit" means rigid or flexible metallic tubing or mechanically strong and fire resisting non-metallic tubing into which a cable or cables may be drawn for the purpose of affording it or them mechanical protection;

(l) "connected load" means the sum of the ratings of the electricity consuming apparatus connected to a consumer's installation;

(m) "covered with insulating material" means adequately covered with insulating material of such quality and thickness as to prevent danger;

(n) "cut out" means any appliance for automatically interrupting the transmission of electricity through the conductor when the current rises above a pre-determined amount, and shall also include fusible cut-out;

(o) "danger" means danger to health or danger to life or any part of body from shock, burn or other injury to persons, or property, or from fire or explosion, attendant upon the generation, transmission, transformation, conversion, distribution or use of electricity;

(p) "dead" means at or about earth potential and disconnected from any live system. It is used only with reference to current carrying parts when these parts are not live.

(q) "designated person" means a person designated under regulation 3;

(r) "earthed" or "connected with earth" means connected with the general mass of earth in such manner as to ensure at all times an immediate discharge of electricity without danger;

(s) "earthing system" means an electrical system in which all the conductors and appliances are earthed;

(t) "enclosed sub-station" means any premises or enclosure or part thereof, being large enough to admit the entrance of a person after the apparatus therein is in position, containing apparatus for transforming or converting electricity to or from a voltage at or exceeding 650 V (other than transforming or converting solely for the operation of switch gear or instruments) with or without any other apparatus for switching, controlling or otherwise regulating the electricity, and includes the apparatus therein;

(u) "enclosed switch-station" means any premises or enclosure or part thereof, being large enough to admit the entrance of a person after the apparatus therein is in position, containing apparatus for switching, controlling or otherwise regulating electricity at or exceeding 650 V but not for transforming or converting electricity(other than for transforming or converting solely for the operation of switchgear or instruments)and includes the apparatus therein,

(v) "flameproof enclosure" means an enclosure for electrical machinery or apparatus that will withstand, when the covers, or other access doors are properly secured, an internal explosion of the inflammable gas or vapour which may enter or originate inside the enclosure, without suffering damage and without communicating the internal flammation (or explosion) to the external inflammable gas or vapour in which it is designed to be used, through any joints or other structural openings in the enclosure;

(w) "flexible cable" means a cable consisting of one or more cores each formed of a group of wires, the diameter and the physical properties of the wires and insulating material being such as to afford flexibility.

(x) "guarded" means covered, shielded, fenced or otherwise protected by means of suitable casings, barrier, rails or metal screens to remove the possibility of dangerous contact or approach by persons or objects to a point of danger;

(y) "hand-held portable apparatus" means an apparatus which is so designed as to be capable of being held in the hands and moved while connected to a supply of electricity;

(z) "High Voltage Direct Current (HVDC)" means Direct Current (DC) voltage above 100000 Volts used for transmission of power.

(za) "inspector of mines" means an Inspector appointed under the Mines Act,1952 (35 of 1952);

(zb) "installation" means any composite electrical unit used for the purpose of generating, transforming, transmitting, converting, distributing or utilizing electricity;

(zc) "intrinsically safe" as applied to apparatus or associated circuits shall denote that any sparking that may occur in normal working is incapable of causing explosion of inflammable gas or vapour;

(zd) "increased safety type 'e' " means a method of protection by which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of occurrence of arcs and sparks in apparatus which does not produce arcs or sparks in normal service;

(ze) "lightning arrestor" means a device which has the property of diverting to earth any electrical surge of excessively high amplitude applied to its terminals and is capable of interrupting flow current if present and restoring itself thereafter to its original operating conditions;

(zf) "linked switch" means a switch with all the poles mechanically linked so as to operate simultaneously;

(zg) "live" means electrically charged;

(zh) "metallic covering" means mechanically strong metal covering surrounding one or more conductors;

(zi) "meter" means a device suitable for measuring, indicating and recording consumption of electricity or any other quantity related with electrical system and shall include, wherever applicable, other equipment such as Current Transformer (CT), Voltage Transformer (VT) or Capacitor Voltage Transformer (CVT) with necessary wiring and accessories;

(zj) "mine" has the same meaning as defined in the Mines Act, 1952 (35 of 1952);

(zk) "neutral conductor" means that conductor of a multi-wire system, the voltage of which is normally intermediate between the voltages of the other conductors of the system and shall also include return wire of the single phase system;

(zl) "occupier" means the owner or person in occupation of the premises where electricity is used or proposed to be used;

(zm) "ohm" means a unit of electrical resistance and is the electrical resistance between two points of a conductor when a constant potential difference of one volt, applied to these points produces a current of one ampere in the conductor, provided no electromotive force is generated in the conductor;

(zn) "open sparking" means sparking which owing to the lack of adequate provisions for preventing the ignition of inflammable gas external to the apparatus would ignite such inflammable gas;

(zo) "overhead line" means any electric supply line which is placed above ground and in the open air but excluding live rails of a traction system;
(zp) "owner" means the company or body corporate or association or body of individuals, whether incorporated or not or artificial juridical person which owns or operates or maintains Electric Plants and Lines;
(zq) "owner", "agent" and "manager" of a mine have the same meanings as are assigned to them in the Mines Act,1952(35 of 1952);
(zr) "poles" means the phase terminals of a Switch.
(zs) "portable apparatus" means an apparatus which is so designed as to be capable of being moved while in operation;
(zt) "portable hand lamp" means a portable light-fitting provided with suitable handle, guard and flexible cord connected to a plug;
(zu) "Schedule" means a schedule to these regulations.
(zw) "section" means a Section of the Act;
(zv) "span" means the horizontal distance between two adjacent supporting points of an overhead conductor;
(zw) "street box" means a totally enclosed structure, either above or below ground containing apparatus for transforming, switching, controlling or otherwise regulating electricity;
(zx) "supplier" means any generating company or licensee from whose system electricity flows into the system of another generating company or licensee or consumer;
(zy) "switch" means a manually operated device for opening and closing or for changing the connection of a circuit;
(zz) "switchboard" means an assembly including the switchgear for the control of electrical circuits, electric connections and the supporting frame;
(zza) "switchgear" shall denote switches, circuit breakers, cut-outs and other apparatus used for the operation, regulation and control of circuits;
(zzb) "system" means an electrical system in which all the conductors and apparatus are electrically connected to a common source of electric supply;
(zzc) "transportable apparatus" means apparatus which is operated in a fixed position but which is so designed as to be capable of being moved readily from one place to another;
(zzd) "volt" means a unit of potential difference of electro-motive force and is the difference of electric potential which exists between two points of a conductor carrying a constant current of one ampere, when the power dissipated between these points is one watt;
(zze) "voltage" means the difference of electric potential measured in Volts between any two conductors or between any part of either conductor and the earth as measured by a voltmeter meeting Indian Standards;
(zzf) "watt" is a unit of active power and "MW" means megawatt and is equal to 10^6 watts.

(2) Words and expressions used and not defined in these regulations but defined in the Act shall have the meanings respectively assigned to them in the Act.

Chapter II

3. **Designating person(s) to operate and carry out the work on electrical lines and apparatus.-** (1) A supplier or a consumer, or the owner, agent or manager of a mine, or the agent of any company operating in an oil-field or the owner of a drilled well in an oil field or a contractor who has entered into a contract with a supplier or a consumer to carry out duties incidental to the generation, transformation, transmission, conversion, distribution or use of electricity shall designate persons for the purpose to operate and carry out the work on electrical lines and apparatus.

(2) The supplier or consumer, or the owner, agent or manager of a mine, or the agent of any company operating in an oil-field or the owner of a drilled well in an oil field or a contractor referred to on sub-regulation (1) shall maintain a register wherein the names of the designated persons and the purpose for which they are engaged, shall be entered.

(3) No person shall be designated under sub-regulation (1) unless,-

(i) he possesses a certificate of competency or electrical work permit, issued by the Appropriate Government.

(ii) his name is entered in the register referred to in sub-relgulation (2).

4. **Inspection of designated officers and other safety measures.-** (1) The register maintained under sub-regulation (2) of regulation 3 shall be produced before the Electrical Inspector when required by him.

(2) If on inspection, the Electrical Inspector finds that the designated person does not fulfill the required qualification, he shall recommend the removal of the name of such persons from the register.

5. **Electrical Safety Officer.-** (1) All suppliers of electricity including generating companies, transmission companies and distribution companies shall designate an Electrical Safety Officer for ensuring observance of safety measures specified under these regulations in their organisation for construction, operation and maintenance of power stations, sub-stations, transmission and distribution lines.

(2) The Electrical Safety Officer shall be an Electrical Engineering degree holder with at least ten years of experience in operation and maintenance of electricity plants or an Electrical Engineering Diploma holder with at least fifteen years of experience in operation and maintenance of electric plant.

(3) The Electrical Safety Officer designated under sub-regulation (1), shall ensure periodic inspection of such installations, get them tested and keep a record thereof and such records shall be made available to the Electrical Inspector if and when required.

(4) For every factory registered under Factory Act, 1948, where more than 250 kW of electrical load is connected, the management of the factory shall designate a person having qualification specified in sub-regulation (2), for ensuring the

observance of the safety provisions laid under the Act and the regulations made thereunder, who shall periodically inspect such installation, get them tested and keep a record thereof and such records shall be made available to the Electrical Inspector if and when required.

6. **Safety measures for operation and maintenance of electric plants.-** (1) Engineers and supervisors appointed to operate or undertake maintenance of any part or whole of a thermal power generating station and a hydro power plant together with the associated sub-station shall hold diploma in Engineering from a recognized institute, or a degree in Engineering from a university.

(2) The Technicians to assist engineers or supervisors shall possess a certificate in appropriate trade, preferably with a two years course from a Industrial Training Institute recognized by the Central Government or the State Government.

(3) Engineers, supervisors and Technicians engaged for operation and maintenance of electric plants should have successfully undergone the type of training as specified in Schedule-I.

Provided that the existing employees shall have to undergo the training mentioned in sub-regulation (3) within three years from the date of coming into force of these regulations.

(4) The owner of every thermal power generating station and hydro power plant together with their associated sub-station shall arrange for training of personnel engaged in the operation and maintenance of his generating station along with associated sub-station in his own institute or any other institute recognized by the Central Government or the State Government.

Provided that separate training shall be given to the persons engaged in operation and maintenance of thermal power stations and hydro power stations including associated sub-stations.

7. **Safety measures for operation and maintenance of transmission, distribution systems.-** (1) Engineers or supervisors engaged in operation and maintenance of transmission and distribution systems shall hold diploma in electrical, mechanical, electronics and instrumentation Engineering from a recognized institute or university.

(2) The Technicians to assist engineers or supervisors shall possess a certificate in appropriate trade, preferably with a two years course from a Industrial Training Institute recognized by the Central Government or State Government.

(3) Engineers, supervisors and Technicians engaged for operation and maintenance of transmission and distribution systems electric plants should have successfully undergone the type of training as specified in Schedule-II.

Provided that the existing employees shall have to undergo the training mentioned in sub-regulation (3) within three years from the date of coming into force of these regulations.

(4) Owner of every transmission or distribution system shall arrange for training of their personnel engaged in the operation and maintenance of transmission and distribution system in his own institute or any other institute recognized by the Central Government or State Government.

8. **Keeping of records and inspection thereof.-** (1) The generating company or licensee shall maintain records of the maps, plans and sections relating to supply or transmission of electricity and submit the same to the Electrical Inspector for inspection as and when required by him.

(2) The Electrical Inspector shall supply a copy of the report of inspection referred to in sub-regulation (1), to the generating company or licensee, as the case may be.

9. **Deposit of maps.** – When a license has been granted, two sets of maps showing, as regards such licensee, the particulars specified in application for license shall be signed and dated to correspond with the date of notification of the grant of the license by an officer designated by the Appropriate Commission in this behalf, one set of such maps shall be retained by the said officer and the other one shall be furnished to the licensee.

10. **Deposit of printed copies.-** (1) Every person who is granted a license, shall, within thirty days of the grant thereof, have copies of the license and maps, showing the area of supply as specified in the license to Exhibit I same for public inspection at all reasonable times at his head office, his local offices, if any, and at the office of every local authority within the area of supply.

(2) Every such licensee shall, within the aforesaid period of thirty days, supply free of charge one copy of the license along with the relevant maps to every local authority within the area of supply and shall also make necessary arrangement for the sale of printed copies of the license and maps to all persons applying for the same, at a price to be notified by the Appropriate Government from time to time.

11. **Plan for area of supply to be made and kept open for inspection.-** (1) The licensee shall, after commencing to supply electricity, forthwith cause a plan, to be made in electronic form, of the area of supply, and shall cause to be marked thereon the alignment and in the case of underground works, the approximate depth below the surface of all the existing electric supply lines, street distributing boxes and other works, and shall once in every year cause that plan to be duly corrected so as to show the electric supply lines, street distributing boxes and other works for the time being in position and shall also, if so required by an Electrical Inspector, cause to be made sections showing the approximate level of all his existing underground works other than service lines.

(2) Every plan shall be drawn to such horizontal and vertical scale as the Appropriate Commission may require.

Provided that no scale shall be required unless maps of the locality on that scale are for the time being available to the public.

(3) Every plan and section so made or corrected, or a copy thereof, marked with the date when it was made or corrected, shall be kept by the licensee at his

principal office or place of business within the area of supply, and shall at all reasonable times be open to the inspection of all applicants, and copies thereof shall be supplied.

Provided that existing and old plans and sections and underground distribution network shall be converted to electronic form within three years from the date of commencement of these regulations.

(4) Global Positioning System (GPS) mapping or mapping through any other latest technology, of existing and old plans and sections shall be completed within five years from the date of commencement of these regulations and new plans and sections shall be compatible to the Global Positioning System mapping or mapping through any other latest technology.

(5) The licensee shall, if required by an Electrical Inspector, and, where the licensee is not a local authority, by the local authority, if any, concerned, supply free of charge to such Electrical Inspector or local authority a duplicate copy of every such plan or section or a part of the same duly corrected.

(6) The copies of plans and sections under this regulation shall be supplied by the licensee to every applicant on the payment of such fee as the Appropriate Commission may, by regulation, specify.

Chapter III

General safety requirements

12. **General safety requirements pertaining to construction, installation, protection, operation and maintenance of electric supply lines and apparatus.-** (1) All electric supply lines and apparatus shall be of sufficient rating for power, insulation and estimated fault current and of sufficient mechanical strength, for the duty cycle which they may be required to perform under the environmental conditions of installation, and shall be constructed, installed, protected, worked and maintained in such a manner as to ensure safety of human beings, animals and property.

(2) Save as otherwise provided in these regulations, the relevant code of practice of the Bureau of Indian Standards or National Electrical Code, if any, may be followed to carry out the purposes of this regulation and in the event of any inconsistency, the provisions of these regulaions shall prevail.

(3) The material and apparatus used shall conform to the relevant specifications of the Bureau of Indian Standards or International Elelctro-Technical Commission where such specifications have already been laid down.

(4) All electrical equipment shall be installed above the Mean Sea Level (MSL) as declared by local Municiple Authorities and where such equipment is to be installed in the basement, consumer shall ensure that the design of the basement

should be such that there is no seapage or leakage or logging of water in the basement.

13. **Service lines and apparatus on consumer's premises.-** (1) The supplier shall ensure that all electric supply lines, wires, fittings and apparatus belonging to him or under his control, which are on a consumer's premises, are in a safe-condition and in all respects fit for supplying electricity and the supplier shall take precautions to avoid danger arising on such premises from such supply lines, wires, fittings and apparatus.

(2) Service lines placed by the supplier on the premises of a consumer which are underground or which are accessible shall be so insulated and protected by the supplier as to be secured under all ordinary conditions against electrical, mechanical, chemical or other injury to the insulation.

(3) The consumer shall, as far as circumstances permit, take precautions for the safe custody of the equipment on his premises belonging to the supplier.

(4) The consumer shall also ensure that the installation under his control is maintained in a safe condition.

14. **Switchgear on consumer's premises.-** (1) The supplier shall provide a suitable switchgear in each conductor of every service line other than an earthed or earthed neutral conductor or the earthed external conductor of a concentric cable within a consumer's premises, in an accessible position and such switchgear shall be contained within an adequately enclosed fireproof receptacle:

Provided that where more than one consumer is supplied through a common service line, each such consumer shall be provided with an independent switchgear at the point of rigid junction to the common service.

(2) Every electric supply line other than the earthed or earthed neutral conductor of any system or the earthed external conductor of a concentric cable shall be protected by a suitable switchgear by its owner.

15. **Identification of earthed and earthed neutral conductors and position of switches and switchgear therein.-** Where the conductors include an earthed conductor of a two-wire system or an earthed neutral conductor of a multi-wire system or a conductor which is to be connected thereto, the following conditions shall be complied with:-

(i) an indication of a permanent nature shall be provided by the owner of the earthed or earthed neutral conductor, or the conductor which is to be connected thereto, to enable such conductor to be distinguished from any live conductor and such indication shall be provided-

(a) where the earthed or earthed neutral conductor is the property of the supplier, at or near the point of commencement of supply;

(b) where a conductor forming part of a consumer's system is to be connected to the supplier's earthed or earthed neutral conductor, at the point where such connection is to be made;

(c) in all other cases, at a point corresponding to the point of commencement of supply or at such other points as may be approved by an Electrical Inspector.

(ii) no cut-out, link or switch other than a linked switch arranged to operate simultaneously on the earthed or earthed neutral conductor and live conductors shall be inserted or remain inserted in any earthed or earthed neutral conductor of a two wire-system or in any earthed or earthed neutral conductor of a multi-wire system or in any conductor connected thereto.

Provided that the above requirement shall not apply in case of-

(a) a link for testing purposes, or

(b) a switch for use in controlling a generator or transformer.

16. Earthed terminal on consumer's premises.- (1) The supplier shall provide and maintain on the consumer's premises for the consumer's use, a suitable earthed terminal in an accessible position at or near the point of commencement of supply.

Provided that in the case of installation of voltage exceeding 250 V the consumer shall, in addition to the aforementioned earthing arrangement, provide his own earthing system with an independent electrode.

Provided further that the supplier may not provide any earthed terminal in the case of installations already connected to his system on or before the date to be specified by the State Government in this behalf if he is satisfied that the consumer's earthing arrangement is efficient.

(2) The consumer shall take all reasonable precautions to prevent mechanical damage to the earthed terminal and its lead belonging to the supplier.

(3) The supplier may recover from the consumer the cost of installation on the basis of schedule of charges published by him in advance and where such schedule of charges is not published, the procedure laid down, in regulation 63 shall apply.

Explanation.- For the purposes of sub-regulation (1), the expression "point of commencement of supply of electricity" shall mean the point at the incoming terminal of the switchgear installed by the consumer.

17. Accessibility of bare conductors.- Where bare conductors are used in a building, the owner of such conductors shall,-

(a) ensure that they are inaccessible;

(b) provide in readily accessible position switches for rendering them dead whenever necessary; and

(c) take such other safety measures as are specified in the relevant Indian Standards.

18. **Danger Notices**.- The owner of every installation of voltage exceeding 250 V shall affix permanently in a conspicious position a danger notice in Hindi or English and the local language of the District, with a sign of skull and bones of a design as per IS -2551 on-

(a) every motor, generator, transformer and other electrical plant and equipment together with apparatus used for controlling or regulating the same;

(b) all supports of overhead lines of voltage exceeding 650 V which can be easily climbed upon without the aid of ladder or special appliances;

(c) luminous tube sign requiring supply, X-ray and similar high frequency installations of voltage exceeding 650 V but not exceeding 33 kV:

Provided that where it is not possible to affix such notices on any generator, motor, transformer or other apparatus, they shall be affixed as near as possible thereto, or the word 'danger' and the voltage of the apparatus concerned shall be permanently painted on it:

Provided further that where the generator, motor, transformer or other apparatus is within an enclosure one notice affixed to the said enclosure shall be sufficient for the purposes of this regulation.

Explanation- For the purpose of clause (b) rails, tubular poles, wooden supports, reinforced cement concrete poles without steps, I-sections and channels, shall be deemed as supports which cannot be easily climbed upon

19. **Handling of electric supply lines and apparatus.**- (1) Before any conductor or apparatus is handled, adequate precautions shall be taken, by earthing or other suitable means, to discharge electrically such conductor or apparatus, and any adjacent conductor or apparatus if there is danger therefrom, and to prevent any conductor or apparatus from being accidentally or inadvertently electrically charged when persons are working thereon.

(2) Every person who is working on an electric supply line or apparatus or both shall be provided with tools and devices such as gloves, rubber shoes, safety belts, ladders, earthing devices, helmets, line testers, hand lines and the like for protecting him from mechanical and electrical injury and such tools and devices shall always be maintained in sound and efficient working condition.

(3) No person shall work on any live electric supply line or apparatus and no person shall assist such person on such work, unless he is designated in that behalf, and takes the safety precautions given in Schedule-III.

(4) Every telecommunication line on supports carrying a line of voltage exceeding 650 V but not exceeding 33 kV shall, for the purpose of working thereon, be deemed to be a line of voltage exceeding 650 V.

(5) All non-current carrying metal parts of switchgear and control panels shall be properly earthed and insulating floors or mat conforming to IS-15652: 2006, of appropriate voltage level shall be provided in front of the panels for the safety of operating personnel.

(6) All panels shall be painted with the description of its identification at front and at the rear.

20. **Supply to vehicles and cranes.-** Every person owning a vehicle, travelling crane, or the like to which electricity is supplied from an external source shall ensure that it is efficiently controlled by a suitable switch enabling all voltage to be cut off in one operation and, where such vehicle, travelling crane or the like runs on metal rails, the owner shall ensure that the rails are electrically continuous and earthed.

21. **Cables for portable or transportable apparatus.-** (1) Flexible cables shall not be used for portable or transportable motors, generators, transformers, rectifiers, electric drills, electric sprayers, welding sets or any other portable or transportable apparatus unless they are heavily insulated and adequately protected from mechanical injury.

(2) Where the protection is by means of metallic covering, the covering shall be in metallic connection with the frame of any such apparatus and earthed.

(3) The cables shall be three core type and four core type for portable and transportable apparatus working on single phase and three phase supply respectively and the wire meant to be used for ground connection shall be easily identifiable.

22. **Cables protected by bituminous materials.-** (1) Where the supplier or the owner has brought into use an electric supply line, other than an overhead line, which is not completely enclosed in a continuous metallic covering connected with earth and is insulated or protected *in situ* by composition or material of a bituminous character,-

(i) any pipe, conduit, or the like into which such electric supply line may have been drawn or placed shall, unless other arrangements are approved by the Electrical Inspector in any particular case, be effectively sealed at its point of entry into any street box so as to prevent any flow of gas to or from the street box, and;

(ii) such electric supply line shall be periodically inspected and tested where accessible, and the result of each such inspection and test shall be duly recorded by the supplier or the owner.

(2) The supplier or the owner after the coming into force of these regulations, shall not bring into use any further electric supply line as aforesaid which is insulated or

protected *in situ* by any composition or material known to be liable to produce noxious or explosive gases on excessive heating.

23. **Street boxes.**- (1) Street boxes shall not contain gas pipes, and precautions shall be taken to prevent, as far as reasonably possible, any influx of water or gas.

(2) Where electric supply lines forming part of different systems pass through the same street box, they shall be readily distinguishable from one another and all electric supply lines of voltage exceeding 650 V at or in street boxes shall be adequately supported and protected so as to prevent risk of damage to or danger from adjacent electric supply lines.

(3) All street boxes shall be regularly inspected for the purpose of detecting the presence of gas and if any influx or accumulation is discovered, the owner shall give immediate notice to any authority or company who have gas mains in the neighbourhood of the street box and in cases where a street box is large enough to admit the entrance of a person after the electric supply lines or apparatus therein have been placed in position, ample provision shall be made-

(i) to ensure that any gas which may by accident have obtained access to the box shall escape before a person is allowed to enter; and

(ii) for the prevention of danger from sparking.

(4) The owners of all street boxes or pillars containing circuits or apparatus shall ensure that their covers and doors are kept closed and locked and are so provided that they can be opened only by means of a key or a special appliance.

24. **Distinction of different circuits.**- The owner of every generating station, sub-station, junction-box or pillar in which there are any circuits or apparatus, whether intended for operation at different voltages or at the same voltage, shall ensure by means of indication of a permanent nature that the respective circuits are readily distinguishable from one another.

25. **Distinction of the installations having more than one feed.**- The owner of every installation including sub-station, double pole structure, four pole structure or any other structure having more than one feed, shall ensure by means of indication of a permanent nature, that the installation is readily distinguishable from other installations

26. **Accidental charging.**- (1) The owners of all circuits and apparatus shall so arrange them that there shall be no danger of any part thereof becoming accidentally charged to any voltage beyond the limits of voltage for which they are intended.

(2) Where alternating current and direct current circuits are installed on the same box or support, they shall be so arranged and protected that they shall not come into contact with each other when live.

27. **Provisions applicable to protective equipment.**- (1) Fire buckets filled with clean dry sand and ready for immediate use for extinguishing fires, in addition to fire extinguishers suitable for dealing with fires, shall be conspicuously marked

and kept in all generating stations, enclosed sub-stations and switching-stations in convenient location.

(2) The fire extinguishers shall be tested for satisfactory operation as per relevant Indian Standard at least once a year and record of such tests shall be maintained.

(3) First-aid boxes or cupboards conspicuously marked and equipped with such contents as the State Government may specify, shall be provided and maintained in every generating station, enclosed sub-station, enclosed switching station and in vehicles used for maintenance of lines so as to be readily accessible during all working hours and all such boxes and cupboards shall, except in the case of unattended sub-stations and switching stations, be kept in charge of responsible persons who are trained in first-aid treatment and one of such persons shall be available during working hours.

(4) Two or more gas masks shall be provided conspicuously and installed and maintained at accessible places in every generating station with capacity of 5 MW and above and enclosed sub-station with transformation capacity of 5 MVA and above for use in the event of fire or smoke:

Provided that where more than one generator with capacity of 5 MW and above is installed in a power station, each generator shall be provided with at least two separate gas masks in an accessible and conspicuous place:

Provided further that adequate number of gas masks shall be provided by the owner at every generating station and enlosed sub-station with capacity less than 5 MW and 5 MVA respectively.

28. **Display of instructions for resuscitation of persons suffering from electric shock.-** (1) Instructions, in English or Hindi and the local language of the District and where Hindi is the local language, in English and Hindi for the resuscitation of persons suffering from electric shock, shall be affixed by the owner in a conspicuous place in every generating station, enclosed sub-station, enclosed switching station, mines and in every factory as defined in clause (m) of section 2 of the Factory Act,1948 (63 of 1948) in which electricity is used and in such other premises where electricity is used as the Electrical Inspector may, by notice in writing served on the owner, direct.

(2) The owner of every generating station, enclosed sub-station, enclosed switching station and every factory or other premises to which these regulations apply, shall ensure that all designated persons employed by him are acquainted with and are competent to apply the instructions referred to in sub-regulation (1).

(3) In every manned generating station, sub-station or switching station of voltage exceeding 650 V, an artificial respirator shall be provided and kept in good working condition.

29. **Precautions to be adopted by consumers, owners, occupiers, electrical contractors, electrical workmen and suppliers.-** (1) No electrical installation work, including additions, alterations, repairs and adjustments to existing installations, except such replacement of lamps, fans, fuses, switches, domestic

appliances of voltage not exceeding 250V and fittings as in no way alters its capacity or character, shall be carried out upon the premises of or on behalf of any consumer, supplier, owner or occupier for the purpose of supply to such consumer, supplier, owner or occupier except by an electrical contractor licensed in this behalf by the State Government and under the direct supervision of a person holding a certificate of competency and by a person holding a permit issued or recognised by the State Government.

Provided that in the case of works executed for or on behalf of the Central Government and in the case of installations in mines, oil fields and railways, the Central Government and in other cases the State Government, may, by notification in the Official Gazette, exempt on such conditions as it may impose, any such work described therein either generally or in the case of any specified class of consumers, suppliers, owners or occupiers.

(2) No electrical installation work which has been carried out in contravention of sub-regulation (1) shall either be energised or connected to the works of any supplier.

30. **Periodical inspection and testing of installations.**- (1) Where an installation is already connected to the supply system of the supplier or trader, every such installation shall be periodically inspected and tested at intervals not exceeding five years either by the Electrical Inspector or by the supplier as may be directed by the State Government in this behalf or in the case of installations belonging to, or under the control of the Central Government, and in the case of installation in mines, oilfields and railways, by the Central Government.

(2) The periodical inspection and testing of installations of voltage above 650 V belonging to the supplier, shall also be carried out at intervals not exceeding five years by the Electrical Inspector;

(3) Where the supplier is directed by the Central or the State Government, as the case may be, to inspect and test the installation, he shall report on the condition of the installation to the consumer concerned in the Forms I, II and III as specified in Schedule-IV and shall submit a copy of such report to the Electrical Inspector;

(4) The Electrical Inspector may, on receipt of such report, accept the report submitted by the supplier or record variations as the circumstances of each case may require and may recommend that the defects may be ractified as per report;

(5) In the event of the failure of the owner of any installation to rectify the defects in his installation pointed out by the Electrical Inspector in his report and within the time indicated therein, such installation shall be liable to be disconnected under the directions of the Electrical Inspector after serving the owner of such installation with a notice for not less than forty eight hours.

Provided that the installation shall not be disconnected in case an appeal is made under sub-rule (1) of rule (8) of "Qualifications, Powers and Functions of Chief Electrical Inspector and Electrical Inspectors issued by Central Government vide GSR 481 (E) dated 17.08.2006 and the appellate authority has stayed the orders of disconnection.

Chapter VI

Safety provisions for electrical installations and apparatus of voltage exceeding 650 volts

43. **Approval by Electrical Inspector.** – (1) Voltage above which electrical installations will be required to be inspected by the Electrical Inspector before commencement of supply or recommencement after shutdown for six months and above shall be as per the notification to be issued by the Appropriate Government, under clause (x) of sub-section (2) of section 176 and sub-section (1) of section 162 of the Act.

(2) Before making an application to the Electrical Inspector for permission to commence or recommence supply after an installation has been disconnected for six months and above at voltage exceeding 650 V to any person, the supplier shall ensure that electric supply lines or apparatus of voltage exceeding 650 V belonging to him are placed in position, properly joined and duly completed and examined and the supply of electricity shall not be commenced by the supplier for installations of voltage needing inspection under these regulations unless the provisions of regulations 12 to 29, 33 to 35, 44 to 51 and 55 to 77 have been complied with and the approval in writing of the Electrical Inspector has been obtained by him:

Provided that the supplier may energise the aforesaid electric supply lines or apparatus for the purpose of tests specified in regulation 46.

(3) The owner of any installation of voltage exceeding 650 V shall, before making application to the Electrical Inspector for approval of his installation or additions thereto, test every circuit of voltage exceeding 650 V or additions thereto, other than an overhead line, and satisfy himself that they withstand the application of the testing voltage set out in sub-regulation (1) of regulation 46 and shall duly record the results of such tests and forward them to the Electrical Inspector:

Provided that an Electrical Inspector may direct such owner to carry out such tests as he deems necessary or accept the manufacturer's certified tests in respect of any particular apparatus in place of the tests required by this regulation

(4) The owner of any installation of voltage exceeding 650 V who makes any addition or alteration to his installation shall not connect to the supply his apparatus or electric supply lines, comprising the said alterations or additions unless and until such alteration or addition has been approved in writing by the Electrical Inspector.

44. **Use of electricity at voltage exceeding 650 Volts.** - (1) The Electrical Inspector shall not authorise the supplier to commence supply or where the supply has been discontinued for a period of six months and above, to recommence the supply at voltage exceeding 650 V to any consumer unless-

(i) all conductors and apparatus situated on the premises of the consumer are so placed as to be inaccessible except to a designated person

and all operations in connection with the said conductors and apparatus are carried out by a designated person;

(ii) the consumer has provided and agrees to maintain a separate building or a locked weather proof and fire proof enclosure of agreed design and location, to which the supplier at all times shall have access for the purpose of housing his apparatus and metering equipment, or where the provision for a separate building or enclosure is impracticable, the consumer has segregated the aforesaid apparatus of the supplier from any other part of his own apparatus:

Provided that such segregation shall be by the provision of fire proof walls, if the Electrical Inspector considers it to be necessary:

Provided further that in the case of an outdoor installation the consumer shall suitably segregate the aforesaid apparatus belonging to the supplier from his own;

(iii) all pole type sub-stations are constructed and maintained in accordance with regulation 50.

(2) The owner shall observe the following conditions, where electricity at voltage exceeding 650 V is supplied, converted, transformed or used,-

(i) he shall maintain safety clearances for electrical apparatus as per Bureau of Indian Standard specification so that sufficient space is available for easy operation and maintenance without any hazard to the operating and maintenance personnel working near the equipment and for ensuring adequate ventilation;

(ii) he shall not allow any encroachment below such installation:

Provided that where the Electrical Inspector comes across any such encroachment, he shall direct the owner to remove such encroachments;

(iii) the minimum safety working clearances specified in Schedule-VII shall be maintained for the bare conductors or live parts of any apparatus in outdoor sub-stations excluding overhead lines of installations of voltage exceeding 650 V;

(iv) he shall ensure that the windings of motors or other apparatus within reach from any position in which a person may require to be, are suitably protected so as to prevent danger;

(v) he shall ensure that where a transformer or transformers are used, suitable provision shall be made, either by connecting with earth, a point of the circuit at the lower voltage or otherwise, to guard against danger by reason of the said circuit becoming accidentally charged above its normal voltage by leakage from or contact with the circuit at the higher voltage;

(vi) a sub-station or a switching station with apparatus having more than 2000 litres of oil shall not be located in the basement where proper oil draining arrangement cannot be provided;

(vii) where a sub-station or a switching station with apparatus having more than 2000 litres of oil is installed, whether indoor or outdoors, he shall take the following measures, namely:-

(a) the baffle walls of four hours fire rating shall be provided between the apparatus,-

(i) where there is a single phase transformer banks in the switch-yards of generating stations and sub-stations;

(ii) on the consumer premises;

(iii) where adequate clearance between the units is not available.

(b) provisions shall be made for suitable oil soakpit and where use of more than 9000 litres of oil in any one oil tank, receptacle or chamber is involved, provision shall be made for the draining away or removal of any oil which may leak or escape from the tank, receptacle or chamber containing the same, and special precautions shall be taken to prevent the spread of any fire resulting from the ignition of the oil from any cause and adequate provision shall be made for extinguishing any fire which may occur;

(c) spare oil shall not be stored in the vicinity of any oil filled equipment in any such sub-station or switching station;

(d) all the transformers and switchgears shall be maintained in accordance with the maintenance schedules prepared in accordance with the relevant codes of practice of Bureau of Indian Standards;

(e) dry type of transformers only shall be used for installations inside the residential and commercial buildings;

(viii) without prejudice to the above measures, he shall take adequate fire protection arrangement for quenching the fire in the apparatus;

(ix) he shall ensure that the transformers of 10 MVA and above rating or in case of oil filled transformers with oil capacity of more than 2000 liters are provided with fire fighting system as per IS - 3034: 1993 or with Nitrogen Injection Fire Protection system;

(x) where it is necessary to locate the sub-station, or switching station in the basement, he shall take the following measures, namely:-

(a) the room shall necessarily be in the first basement at the periphery of the basement;

(b) the entrances to the room shall be provided with fire resisting doors of 2 hour fire rating and the door shall always be kept closed and a notice of this effect shall be affixed on outer side of the door;

(c) a curb (sill) of a suitable height shall be provided at the entrance in order to prevent the flow of oil from a ruptured transformer into other parts of the basement;

(d) direct access to the transformer room shall be provided from outside and the surrounding walls shall be lined with fire bricks;

(e) the cables to primary side and secondary side shall have sealing at all floors and wall opening of atleast two hours rating;

(f) fire Retardent Low Smoke (FRLS) cable of two hours rating shall be used.

(xi) he shall ensure that oil filled transformers installed indoors in other than residential or commercial buildings are placed at the ground floor or not below the first basement;

(xii) he shall ensure that cable trenches inside the sub-stations and switching stations containing cables are filled with sand, pebbles or similar non-inflammable materials or completely covered with non-inflammable slabs;

(xiii) he shall ensure that unless the conditions are such that all the conductors and apparatus may be made dead at the same time for the purpose of cleaning or for other work, the said conductors and apparatus shall be so arranged that these may be made dead in sections, and that work on any such section may be carried on by a designated person without danger;

(xiv) only persons designated under sub-regulation (1) of regulation 3, shall carry out the work on live lines and apparatus.

(3) All apparatus shall be protected against lightning and apparatus exceeding 220 kV shall also be protected against switching over voltages.

(4) The equipment used for protection and switching shall be adequately co-ordinated with the protected apparatus to ensure safe operation and to maintain the stability of the inter-connected units of the power system.

(5) The minimum clearances specified in Schedule-VIII shall be maintained for bare conductors or live parts of any apparatus in outdoor sub-stations, excluding overhead lines of High Voltage Direct Current installations.

(6) There shall not be tapping of another transmission line from the main line for 66 kV and above class of lines.

45. Inter-locks and protection for use of electricity at voltage exceeding 650 Volts.- (1) The owner shall ensure the following, namley:-

(i) isolators and the controlling circuit breakers shall be inter-locked so that the isolators cannot be operated unless the corresponding breaker is in open position;

(ii) isolators and the corresponding earthing switches shall be inter-locked so that no earthing switch can be closed unless and until the corresponding isolator is in open position;

(iii) where two or more supplies are not intended to be operated in parallel, the respective circuit breakers or linked switches controlling the supplies shall be inter-locked to prevent possibility of any inadvertent paralleling or feedback;

(iv) when two or more transformers are operated in parallel, the system shall be so arranged as to trip the secondary breaker of a transformer in case the primary breaker of that transformer trips;

(v) all gates or doors which give access to live parts of an installation shall be inter-locked in such a way that these cannot be opened unless the live parts are made dead and proper discharging and earthing of these parts should be ensured before any person comes in close proximity of such parts;

(vi) where two or more generators operate in parallel and neutral switching is adopted, inter-lock shall be provided to ensure that generator breaker cannot be closed unless one of the neutrals is connected to the earthing system.

(2) The following protection shall be provided in all systems and circuits to automatically disconnect the supply under abnormal conditions, namly:-

(i) over current protection to disconnect the supply automatically if the rated current of the equipment, cable or supply line is exceeded for a time which the equipment, cable or supply line is not designed to withstand;

(ii) earth fault or earth leakage protection to disconnect the supply automatically if the earth fault current exceeds the limit of current for keeping the contact potential within the reasonable values;

(iii) gas pressure type and winding and oil temperature protection to give alarm and tripping shall be provided on all transformers of ratings 1000 KVA and above;

(iv) transformers of capacity 10 MVA and above shall be protected against incipient faults by differential protection;

(v) all generators with rating of 100 KVA and above shall be protected against earth fault or leakage;

(vi) all generators of rating 1000 KVA and above shall be protected against faults within the generator winding using restricted earth fault protection or differential protection or by both;

(vii) high speed bus bar differential protection along with local breaker back up protection shall be commissioned and shall always be available at all 132 kV and above voltage sub-stations and switching stations and generating stations connected with the grid:

Provided that in respect of existing 132 kV sub-stations and switching stations having more than one incoming feeders, the high speed bus bar differential protection along with local breaker back up protection, shall be commissioned and shall always be available;

(viii) every generating station and sub-station connected to the grid at 220 kV and above shall be provided with disturbance recording and event logging facilities and all such equipment shall be provided with time synchronization facility for global common time reference but wherever numerical relays with provision of recording fault data are installed, disturbance recorder and event logger may not be installed;

(ix) distance protection and carrier communication protection shall be provided for all lines connecting to 400/220 kV substation.

46. **Testing, Operation and Maintenance.-** (1) Before approval is accorded by the Electrical Inspector under regulation 43 the manufacturer's test certificates shall, if required, be produced for all the routine tests as required under the relevant Indian Standards.

(2) No new apparatus, cable or supply line of voltage exceeding 650 Volts shall be commissioned unless such apparatus, cable or supply line are subjected to site tests as per relevant code of practice of the Bureau of Indian Standards.

(3) No apparatus, cable or supply line of voltage exceeding 650 V which has been kept disconnected, for a period of six months or more, from the system for alterations or repair, shall be connected to the system until such apparatus, cable or supply line are subjected to the relevant tests as per code of practice of Bureau of Indian Standards.

(4) Notwithstanding the provisions of this regulation, the Electrical Inspector may require certain tests to be carried out before or after charging the installations.

(5) All apparatus, cables and supply lines shall be maintained in healthy conditions and tests shall be carried out periodically as per the relevant code of practice of the Bureau of Indian Standards.

(6) Records of all tests, trippings, maintenance works and repairs of all equipments cables and supply lines shall be duly kept in such a way that these records can be compared with earlier ones.

(7) It shall be the responsibility of the owner of all installations of voltage exceeding 650 V to maintain and operate the installations in a condition free from danger and as recommended by the manufacturer or by the relevant codes of practice of the Bureau of Indian Standards.

(8) Failures of transformers and reactors of 20 MVA or MVAR and higher capacity shall be reported by the consumer and the suppliers of electricity, within forty eight hours of the occurrence of the failure, to the Central Electricity Authority and the reasons for failure and measures to be taken to avoid recurrence of failure shall be sent to the Central Electricity Authority within one month of the occurrence in the format given in Schedule-IX.

47. **Precautions to be taken against excess leakage in case of metal sheathed electric supply lines.-** The following precautions shall be taken in case of electric supply lines other than overhead lines, for use at voltage exceeding 650 V; namely:-

(i) the conductors of the cable except the cable with thermoplastic insulation without any metallic screen or armour shall be enclosed in metal sheathing which shall be electrically continuous and connected with earth, and the conductivity of the metal sheathing shall be maintained and reasonable precautions taken where necessary to avoid corrosion of the sheathing;

(ii) the resistance of the earth connection with metallic sheath shall be kept low enough to permit the controlling circuit breaker or cut-out to operate in the event of any failure of insulation between the metallic sheath and the conductor.

Explanation- For the purpose of this regulation;

(a) in the case of thermoplastic insulated and sheathed cables with metallic armour the metallic wire or tape armour, shall be considered as metal sheathing.

(b) where an electric supply line as aforesaid has concentric cables and the external conductor is insulated from an outer metal sheathing and connected with earth, the external conductor may be regarded as the metal sheathing for the purposes of this regulation provided that the foregoing provisions as to conductivity are complied with.

48. **Connection with earth for apparatus exceeding 650V.-** (1) All non-current carrying metal parts associated with an installation of voltage exceeding 650 V shall be effectively earthed to a grounding system or mat which shall,-

(i) limit the touch and step potential to tolerable values;

(ii) limit the ground potential rise to tolerable values so as to prevent danger due to transfer of potential through ground, earth wires, cable sheath, fences, pipe lines, etc.;

(iii) maintain the resistance of the earth connection to such a value as to make operation of the protective device effective;

(2) In the case of star connected system with earthed neutrals or delta connected system with earthed artificial neutral point,-

(i) the neutral point of every generator and transformer shall be earthed by connecting it to the earthing system not by less than two separate and distinct connections:

Provided that the neutral point of a generator may be connected to the earthing system through an impedance to limit the fault current to the earth:

Provided further that in the case of multi-machine systems neutral switching may be resorted to, for limiting the injurious effect of harmonic current circulation in the system;

(ii) the generator or transformer neutral shall be earthed through a suitable impedance where an appreciable harmonic current flowing in the neutral connection causes interference, with communication circuits;

(iii) in case of the delta connected system the neutral point shall be obtained by the insertion of a grounding transformer and current limiting resistance or impedance wherever considered necessary at the commencement of such a system.

(3) In case of generating stations, sub-stations and industrial installations of voltage exceeding 33 kV, the system neutral earthing and protective frame earthing may be, if system design so warrants, integrated into common earthing grid provided the resistance to earth of combined mat does not cause the step and touch potential to exceed its permissible values.

(4) Single phase systems of voltage exceeding 650 V shall be effectively earthed.

(5) In the case of a system comprising electric supply lines having concentric cables, the external conductor shall be connected with earth.

(6) Where a supplier proposes to connect with earth an existing system for use at voltage exceeding 650 V which has not hitherto been so connected with earth, he shall give not less than fourteen days notice in writing together with particulars of the proposed connection with earth to the telegraph-authority established under the Indian Telegraph Act, 1885 (13 of 1885).

(7) Where the earthing lead and earth connection are used only in connection with earthing guards erected under overhead lines of voltage exceeding 650 V where they cross a telecommunication line or a railway line, and where such lines are equipped with earth leakage, the earth resistance shall not exceed twenty five

ohms and the project authorities shall obtain No Objection Certificate (NOC) from Railway Authorities and Power and Telecommunication Co-ordination Committee before energisation of the facilities.

(8) Every earthing system belonging to either the supplier or the consumer shall be tested for its resistance to earth on a dry day during dry season not less than once a year and records of such tests shall be maintained and produced, if so required, before the Electrical Inspector.

49. **General conditions as to transformation and control of electricity.-** (1) Where electricity of voltage exceeding 650 V is transformed, converted, regulated or otherwise controlled in sub-stations or switching stations including outdoor sub-stations and outdoor switching stations to be transformed or in street boxes constructed underground, the following provisions shall be observed, namely:-

(i) sub-stations and switching stations shall preferably be erected above ground, but where necessarily constructed underground due provisions for ventilation and drainage shall be made and any space housing switchgear shall not be used for storage of any materials especially inflammable and combustible materials or refuse;

(ii) outdoor sub-stations except pole type sub-stations and outdoor switching stations shall, unless the apparatus is completely enclosed in a metal covering connected with earth, the said apparatus also being connected with the system by armoured cables, be efficiently protected by fencing not less than 1.8 metres in height or other means so as to prevent access to the electric supply lines and apparatus therein by an undesignated person and the fencing of such area shall be earthed efficiently;

(iii) underground street boxes, other than sub-stations, which contain transformers shall not contain switches or other apparatus, and switches, cut-outs or other apparatus required for controlling or other purposes shall be fixed in separate receptacle above ground wherever practicable.

(2) Where electricity is transformed, suitable connection shall be made by connecting with earth a point of the system at the lower voltage and also to guard against danger by reason of the said system becoming accidentally charged above its normal voltage by leakage from a contact with the system at the higher voltage.

50. **Pole type sub-stations.-** Where platform type construction is used for a pole type sub-station and sufficient space for a person to stand on the platform is provided, a substantial hand rail shall be built around the said platform and if the hand rail is of metal, it shall be connected with earth:

Provided that in the case of pole type sub-station on wooden supports and wooden platform the metal hand-rail shall not be connected with earth.

51. **Condensers.-** Suitable arrangement shall be made for immediate and automatic or manual discharge of every static condenser on disconnection of supply.

52. Supply to luminous tube sign installations of voltage exceeding 650 Volts but not exceeding 33 kV.- (1) Any person who proposes to use or who is using electricity for the purpose of operating a luminous tube sign installation, or who proposes to transform or is transforming electricity to a voltage exceeding 650 V but not exceeding 33 kV for any such purpose shall comply with the following conditions, namely:-.

(i) all live parts of the installation, including all apparatus and live conductors in the secondary circuit, but excluding the tubes except in the neighbourhood of their terminals, shall be inaccessible to undesignated persons and such parts shall be effectively screened;

(ii) irrespective of the method of obtaining the voltage of the circuit which feeds the luminous discharge tube sign, no part of any conductor of such circuit shall be in metallic connection, except in respect of its connection with earth, with any conductor of the supply system or with the primary winding of the transformer;

(iii) all live parts of an exterior installation shall be so disposed as to protect them against the effects of the weather and such installation shall be so arranged and separated from the surroundings as to limit, as far as possible, the spreading of fire;

(iv) the secondary circuit shall be permanently earthed at the transformer and the core of every transformer shall be earthed;

(v) where the conductors of the primary circuit are not in metallic connection with the supply conductors, one phase of such primary circuit shall be permanently earthed at the motor generator or convertor, or at the transformer and an earth leakage circuit breaker of sufficient rating shall be provided on the side of voltage not exceeding 250 V to detect the leakage in such luminous tube sign installations;

(vi) a sub-circuit which forms the primary circuit of a fixed luminous discharge tube sign installation shall be reserved solely for such purpose;

(vii) a separate primary final sub-circuit shall be provided for each transformer or each group of transformers having an aggregate input not exceeding 1,000 volt-amperes, of a fixed luminous discharge tube sign installation;

(viii) an interior installation shall be provided with suitable adjacent means for disconnecting all phases of the supply except the "neutral" in a 3-phase, 4-wire circuit;

(ix) for installations on the exterior of a building a suitable emergency fire-proof linked switch to operate on all phases except the neutral in a 3-phase, 4-wire circuit shall be provided and fixed in a conspicuous position at not more than 1.70 metres above the ground;

(x) a special "caution" notice shall be affixed in a conspicuous place on the door of every enclosure of voltage exceeding 650 V but not exceeding 33 kV to the effect that the supply must be cut off before the enclosure is opened;

(xi) where static condensers are used, they shall be installed on the load side of the fuses and the primary side of the transformers where the voltage does not exceed 250 V;

(xii) where static condensers are used on primary side, provision shall be made for automatic or manual discharging of the condensers when the supply is cut off;

(xiii) before using the static condensers or any interrupting device on the voltage exceeding 650 V, the executing agencies shall test and ensure that automatic discharging device is functional thereon.

(2) The owner or user of any luminous tube sign or similar installation of voltage exceeding 650 V but not exceeding 33 kV shall not bring the same into use without giving to the Electrical Inspector not less than fourteen days notice in writing of his intention so to do.

53. **Supply to electrode boilers of voltage exceeding 650 Volt but not exceeding 33 kV.**- (1) Where a system having a point connected with earth is used for supply of electricity to an electrode boiler of voltage exceeding 650 V which is also connected with earth, the owner or user of electrode boiler shall comply with the following conditions, namely:-

(i) the metal work of the electrode boiler shall be efficiently connected to the metal sheathing and metallic armouring, if any, of the electric supply line of voltage exceeding 650 V but not exceeding 33 kV whereby electricity is suppied to the electrode boiler;

(ii) the supply of electricity at voltage exceeding 650 V to the electrode boiler shall be controlled by a suitable circuit-breaker so set as to operate in the event of the phase currents becoming unbalanced to the extent of ten per cent of the rated current consumption of the electrode boiler under normal conditions of operation:

Provided that if in any case a higher setting is essential to ensure stability of operation of the electrode boiler, the setting may be increased so as not to exceed fifteen per cent of the rated current consumption of the electrode boiler under normal conditions of operation;

(iii) an inverse time element device may be used in conjuction with the aforesaid circuit breaker to prevent the operation thereof unnecessarily on the occurrence of unbalanced phase currents of momentary or short duration;

(iv) the supplier or owner shall serve a notice in writing on the telegraph-authority at least seven days prior to the date on which such supply of electricity is to be afforded specifying the location of every point, including

the earth connection of the electrode boiler, at which the system is connected with earth.

(2) The owner or user of any electrode boiler of voltage exceeding 650 V shall not bring the same into use without giving the Electrical Inspector not less than fourteen days notice in writing of his intention so to do.

54. **Supply to X-ray and high frequency installations.**- (1) Any person, who proposes to use or who is using electricity for the purpose of operating an X-ray or similar high-frequency installation, other than portable units or shock-proof self contained and stationary units shall comply the following conditions, namely:-

(i) mechanical barriers shall be provided to prevent too close an approach to any parts of the X-ray apparatus of voltage exceeding 650 V but not exceeding 33 kV, except the X-ray tube and its leads, unless such parts of voltage exceeding 650 V but not exceeding 33 kV have been rendered shock proof by being shielded by earthed metal or adequate insulating material;

(ii) where generators operating at 300 kV peak or more are used, such generators shall be installed in rooms separate from those containing the other equipment and any step-up transformer employed shall be so installed and protected as to prevent danger;

(iii) a suitable switch shall be provided to control the circuit supplying a generator, and shall be so arranged as to be open except while the door of the room housing the generator is locked from the outside;

(iv) X-ray tubes used in therapy shall be mounted in an earthed metal enclosure;

(v) every X-ray machine shall be provided with a milliammeter or other suitable measuring instrument, readily visible from the control position and connected, if practicable, in the earthed lead, but guarded if connected in the lead of voltage exceeding 650 V but not exceeding 33 kV:

Provided that earth leakage circuit breaker of sufficient rating shall be provided on the side wherein voltage does not exceed 250 V to detect the leakage in such X-ray installations.

Explanation:- For the purpose of this regulation "shock proof", as applied to X-ray and high-frequency equipment, shall mean that such equipment is guarded with earthed metal so that no person may come into contact with any live part.

(2) (i) in the case of nonshock proof equipment, overhead conductors of voltage exceeding 650 V but not exceeding 33 kV, unless suitably guarded against personal contact, shall be adequately spaced and high voltage leads on tilting tables and fluroscopes shall be adequately insulated or so surrounded by barriers as to prevent inadvertent contact;

(ii) the circuit of voltage not exceeding 250 V of the step up transformer shall contain a manually operated control device having overload protection, in addition to the over current device for circuit protection, and these devices shall have no exposed live parts and for diagnostic work there shall be an additional switch in the said circuit, which shall be of one of the following types:-

(a) a switch with a spring or other mechanism that will open automatically except while held close by the operator, or;

(b) a time switch which will open automatically after a definite period of time for which it has been set;

(iii) if more than one piece of apparatus be operated from the same source of voltage exceeding 650 V, each shall be provided with a switch of voltage exceeding 650 V to give independent control;

(iv) low frequency current-carrying parts of a machine of the quenched-gap or open gap type shall be so insulated or guarded that they cannot be touched during operation but the high frequency circuit-proper which delivers high-frequency current normally for the therapeutic purposes shall be exempt from such insulation;

(v) all X-ray generators having capacitors shall have suitable means for discharging the capacitors manually;

(vi) except in the case of self-contained units, all 200 kV peak or higher X-ray generators shall have a sphere gap installed in the system of voltage exceeding 650 V but not exceeding 33 kV adjusted so that it will break down on over voltage surges.

(3) (i) all non-current carrying metal parts of tube stands, fluroscopes and other apparatus shall be properly earthed and insulating floors, mats or platforms shall be provided for operators in proximity to parts of voltage exceeding 650V unless such parts have been rendered shock proof;

(ii) where short wave therapy machines are used, the treatment tables and examining chairs shall be wholly non-metallic.

(4) The owner of any X-ray installation or similar high frequency apparatus shall not bring the same into use without giving to the Electrical Inspector not less than fourteen days notice in writing of his intention to do so:

Provided that the aforesaid notice shall not be necessary in the case of shock-proof portable X-ray and high-frequency equipment which have been inspected before the commencement of their use and periodically thereafter.

Chapter VII

Safety requirements for overhead lines, underground cables and generating stations

55. Material and strength.- (1) All conductors of overhead lines other than those specified in regulation 68 shall have a breaking strength of not less than 350 kg.

(2) Where the voltage does not exceed 250 V and the span is of less than fifteen metres and is drawn through the owner's or consumer's premises, a conductor having an actual breaking strength of not less than 150 kg may be used.

56. Joints.- (1) No conductor of an overhead line shall have more than one joint in a span and joints between conductors of overhead lines shall be mechanically and electrically secure under the conditions of operation.

(2) The ultimate strength and the electrical conductivity of the joint shall be as per relevant Indian Standards.

57. Maximum stresses and factors of safety.- (1) The load and permissible stresses on the structural members, conductors and ground wire of self supporting steel lattice towers for overhead transmission lines shall be in accordance with the specifications laid down, from time to time, by the Bureau of Indian Standards.

(2) Overhead lines not covered in sub-regulation (1) shall have the following minimum factors of safety, namely:-

(i)	for metal supports	-	1.5
(ii)	for mechanically processed concrete supports	-	2.0
(iii)	for hand-moulded concrete supports	-	2.5
(iv)	for wood supports	-	3.0

(3) The minimum factors of safety shall be based on such load as may cause failure of the support to perform its function, assuming that the foundation and other components of the structure are intact.

(4) The load shall be equivalent to the yield point stress or the modulus of rupture, as the case may be, for supports subject to bending and vertical loads and the crippling load for supports used as strut.

(5) The strength of the supports of the overhead lines in the direction of the line shall not be less than one-fourth of the strength required in the direction transverse to the line.

(6) The minimum factor of safety for stay-wires, guard-wires or bearer-wires shall be 2.5 based on the ultimate tensile strength of the wire.

(7) The minimum factor of safety for conductors shall be two, based on their ultimate tensile strength, in addition, the conductor's tension at 32^0 C, without external load, shall not exceed the following percentages of the ultimate tensile strength of the conductor:- .

(i)	Initial unloaded tension	.....	35 per cent
(ii)	Final unloaded tension	.....	25 per cent

Provided that for the conductors having a cross section of a generally triangular shape, such as conductors composed of 3-wires, the final unloaded tension at 32^0 C shall not exceed thirty per cent of the ultimate tensile strength of such conductor.

(8) For the purpose of calculating the factors of safety in sub-regulation (2), the following conditions shall be observed, namely:-

(i) the maximum wind pressure shall be as specified in the relevant Indian Standards;

(ii) for cylindrical bodies the effective area shall be taken as full projected area exposed to wind pressure; and

(iii) the maximum and minimum temperatures shall be such as specified in the relevant Indian Standards.

(9) Notwithstanding anything contained in sub-regulation (2) to (8) in localities where overhead lines are liable to accumulations of ice or snow, the load and permissible stresses on the structural members, conductors and ground wire of self supporting steel lattice towers for overhead transmission lines shall be in accordance with the specifications laid down, from time to time, by the Bureau of Indian Standards or as specified by Appropriate Government, by order in writing.

58. **Clearance above ground of the lowest conductor of overhead lines.-** (1) No conductor of an overhead line, including service lines, erected across a street shall at any part thereof be at a height of less than-

(i)	for lines of voltage not exceeding 650 Volts	-	5.8 metres
(ii)	for lines of voltage exceeding 650 Volts but not exceeding 33 kV	-	6.1 metres

(2) No conductor of an overhead line, including service lines, erected along any street shall at any part thereof be at a height less than-

(i)	for lines of voltage not exceeding 650 Volts	-	5.5 metres
(ii)	for lines of voltage exceeding 650 Volts but not exceeding 33 kV	-	5.8 metres

(3) No conductor of an overhead line including service lines, erected elsewhere than along or across any street shall be at a height less than -

(i)	for lines of voltage upto and including 11,000 Volts,if bare	-	4.6 metres
(ii)	for lines of voltage upto and including 11,000 Volts, if insulated	-	4.0 metres
(iii)	for lines of voltage exceeding 11,000 Volts but not exceeding 33 kV	-	5.2 metres

(4) For lines of voltage exceeding 33 kV the clearance above ground shall not be less than 5.2 metres plus 0.3 metre for every 33,000 Volts or part thereof by which the voltage of the line exceeds 33,000 Volts;

Provided that the minimum clearance along or across any street shall not be less than 6.1 metres.

(5) For High Voltage Direct Current (HVDC) lines, the clearance above ground shall not be less than:-

Sl.No.	DC Voltage(kV)	Ground Clearance (mtrs.)
1.	100 kV	6.1
2.	200 kV	7.3
3.	300 kV	8.5
4.	400 kV	9.4
5.	500 kV	10.6
6.	600 kV	11.8
7.	800 kV	13.9

(6) Ground clearances shall be as specified in schedule-X.

59. **Clearance between conductors and trolley wires.-** (1) No conductor of an overhead line crossing a tramway or trolley bus route using trolley wires shall have less than the following clearances above any trolley wire-

(i) lines of voltage not exceeding 650 Volts - 1.2 metres

Provided that where an insulated conductor suspended from a bearer wire crosses over a trolley wire the minimum clearance for such insulated conductor shall be 0.6 metre.

(ii) lines of voltage exceeding 650 Volts up to and including 11,000 Volts - 1.8 metres

(iii) lines of voltage exceeding 11,000 Volts but not exceeding33,000 Volts - 2.5 metres

(iv) lines of voltage exceeding 33 kV - 3.0 metres

(2) In any case of a crossing specified in sub-regulation (1), whoever lays his line later in time, shall provide the clearance between his own line and the line which will be crossed in accordance with the provisions of the said sub-regulation:

Provided that if the later entrant is the owner of the lower line and is not able to provide adequate clearance, he shall bear the cost for modification of the upper line so as to comply with this sub-regulation.

60. **Clearance from buildings of lines of voltage and service lines not exceeding 650 Volts.-** (1) An overhead line shall not cross over an existing building as far as possible and no building shall be constructed under an existing overhead line.

(2) Where an overhead line of voltage not exceeding 650 V passes above or adjacent to or terminates on any building, the following minimum clearances from any accessible point, on the basis of maximum sag, shall be observed, namely:-

(i) for any flat roof, open balcony, varandah roof and lean-to-roof-

(a) when the line passes above the building a vertical clearance of 2.5 metres from the highest point, and

(b) when the line passes adjacent to the building a horizontal clearance of 1.2 metres from the nearest point, and

(ii) for pitched roof-

(a) when the line passes above the building a vertical clearance of 2.5 metres immediately under the line, and

(b) when the line passes adjacent to the building a horizontal clearance of 1.2 metres.

(3) Any conductor so situated as to have a clearance less than that specified above shall be adequately insulated and shall be attached at suitable intervals to a bare earthed bearer wire having a breaking strength of not less than 350 kg.

(4) The horizontal clearance shall be measured when the line is at a maximum deflection from the vertical due to wind pressure.

(5) Vertical and horizontal clearances shall be as specified in schedule-X.

Explanation:- For the purpose of this regulation, the expression "building" shall be deemed to include any structure, whether permanent or temporary.

61. **Clearances from buildings of lines of voltage exceeding 650 V.-** (1) An overhead line shall not cross over an existing building as far as possible and no building shall be constructed under an existing overhead line.

(2) Where an overhead line of voltage exceeding 650 V passes above or adjacent to any building or part of a building it shall have on the basis of maximum sag a vertical clearance above the highest part of the building immediately under such line, of not less than-

(i) for lines of voltages exceeding 650 Volts upto and including 33,000 Volts	- 3.7 metres
(ii)for lines of voltages exceeding 33 kV	- 3.7 metres plus 0.30 metre for every additional 33,000 Volts or part thereof.

(3) The horizontal clearance between the nearest conductor and any part of such building shall, on the basis of maximum deflection due to wind pressure, be not less than-

(i)	for lines of voltages exceeding 650 V upto and including 11,000 Volts	- 1.2 metres
(ii)	for lines of voltages exceeding 11,000 V and up to and including 33,000 V	- 2.0 metres
(iii)	for lines of voltages exceeding 33 kV	- 2.0 metres plus 0.3 metre fore every additional 33kV or part thereof.

(4) For High Voltage Direct Current (HVDC) systems, vertical clearance and horizontal clearance, on the basis of maximum deflection due to wind pressure, from buildings shall be maintained as below:

Sl.No	DC Voltage (kV)	Vertical Clearance (mtrs.)	Horizontal Clearance (mtrs.)
1.	100 kV	4.6	2.9
2.	200 kV	5.8	4.1
3.	300 kV	7.0	5.3
4.	400 kV	7.9	6.2
5.	500 kV	9.1	7.4
6.	600 kV	10.3	8.6
7.	800 kV	12.4	10.7

(5) Vertical and horizontal clearances shall be as specified in schedule-X.

Explanation:- For the purpose of this regulation the expresssion "building" shall be deemed to include any structure, whether permanent or temporary.

62. **Conductors at different voltages on same supports.-** Where conductors forming parts of systems at different voltages are erected on the same supports, the owner shall make adequate provision to guard against danger to linemen and others, from the lower voltage system being charged above its normal working voltage, by leakage from or contact with the higher voltage system and the methods of construction and the applicable minimum clearances between the conductors of the two systems shall be as specified in regulation 69 for lines crossing each other.

63. Erection or alteration of buildings, structures, flood banks and elevation of roads.- (1) If at any time subsequent to the erection of an overhead line, whether covered with insulating material or not, any person proposes to erect a new building or structure or flood bank or to raise any road level or to carry out any other type of work whether permanent or temporary or to make in or upon any building, or structure or flood bank or road, any permanent or temporary addition or alteration, he and the contractor whom he employs to carry out the erection, addition or alteration, shall, give intimation in writing of his intention to do so, to the supplier or owner and to the Electrical Inspector and shall furnish therewith a scale drawing showing the proposed building, structure, flood bank, road or any addition or alteration and scaffolding thereof required during the construction.

(2) On receipt of such intimation, the supplier or owner shall examine,-

(i) whether the line under reference was laid in acordance with the provisions of these regulations and any other law;

(ii) whether it is technically feasible;

(iii) whether it meets the requirement of Right of Way (ROW);

(iv) whether such person was liable to pay the cost of alteration of the overhead line and if so, send a notice without undue delay, to such person together with an estimate of the cost of the expenditure likely to be incurred to so alter the overhead line and require him to deposit, within thirty days of the receipt of the notice, with the supplier or owner, the amount of the estimated cost.

(3) If such person disputes the cost of alteration of the overhead line estimated by the supplier or owner or even the responsibility to pay such cost, the dispute may be referred to the Electrical Inspector whose decision thereof shall be final.

(4) The Electrical Inspector shall estimate the cost of alteration of overhead line on the following basis, namely:-

(i) the cost of material used on the alteration after crediting the depreciated cost of the material which shall be available from the existing line;

(ii) the wages of labour employed in affecting the alteration;

(iii) supervision charges to the extent of fifteen per cent of the wages mentioned in sub clause (ii); and charges incurred by the supplier or owner in complying with the provisions of section 67 of the Act, in respect of such alterations.

(5) Any addition or alteration to the building or structure shall be allowed only after the deposite of such estimated cost to the supplier or owner.

(6) No work upon such building, structure, flood bank, road and addition or alteration thereto shall be commenced or continued until the Electrical Inspector

has certified that the provisions of regulation 58, 60 and 61 should not be contravened either during or after the aforesaid construction:

Provided that the Electrical Inspector may, if he is satisfied that the overhead line has been so guarded as to secure the protection of persons or property from injury, certify that the work may be executed prior to the alteration of the overhead line or in the case of temporary addition or alteration, without alteration of the overhead line.

(7) The supplier or owner shall, on receipt of such deposit, alter the overhead line in such a way that it does not contravene the provisions regulation 58, 60 and 61 either during or after such construction within two months from the date of such deposit or within such longer period as the Electrical Inspector may allow.

64. **Transporting and storing of material near overhead lines.**- (1) No rods, pipes or similar materials shall be taken below, or in the vicinity of, any bare overhead conductors or lines if these contravene the provisions of regulations 60 and 61 unless such materials are transported under the direct supervision of a person designated in this behalf by the owner of such overhead conductors or lines.

(2) No rods, pipes or other similar materials shall be brought within the flash over distance of bare live conductors or lines.

(3) No material or earth work or agricultural produce shall be dumped or stored, no trees grown below or in the vicinity of, bare overhead conductors, or lines to contravene the provision of regulations 60 and 61.

(4) No flammable material shall be stored under the electric supply line.

(5) No fire shall be allowed above underground cables.

(6) Firing of any material below electric lines shall be prohibited.

65. **General clearances.**- (1) For the purpose of computing the vertical clearance of an overhead line, the maximum sag of any conductor shall be calculated on the basis of the maximum sag in still air and the maximum temperature as specified under regulations 57 and computing any horizontal clearance of an overhead line the maximum deflection of any conductor shall be calculated on the basis of the wind pressure specified under regulations 57.

(2) No blasting for any purpose shall be done within 300 metres from the boundary of a sub-station or from the electric supply lines of voltage exceeding 650 V or tower structure thereof without the written permission of the owner of such sub-station or electric supply lines or tower structures and in case of mining lease hold area, without the written permission of the Inspector of Mines.

(3) No cutting of soil within ten meters from the tower structure of 132 kV and above voltage level shall be permitted without the written permission of the owner of tower structure.

(4) No person shall construct brick kiln or other polluting units near the installations or transmission lines of 220 kV and above within a distance of 500 metres.

66. **Routes proximity to aerodromes.**- Overhead lines shall not be erected in the vicinity of aerodromes unless the Airport Authorities have approved in writing the route of the proposed lines as per relevant Indian Standards.

67. **Maximum interval between supports.**- All conductors shall be attached to supports at intervals not exceeding the safe limits based on the ultimate tensile strength of the conductor and the factor of safety specified under regulations 57.

Provided that in the case of overhead lines carrying conductors of voltage not exceeding 650 V when erected in, over, along or across any street, the interval shall not, without the consent in writing of the Electrical Inspector, exceed 65 metres.

68. **Conditions to apply where telecommunication lines and power lines are carried on same supports.**- (1) Every overhead telecommunication line erected on supports carrying a power line shall consist of conductors each having a breaking strength of not less than 270 kg.

(2) Every telephone used on a telecommunication line erected on supports carrying a power line shall be suitably guarded against lightning and shall be protected by cut-outs.

(3) Where a telecommunication line is erected on supports carrying a power line of voltage exceeding 650 V, arrangement shall be made to safeguard any person against injury resulting from contact, leakage or induction between such power and telecommunication lines.

69. **Lines crossing or approaching each other and lines crossing street and road.**- Where an overhead line crosses or is in proximity to any telecommunication line, the owner of either the overhead line or the telecommunication line, whoever lays his line later, shall arrange to provide for protective devices or guarding arrangement and shall observe the following provisions, namely:-

(i) when it is intended to erect a telecommunication line or an overhead line which will cross or be in proximity to an overhead line or a telecommunication line, as the case may be, the person proposing to erect such line shall give one month's notice of his intention so to do along with the relevant details of protection and drawings to the owner of the existing line;

(ii) guarding shall be provided where lines of voltage not exceeding 33 kV cross a road or street;

(iii) where an overhead line crosses or is in proximity to another overhead line, guarding arrangements shall be provided so to guard against the possibility of their coming into contact with each other;

(iv) where an overhead line crosses another overhead line, clearances shall be as under:-

(Minimum clearances in metres between lines crossing each other)

Sl. No	Nominal System Voltage	11-66 kV	110-132 kV	220 kV	400 kV	800 kV
1.	Low and Medium	2.44	3.05	4.58	5.49	7.94
2.	11-66 kV	2.44	3.05	4.58	5.49	7.94
3.	110-132 kV	3.05	3.05	4.58	5.49	7.94
4.	220 kV	4.58	4.58	4.58	5.49	7.94
5.	400 kV	5.49	5.49	5.49	5.49	7.94
6.	800 kV	7.94	7.94	7.94	7.94	7.94

Provided that no guardings are required when line of voltage exceeding 33 kV crosses over another line of 250 V and above voltage or a road or a tram subject to the condition that adequate clearances are provided between the lowest conductor of the line of voltage exceeding 33 kV and the top most conductor of the overhead line crossing underneath the line of voltage exceeding 33 kV and the clearances as stipulated in regulation 58 from the topmost surface of the road maintained;

(v) where an overhead direct current (DC) line crosses another overhead line, clearances shall be as under:-

(Minimum clearances in metres between AC and DC lines crossing each other)

Sl. No.	Sysytem Voltage AC/DC	100 kV DC	200 kV DC	300 kV DC	400 kV DC	500 kV DC	600 kV DC
1.	Low and Medium AC	3.05	4.71	5.32	6.04	6.79	7.54
2.	11-66 kV AC	3.05	4.71	5.32	6.04	6.79	7.54
3.	110-132 kV AC	3.05	4.71	5.32	6.04	6.79	7.54
4.	220 kV AC	4.58	4.71	5.32	6.04	6.79	7.54
5.	200 kV DC	4.71	4.71	5.32	6.04	6.79	7.54

6.	300 kV AC	5.32	5.32	5.32	6.04	6.79	7.54
7.	400 kV AC	5.49	5.49	5.49	6.04	6.79	7.54
8.	400 kV DC	6.04	6.04	6.04	6.04	6.79	7.54
9.	500 kV DC	6.79	6.79	6.79	6.79	6.79	7.54
10.	600 kV DC	7.54	7.54	7.54	7.54	7.54	7.54
11.	800 kV DC	7.94	7.94	7.94	7.94	7.94	7.94

(vi) a person erecting or proposing to erect a line which may cross or be in proximity with an existing line, shall provide arrangements on his own line or require the owner of the other overhead line to provide guarding arrangements as referred to in clause (iii) and (iv);

(vii) in all cases referred to in this regulation the expenses of providing the guarding arrangements or protective devices shall be borne by the person whose line was last erected;

(viii) where two lines cross, the crossing shall be made as nearly at right angles as the nature of the case admits and as near the support of the line as practicable, and the support of the lower line shall not be erected below the upper line;

(ix) the guarding arrangements shall ordinarily be carried out by the owner of the supports on which it is made and he shall be responsible for its efficient maintenace.

70. **Guarding.**- (1) Where guarding is required under these regulations the following shall be observed , namely:-

(i) every guard-wire shall be connected with earth at each point at which its electrical continuity is broken;

(ii) every guard-wire shall have an actual breaking strength of not less than 635 kg and if made of iron or steel , shall be galvanised;

(iii) every guard-wire or cross-connected systems of guard-wires shall have sufficient current-carrying capacity to ensure them rendering dead, without risk of fusing of the guard-wire or wires, till the contact of any live wire has been removed.

(2) In the case of a line crossing over a trolley-wire the guarding shall be subjected to the following conditions, namely:-.

(i) where there is only one trolley-wire, two guard-wires shall be erected as in DIAGRAM-A;

(ii) where there are two trolley –wires and the distance between them does not exceed 40 cms, two guard-wires shall be erected as in DIAGRAM-B;

(iii) where there are two trolley wires and the distance between them exceeds 40 cms but does not exceed 1.2 metres, three guard-wires shall be erected as in DIAGRAM-C;

(iv) where there are two trolley-wires and the distance between them exceeds 1.2 metres, each trolley-wire shall be separately guarded as in DIAGRAM-D;

(v) the rise of trolley boom shall be so limited that when the trolley leaves the trolley-wire, it shall not foul the guard-wires; and

(vi) where a telegraph-line is liable to fall or be blown down upon an arm, stay-wire or span-wire and so slide-down upon a trolley-wire, guard hooks shall be provided to prevent such sliding.

DIAGRAM-A

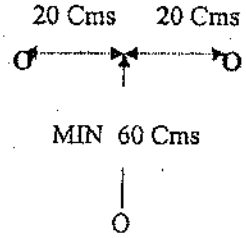


DIAGRAM-B

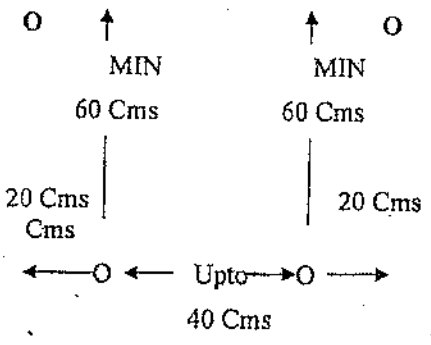


DIAGRAM-C

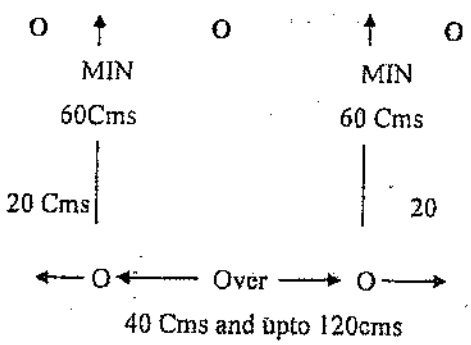
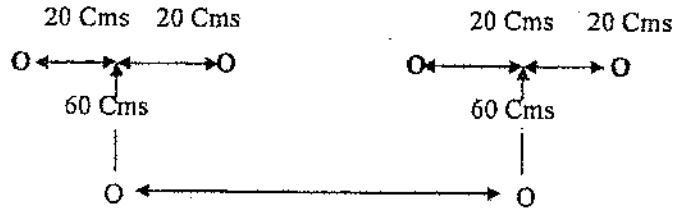


DIAGRAM-D



OVER 120cms.

71. **Service lines from overhead lines.-** No service-line or tapping shall be taken off an overhead line except at a point of support:

Provided that the number of tappings per conductor shall not be more than four in case of connections at voltage not exceeding 650 V.

72. **Earthing.-** (1) All metal supports and all reinforced and prestressed cement concrete supports of overhead lines and metallic fittings attached thereto, shall be either permanently and efficiently earthed by providing a continuous earth wire and securely fastening to each pole and connecting with earth ordinarily at three points in every km. with the spacing between the points being as nearly equidistant as possible or each support and the metallic fitting attached thereto shall be efficiently earthed.

(2) Metallic bearer wire used for supporting insulated wire of overhead service lines of voltage not exceeding 650 V shall be efficiently earthed or insulated.

(3) Each stay-wire shall be similarly earthed unless insulator has been placed in it at a height not less than 3.0 metres from the ground.

73. **Safety and protective devices.-** (1) Every overhead line which is not being suspended from a dead bearer wire, not being covered with insulating material and not being a trolley-wire, is erected over any part of a street or other public place

or in any factory or mine or on any consumer's premises shall be protected with earth gaurding for rendering the line electrically harmless in case it breaks.

(2) An Electrical Inspector may, by notice in writing, require the owner of any such overhead line, wherever it may be erected, to protect it in the manner specified in sub-regulation (1).

(3) The owner of every overhead line of voltage exceeding 650 V shall make adequate arrangements as per relevant Indian Standards to prevent undesignated persons from ascending any of the supports of such overhead lines which can be easily climbed upon without the help of a ladder or special appliances.

Explanation.- For the purpose of this relgulation, rails, reinforced cement concrete poles and pre-stressed cement concrete poles without steps, tubular poles, wooden supports without steps, I-sections and channels' shall be deemed as supports which cannot be easily climbed upon.

74. **Protection against lightning.**- (1) The owner of every overhead line, sub-station or generating station which is exposed to lightning shall adopt efficient means for diverting to earth any electrical surges due to lightning which may result into injuries.

(2) The earthing lead for any lightning arrestor shall not pass through any iron or steel pipe, but shall be taken as directly as possible from the lightning arrestor without touching any metal part to a separate vertical ground electrode or junction of the earth mat already provided for the sub-station of voltage exceeding 650 V subject to the avoidance of bends wherever practicable.

75. **Unused overhead lines.**- Where an overhead line ceases to be used as an electric supply line:

(i) the owner shall maintain it in a safe mechanical condition in accordance with regulation 57 or remove it.

(ii) the Electrical Inspector shall, by a notice in writing served on the owner, require him to maintain it in a safe mechanical condition or to remove it within thirty days of the receipt of the notice.

76. **Laying of cables.**- (1) No underground power cable of voltage exceeding 33 kV shall be laid without a minimum underground depth of 1.2 meters.

(2) No underground telecommunication cable shall be laid without a minimum separation distance of 0.6 meters to the underground power cable of voltage exceeding 33 kV.

77. **Protection against electromagnetic interference.**- The owner of every overhead power line of voltage level 11 kV or higher shall submit proposal for obtaining Power Telecommunication Co-ordination Committee clearance to ensure safety of the personnel and telecom equipment.

Schedule-II

Safety measures for operation and maintenance of transmission and distribution system

[See sub-regulation (3) of regulation (7)]

Part I

(1). Duration and content of training shall be as specified below:

(i) Engineers and supervisors – The time allocation and various components of the training course for engineers and supervisors who would be engaged on operation and maintenance of transmission system shall be as given in Part II of this Schedule.

(ii) Technicians – The time allocation and various components of the training course for technicians who would assist the engineers and supervisors in operation and maintenance of transmission system shall be as given in Part III of this Schedule.

(iii) Engineers, Supervisors and Technicians – The time allocation and various components of the training course for engineers, supervisors and Technicians in operation and maintenance of sub-transmission and distribution system shall be as given in Part IV, V and VI of this Scedule.

(iv) Refresher course - The duration and contents of the refresher courses shall be determined jointly by the owner of the said system and training institute.

(v) Visits to factories- As part of practical training the trainees may be taken to factories manufacturing equipments used in transmission and distribution installations.

(vi) Performance of the trainee(s) – The training institutes shall group the syllabus in modules for organising the training. The pass percentage in each module for theory and for project work shall be 50% whereas for on job training and for viva voce it shall be 75%. The sponsor(s) of the trainees may consider the institution of incentives and awards for excellent performance during the training and also for suitable action for sub-standard performance.

(2). Creation of the Institute:

(i) The existing training institutes established for training of personnel engaged in operation and maintenance of generating stations and substations associated with generating stations can create additional facilities for training in transmission and distribution systems.

(ii) Guidelines for such institutes specified under Schedule-I (Item 2) under the heading "Facilities for Creation of training institute" shall also be applicable for institutes which would impart training in transmission and distribution systems.

(3). Assessment forms for engineers and supervisors and for Technicians to assist the engineers and supervisors are given at Part XXVII of Schedule I .

Part II

SYLLABUS FOR ENGINEERS AND SUPERVISORS FOR OPERATION AND MAINTENANCE OF TRANSMISSION SYSTEM

Item No.	Particulars	Number of Hours
1	2	3
I.	General Introduction: (i) World Power Scenario (ii) Growth of Power Industry in India (iii) Generation Scenario in India (iv) Transmission and Distribution Scenario in India (v) Role of Private Power Participants in India (vi) Organisation/Power Sector set up (vii) Introduction to Indian Standard specifications for Electrical wiring (viii) Energy Conversation	6
II.	Power Generation: (i) Types of generation: conventional and non-conventional; Thermal Power Plant: components/ equipments and their brief details and uses, features and characteristics of boiler, turbine, generator, excitation, etc. Brief operational aspects, captive power plants (ii) Hydro Power Plant: components/ equipments and their brief details; features and characteristics of turbine generator, excitation, etc. Brief operational aspects (iii) Gas Power Plant: concept of open cycle and combined cycle; components, characteristics of gas turbines, brief operational aspects, captive power plants (iv) Nuclear Power Plant: salient features (v) Non-Conventional Energy : various sources, working principle, electricity generation (vi) Co-generation, optimal mix of different types of generation, base load and peak load operation	18
III.	Power Transmission: (1) HVAC and HVDC Transmission System (i) Brief history of EHV transmission system in India (ii) Tower types A, B, C, D and special towers (iii) Conductors/Earthwire and their accessories, types, configuration, transposition, selection criteria (iv) Insulators and hardware fittings: types, strength, details (v) Right of way, CEA (Measures relating to Safety and Electric Supply) Regulations, 2010 and Acts, statutory clearances from other agencies, compensation, etc. (vi) Surveying, route alignment, profiling, tower spotting (vii) Benching and soil classification, soil investigation and soil resistivity measurement. (viii) Tower design and testing, quality checks	30

(ix) Tower erection hardware and accessories, fitting procedures, stringing, clearances, commissioning

(x) Operation and Maintenance of Transmission Line : line patrolling, routine checks, filling log books, T & P, thermovision scanning, fault failure analysis, hot line maintenance, case studies

(xi) Development of HVDC technology, economics, comparison with HVAC systems, principles of HVDC conversion, HVDC lines, HVDC sub-stations - converters, reactive power considerations, HVDC system, operation and control, maintenance, AC and DC harmonics and filtering, protection system, insulation, coordination, emergencies and case studies.

(xii) FACTS (Flexible AC Transmission System)

(2) Sub - Stations (765kV/400 kV/220kV/132kV) 75

(i) Types : generation sub-station, grid sub-station, mobile sub-station, gas insulated sub-station, HVDC sub-station, indoor/outdoor, etc., general comparison

(ii) General arrangement and layout of switchyard, switching schemes, single line diagram

(iii) Power Transformers and Reactors

(a) Types : major components, constructional details, functions

(b) Design and selection, specification and rating

(c) Bushings, On Load Tap Changers (OLTC), Buchholz relay, conservator, breather, thermo syphon filter, indicators, etc.

(d) Cooling arrangements - methods of cooling, pumps, fans, radiators, etc.

(e) Transformer tests

(f) Introduction to relevant Indian Standards

(iv) Switchgears and Introduction to relevant Indian Standard

(a) Circuit Breaker: types (MOCB, ABCB, VCB, SF_6), constructional details, layout arrangement, connection to bus, design, selection parameters, ratings/ specifications, interlocks and introduction to relevant Indian Standard

(b) Isolator: types (Vertical, Horizontal, Pantography Breaks, constructional details, Earth switch, interlocks, design/selection, ratings/specifications

(c) Bus bar types, construction, supports, insulators, connectors, jumpers, safety clearances, design/selection, ratings/specifications

(d) CT/CVT/Lightning Arrestor/Lightning Mast: Types, constructional details, use, location, selection/design, ratings/specifications

(e) Power Line Carrier Communication (PLCC): principle, purpose, types of coupling and choice of components, use and operation of PLCC system, modules of PLCC panels, ratings/specifications

(f) Meters, Indicators, and Recorders: types and functional description of all types of meters, indicators and recorders-Voltmeter, Ammeter, Frequency Meter, Wattmeter, Energy meter, Event logger (EL), Disturbance Recorder (DR), Fault Locator (FL), indicators and knowledge of relevant Indian Standard

(g) Relays: types, functions, constructional details, selection, ratings/ specifications, testing and setting of relays and knowledge of relevant Indian Standard

(h) Protection System Philosophy: types, design, protection schemes, tripping schemes, protection of transformers/reactors, motors, feeders, generator bus, etc.

(v) Grounding: types of grounding, earth testing and treatment, earth mat design, step potential, touch potentials, transfer potentials, neutral grounding factor.

(vi) Auxiliary facilities

(a) DG set

(b) Fire fighting system - types of fire, extinguisher, Emulsifier system, deluge system, fire fighting system for transformer/reactor, oil storage system, control room, office building, etc.

(c) Station Battery System

(d) LT supply

(e) Air Conditioning System

(f) Compressed Air System (service air system, instrument air system)

(vii) Control Room: layout, arrangement of equipments/panels, false ceiling and flooring, fire safety measures, Air-conditioning, Uninterrupted Power Supply (UPS), computer and its peripherals, lighting /emergency lighting

(viii) Cables: types, control cables, power cables, layout, trench/gallery arrangement, cable ratings, selection, and cable termination and jointing.

(ix) Compensating devices: shunt reactor/capacitor, series reactor/ capacitor, static var compensators (SVC)

(x) Sub-station operation: operational aspects of all equipments/systems, salient features and parameters, limiting values, control room operation, local/remote operation, operational guidelines/procedures, and synchronisation, grid operation, communication with RLDC/ SLDC, etc., permit to work, line clear procedure, maintenance of log books, records , tripping reports, shift procedures, monitoring, duties /responsibilities of sub-station staff, interlocks and sequential operation, operational problems, operation under emergency, case studies.

(xi) Sub-station Maintenance:

(a) Need, philosophy, types- routine, preventive, planned, predictive, break-down, emergency maintenance, comparisons, life expectancy curves

(bathtub curves), tools and tackles, testing instruments, safety devices, sampling equipments, test kits, visual checks, condition monitoring techniques, on-line maintenance, daily/weekly/ monthly/quarterly/half yearly/annual maintenance of different equipments, planning the maintenance activities, preparation of maintenance estimates, budgeting for control, maintenance records, history

(b) spare parts management

(c) Transformer and Reactor Maintenance-factors affecting the life of transformer/reactor, types of faults that can occur, reasons for breakdown, visual checks/ inspection/ preliminary testing of various components- oil sampling and testing, oil filtration, Dissolved Gas Analysis (DGA), maintenance Schedule, fault rectification, need for major overhaul and methods

(d) Switchgear and Protection Maintenance : maintenance of CB, isolator, earthswitch, support insulators, CT/CVT, LA. Lightning Mast (LM), meters/ recorders, PLCC, protective relay maintenance, protection system maintenance

(e) Maintenance of auxiliaries and other systems- battery and charging system, DG set, air conditioning plant, compressed air system, fire fighting system, switchyard – lighting, control room, earth resistance testing, cables, compensating devices.

(xii) Erection and commissioning of sub-station, Project Evaluation and Review Technique (PERT), Critical Path Method (CPM), charts, project monitoring, erection, pre-commissioning checks/tests, commissioning, synchronisation.

(xiii) Civil works – surveying, site selection, soil investigation, general layout and architectural drawing, switchyard foundation, cable trench design, oil pit, control room building, DG set building, Fire fighting system and AC system- design, design and construction of roads, drains, water supply pipe lines, fencing/compound wall.

3. Load Dispatch and Communication 18

(i) Load Dispatch Centres- functions, SLDC/RLDC, NLDC, pre-dispatch, during-dispatch, post dispatch functions

(ii) Supervisory Control and Data Acquisition (SCADA) System, RTU, front end computers, main computers, visual display units, mimic boards

(iii) Energy Management System- functions

(iv) Load forecasting, generation scheduling, load management, load shedding

(v) Hydro - thermal scheduling

(vi) Voltage/frequency control

(vii) Reactive Power Management

(viii) Grid Management - problems/solutions
(ix) Operational co-operation, import/export of energy, role of tariff in system operation
(x) Maintenance, on-line maintenance
(xi) Grid disturbances- case studies
(xii) Software tools

Communication System: types- PLCC, microwave, leased lines, fibre optics, satellite, V-SAT Communication, comparison, characteristics, modules, planning criteria, selection criteria , RTUs, modems, baud rate, communication protocols, data exchange, system noise and interference, integrated communication system, O&M of communication system, protocol details, telemetry, tele-control and tele-protection.

IV. Commercial Aspects And Contracts 24

(1) Commercial Aspects

(i) Introduction to commercial aspects of power system/distribution system
(ii) Tariff Structure, types, components, methods of working out, revenue realization
(iii) Energy accounting, Availability Based Tariff (ABT), inter-utility tariff, commercial disputes and solutions
(iv) Inventory planning and control, bill of materials, purchase procedures, standardization and codification of stores
(v) Resource mobilisation through bonds/ debentures/shares.
(vi) Cost Engineering, costing and control, estimation, estimates for providing service (LT/HT) connections, street lighting.
(vii) Electricity Rules and Regulations, Enactment
(viii) Budget types, budgeting procedure, appropriation, budget control.
(ix) Accounting, auditing.

(2) Contracts 12

(i) Contract basics, terminology
(ii) Qualification- requirement, pre-qualification, bids, evaluation
(iii) Notice Inviting Tender (NIT), Notice Inviting Quotation
(iv) Preparation of bid documents, tendering/ bidding
(v) Bid opening, bid evaluation, award of contract, monitoring of contract.
(vi) Contractual obligations/liquidation, guarantee /warranty
(vii) Vendor - qualification, development
(viii) Contractual problems and solutions
(ix) Revised cost estimation, justification for cost/time over-run, substitute items
(x) Handing/taking over procedures, closing of contract
(xi) Legal issues of contracts, arbitration

V. Management: 12

(i) Principles of management, leadership, effective

	communication, motivation, decision making, strategic management (ii) Management Information System (iii) Project Management (iv) Finance Management (v) Construction Management (vi) Materials Management (vii) Total Quality Management	
VI.	System Planning and New Technologies: (1) System Planning (i) Introduction to power system planning requirements and methods (ii) Load forecasting and techniques (iii) Load flow studies for planning (iv) Preparation of feasibility report (FR), Detailed Project Report (DPR) (v) Approval/clearance of projects	6
	(2) New Technologies: (i) Latest development in transmission system design, material, component, system, tariff, operation, maintenance (ii) Latest developments in distribution system design, components, meters, system, tariff, operation, maintenance (iii) Latest developments in power system, communication, application of computers to power system.	6
	Total	207 Hours ≡ 7 Weeks
VII.	On Job Training: (1) System Operation (On job) (A) Sub-Station (Generating/Grid/Distribution) (i) Layout, equipment familiarisation (ii) Details, functioning, specification and different parameters of switchyard, control room, auxiliary system equipments (iii) Shift handing/taking over, logging of parameters, routine checks on equipments/ systems (iv) Operational aspects of equipments /systems, synchronization, grid operation, charging procedure (v) Line/feeder connections, protection schemes, loading aspects, etc. (vi) Salient features and operational aspects of HVDC sub-station.	3 Weeks
	(B) Load Dispatch and Communication (i) Load Dispatch Centre (NLDC/RLDC/SLDC): set up, functioning (ii) Supervisory Control and Data Acquisition (SCADA) and Energy Management System (EMS) functioning (iii) Load forecasting	

(iv) Generation scheduling
(v) Voltage and frequency control activities
(vi) Communication system operation
(vii) System Software
(viii) Shift operation

(2) System Maintenance (On job) **3 Weeks**

(A) Sub-Station Maintenance
(i) Visual checks, routine, preventive, planned, break-down maintenance of equipments/system
(ii) Transformer, reactor, switchgear, relays, protection system and auxiliary facilities.
(iii) Maintenance schedules
(iv) Referring log books/history records for maintenance.
(v) Testing Lab facilities, testing and commissioning.
(vi) Procedure for permit to work/line clear.
(vii) Safety devices and practices.

(B) T&D Line/Cable Maintenance
(i) Line patrolling, thermovision scanning, hot spots, hardware replacement procedure, T&P.
(ii) Emergency Restoration System (ERS)
(iii) Hot Line Maintenance.
(iv) Industrial visits and evaluation

Part III

SYLLABUS FOR TECHNICIANS TO ASSIST ENGINEERS AND SUPERVISORS IN OPERATION AND MAINTENANCE OF TRANSMISSION SYSTEM

Item No.	Particulars	Number of Hours
1	2	3
I	General introduction: (i) Functions of State Electricity Board/Utility (ii) Introduction to Electricity Act, 2003, and CEA (Measures relating to Safety and Electric Supply) Regulations, 2010.	6
II	Substation and Equipments: (i) Substations (a) Sub-stations, selection of site, clearances and control room (b) Sub-stations 33 kV to 765 kV (c) Selection of voltage level for sub-station and layouts (ii) Equipments: (a) Control/relay panels and meters (b) Switch gear, breakers (c) Isolators (d) Cables-types, construction and jointing (e) Power capacitors (f) Lightning arrestors (g) CT, PT and carrier communication.	12

III	Transformers (Power and Distribution) (i) Types of transformers and parallel operations (ii) Cooling and drying out of transformers (iii) Testing of transformers (iv) Maintenance of transformers (v) Protection of transformers (vi) Failures of transformers	12
IV	Circuit Breakers, Isolators and Relays (i) Principle and construction (ii) Types of circuit breakers (iii) Maintenance of circuit breakers (iv) Relays - various types and functions (v) Maintenance of isolators	12
V	Storage Batteries: Need, Functions, commissioning and maintenance	6
VI	Earthing: Sub-station earthing, equipment earthing and Consumer earthing and procedure for improving quality of earth resistance	3
VII	Safety and fire fighting (1) Safety (i) Basic principle of safety, importance of safety rules and their observation (ii) List of safety equipment, their use and maintenance thereof (iii) Permit procedure (iv) Self permit, permit on phone and procedures to be observed (v) Electric shock and safety. (vi) Causes of accident, precautions to be taken to avoid accidents while working. (2) Fire fighting: (i) Principle and causes of fire, class of fires, ie., A, B, C. Precautions to be taken to avoid fire (ii) Fire fighting equipments, their type and use, their periodical maintenance	6
VIII	Transmission and Distribution (Line-Construction and Maintenance) (1) Construction (i) Survey of HT, LT Lines and service lines and cables, crossing such as road, railway, river, etc. (ii) Selection of materials and poles for lines and handling of materials (iii) Pole erection, size of pit, concreting, pole alignment, etc.	18

(iv) Types of stays, their marking, grouting, stay insulator binding, etc.
(v) Types of conductors and their parameters such as current carrying capacity, etc., cables-types and joints.
(vi) Type of guarding and clearances, anticlimbing devices, danger board, etc.
(vii) Erection of transformer DP structure
(viii) Patrolling, line meggering and commissioning of power lines

(2) Line Maintenance
(i) Fuse grading necessity and its benefits
(ii) Patrolling, tree cutting and safe clearances
(iii) Guarding of lines, clearances and maintenance, attending to breakdowns.
(iv) Importance and maintenance of air-break switch, dropout fuse set, dist. box etc.
(v) Pre-monsoon maintenance - necessity and procedure thereof
(vi) Balancing of load using tong tester

(3) Service Connection, theft of energy
(i) Types of service connections (overhead, underground, High Tension/ Low Tension, Single phase, Three phase)
(ii) Point of supply, testing of Consumers' wiring and earthing terminals
(iii) Materials required for service connection, fuse grading, underground cable connections (feeder pillar, mini pillar, junction box.)
(iv) Theft of energy, preventive measures, unauthorized extensions
(v) Consumer relations and dealing with Consumer problems

IX	Duties of staff Duties of staff, assisting supervisory an operating staff and maintenance of records	6
X	Human Resource Development (i) Personal development and motivation (ii) Communication skill and its importance (iii) Attitudinal training	9
	Total	90 Hours ≅ **3 Weeks**
XI	On Job Training, industrial visits and evaluation: (1) Study Visits - after introduction (i) 1st visit :11 kV and 33 kV sub-station (ii) 2nd visit : 66 kV and 132 kV sub-station (iii) 3rd visit : 220 kV and 400 kV sub-station	**3 Weeks**

(2) Study and practicals

(i) Measurement of current, voltage, power, energy, frequency and power factor
(ii) Testing and connection of relays
(iii) Study of Buchholz relays
(iv) Measurement of earth resistivity
(v) Meggering of installation and equipments
(vi) Study and maintenance of breathers
(vii) Study of "on load tap changer" for transformer
(viii) Study of line construction materials and hardware
(ix) Demonstration of conductor jointing
(x) Demonstration of cable jointing.
(xi) Study of various type of power fuses, control fuses, kitkat and horn gaps.
(xii) Use of safety equipments and practicals followed for permit on works
(xiii) First aid and fire fighting drills

Part IV

SYLLABUS FOR ENGINEERS ENGAGED IN THE OPERATION AND MAINTENANCE OF SUB-TRANSMISSION AND DISTRIBUTION SYSTEM

Item No.	Particulars	Number of Hours
1	2	3
I	Overview of Power Sector Scenario: (i) Growth of Power Industry in India (ii) Organisation/ Power Sector set-up in India (iii) Electricity Distribution in India (iv) Private Participation in Distribution (v) Distribution Reforms in India.	3
II	Regulatory Environment – Rules and Regulations: (i) Electricity Act,2003 – Provisions relating to electricity distribution (ii) Role of Regulatory Commissions (iii) CEA(Measures relating to Safety and Electric Supply) Regulations, 2010 – Relating to electricity distribution. (iv) Energy Conservation Act	3
III	Distribution planning and optimization: (i) Philosophy of distribution planning. (ii) Acquaintance with software for distribution planning and optimisation. (iii) Operation of software. (iv) Data entry formats and report generation. (v) Case study.	30
IV	Sub-transmission and Distribution Lines: (i) Supports-towers/ poles: (a) Types and selection criteria (b) Surveying and erection	15

(ii) Line conductor/ cables:
(a) Classification
(b) Selection criteria
(c) Conductor stringing, jointing/ binding, sagging and tensioning, clipping and jumpering
(d) Earthing arrangements

(iii) Cable – types, selection, cable trenches, cable routing and laying, cable jointing and junction box

(iv) Earth wire/ neutral wire, guarding, etc.

(v) Selection and fixing of control devices, viz. Gang Operating Switches, fuses, isolators and earthing switches, lightning arrestors, and distribution box, etc.

(vi) Installation of service lines.

(vii) Street Lighting – design and layout methods.

(viii) Statutory clearances, viz. Environment and forest, local bodies, railway and telegraph crossings, river crossings, clearances under CEA (Measures relating to Safety and Electric Supply) Regulations, 2010, Acts.

(ix) Line/ cable maintenance including hot line maintenance – line patrolling, inspection, periodicity, work permit, line clear and authorisation, erection of temporary earth and restoration of supply, maintenance T&P and safety devices, thermo vision scanning, hot spots, etc.

V Electric Sub-Stations (33 kV and below): 15

(i) Type, site selection , layout and civil Engineering requirements.

(ii) Bus bar arrangement, sub-station equipment, viz. transformers, circuit breakers, etc.

(iii) Auxiliary systems, viz. DG set, battery system and fire fighting system, etc.

(iv) Control panel, meters, indicators and recorders and relays, etc.

(v) Erection, testing and commissioning of equipments/systems

(vi) Earthing of sub-stations equipments and soil testing

(vii) Transformer oil and its testing

(viii) Operation and maintenance of all equipments, protective relays and auxiliaries.

VI Metering Requirements: 6

(i) Type of metering, viz. DT metering, feeder metering and Consumer metering.

(ii) Regulations on installation of meters and technical standards

(iii) Meter types, their settings and operation, testing and sealing.

(iv) Selection of meter and metering equipment

(v) Familiarity with hardware (CMRI) and software for meter data download, analysis and detection of meter tampering

(vi) Role of advanced metering system in controlling commercial losses

VII	Concept of Losses and Loss Reduction Measures: (i) Concept of AT& C losses (ii) Segregation of losses. (iii) Technical loss reduction measures. (iv) Reactive power management. (v) Detection of thefts, tampering, unauthorized loads (vi) Anti-theft measures and case studies (vii) Commercial loss reduction measures. (viii) Penalties under the Act for theft and misuse of power. (ix) Energy audit and accounting. (x) Demand side management.	9
VIII	Reliability Issues, Quality of Power Supply, Customer Awareness and Satisfaction: (i) Reliability and quality of power supply and reliability indices. (ii) Causes and cures for breakdowns, tripping and voltage and frequency fluctuation. (iii) Creating customer awareness (iv) Prompt attendance to faults. (v) Overview of the Electricity Supply Codes of Regulatory Commissions.	6
IX	IT Intervention: (i) Familiarisation with distribution software packages and latest software tools and use thereof for billing and revenue realisation, GIS mapping and Consumer indexing, inventory control, keeping track of equipments failure rate, quick fault location, attendance, staff salary, energy accountability and MIS etc. (ii) SCADA – RTU, communication and distribution automation. (iii) Customer care and call centres.	12
X	Rural Electrification: (i) Outsourcing of distribution activities, appointment of franchisees and self load management by villagers and Gram Panchayats (ii) Maintenance of complaint centres and fault removal, etc., by village Panchayats etc. (iii) Separation of rural and urban supply system (iv) Fixation of responsibility for energy receipt and supply balance. (v) Rajiv Gandhi Grameen Vidyutikaran Yojana. (vi) Distributed generation.	9
XI	Project Management: Contracts: (i) Contract basics and terminology (ii) Qualification – requirement, pre-qualification (iii) Bids – Technical and Commercial	9

	(iv) Vendors – qualification, development	
	(v) Notice Inviting Tenders(NIT)/ Notice Inviting Quotations(NIQ)	
	(vi) Preparation of Bid Documents, tendering/ bidding	
	(vii) Bid opening and evaluation, Award of contracts, monitoring of contracts	
	(viii) Contractual obligations/ liquidation, guarantee/ warranty	
	(ix) Contractual problems and solutions	
	(x) Revision of cost estimates, justification of cost/ time overrun and substitute items	
	(xi) Handling/taking over procedures, closing of contracts	
	(xii) Legal issues of contracts and arbitration	
	(xiii) CVC Guidelines.	
XII	Disaster Management:	3
	(i) Institutional set-up for disaster Management	
	(ii) Impact of different types of disasters	
	(iii) Trigger mechanism and warning system	
	(iv) Check list and preparedness to address disasters.	
	(v) First aid techniques.	
XIII	Electrical Safety Aspects:	9
	(i) Basic principles of safety, importance of safety rules and their observance.	
	(ii) List of safety equipment, their use and maintenance thereof.	
	(iii) Permit procedure - self permit, permit on phone and procedures to be observed.	
	(iv) Electric shock, safety and procedure for recovery/ resuscitation.	
	(v) Causes of accidents, safe working procedures to avoid accidents.	
	(vi) Principle and causes of fire, and precautions to be taken to avoid fires.	
XIV	Field Visits and on-job training:	66
	(i) Familiarisation with layout of sub-stations and equipments	
	(ii) Operational aspects of equipments/ systems and synchronization	
	(iii) Line/ feeder connections, protection schemes, loading aspects, balancing of loads	
	(iv) Planning shift operations.	
	(v) Maintenance schedules	
	(vi) Procedures for permit to work/ line clear	
	(vii) Testing lab facilities, testing and commissioning	
	(viii) Maintenance of Log Books/ history records and adherence to the timely recording.	
	(ix) Familiarisation with IT tools.	
	Total	195 Hours ≅ 6 ½ Weeks

Part V

SYLLABUS FOR SUPERVISORS ENGAGED IN THE OPERATION AND MAINTENANCE OF SUB-TRANSMISSION AND DISTRIBUTION SYSTEM

Item No.	Particulars	Number of Hours
1	2	3
I	Overview of Power Sector Scenario (i) Growth of Power Industry in India. (ii) Organisation/ Power Sector set-up in India. (iii) Electricity Distribution in India (iv) Private Participation in Distribution. (v) Distribution Reforms in India.	3
II	Distribution Planning and Optimisation: (i) Philosophy of distribution planning. (ii) Acquaintance with software for distribution planning and optimisation. (iii) Operation of software. (iv) Data entry formats and report generation. (v) Case study.	6
III	Sub-transmission and Distribution Lines: (i) Supports-towers/ poles (a) Types and selection criteria (b) Surveying and erection (ii) Line Conductor/ Cables – (a) Classification (b) Selection criteria (c) Conductor stringing, jointing/ binding, sagging and tensioning, clipping and jumpering (d) Earthing arrangements (iii) Cables – types, selection, cable trenches, cable routing and laying, cable jointing and junction box (iv) Earth wire/ neutral wire, guarding, etc. (v) Selection and fixing of control devices, viz. Gang Operating switches, fuses, isolators and earthing switches, lightning arrestors, and distribution box, etc. (vi) Installation of service lines. (vii) Street Lighting – design and layout methods. (viii) Statutory clearances, viz. environment and forest, local bodies, railway and telegraph crossings, river crossings, clearances under Safety and Electric Supply Regulations/Acts. (ix) Line/ cable maintenance including hot line maintenance – line patrolling, inspection, periodicity, work permit, line clear and authorisation, erection of temporary earth and restoration of supply, maintenance T&P and safety devices, Thermo vision scanning, hot spots, etc.	9

IV	Electric Sub-Stations (33 kV and below): (i) Type, site selection , layout and civil Engineering requirements. (ii) Bus bar arrangement, sub-station equipment, viz. transformers, circuit breakers, etc. (iii) Auxiliary systems, viz. DG set, battery system and fire fighting system, etc. (iv) Control panel, meters, indicators and recorders and relays, etc. (v) Erection, testing and commissioning of equipments/systems (vi) Earthing of sub-stations equipments and soil testing (vii) Transformer oil and its testing (viii) Operation and maintenance of all equipments, protective relays and auxiliaries.	9
V	Metering Requirements: (i) Type of metering, viz. DT metering, feeder metering and Consumer metering. (ii) Regulations on installation of meters and technical standards (iii) Meter types, their settings and operation, testing and sealing.	3
VI	Concept of Losses and Loss Reduction Measures: (i) Concept of AT&C losses (ii) Segregation of losses. (iii) Technical loss reduction measures. (iv) Reactive power management. (v) Detection of thefts, tampering, unauthorized loads (vi) Anti-theft measures and case studies (vii) Commercial loss reduction measures. (viii) Penalties under the Act for theft and misuse of power. (ix) Energy audit and accounting. (x) Demand side management.	6
VII	Reliability Issues, Quality of Power Supply, Customer Awareness and Satisfaction: (i) Reliability quality of power supply and reliability indices. (ii) Causes and cures for breakdowns, tripping and voltage and frequency fluctuation. (iii) Creating customer awareness (iv) Prompt attendance to faults. (v) Overview of the Electricity Supply codes of Regulatory Commissions.	3
VIII	IT Intervention: (i) Familiarisation with distribution software packages and latest software tools and use thereof for billing and	6

revenue realisation, GIS mapping and Consumer indexing, Inventory control, keeping track of equipments failure rate, quick fault location, attendance, staff salary, Energy accountability and MIS, etc.

(ii) SCADA – RTU, communication and distribution automation.

(iii) Customer care and call centres.

(iv) Enterprise resource planning-
- (a) Maintenance Management
- (b) Asset Management
- (c) Training Management
- (d) Financial Accounting
- (e) Material Management
- (f) Outage Management
- (g) Time Management

IX Rural Electrification: 3
- (i) Outsourcing of distribution activities, appointment of franchisees and self load management by villagers and Gram Panchayats.
- (ii) Maintenance of complaint centres and fault removal, etc., by Village Panchayats, etc.
- (iii) Separation of rural and urban supply system
- (iv) Fixation of responsibility for energy receipt and supply balance.
- (v) Rajiv Gandhi Grameen Vidyutikaran Yojana.
- (vi) Distributed generation.

X Project Management: Contracts: 3
- (i) Contract basics and terminology
- (ii) Qualification – requirement, pre-qualification
- (iii) Bids – technical and commercial
- (iv) Vendors – qualification, development
- (v) Notice Inviting Tenders(NIT)/ Notice Inviting Quotations(NIQ)
- (vi) Preparation of bid documents, tendering/ bidding
- (vii) Bid opening and evaluation, award of contracts, monitoring of contracts
- (viii) Contractual obligations/ liquidation, guarantee/ warranty
- (ix) Contractual problems and solutions
- (x) Revision of cost estimates, justification of cost/ time overrun and substitute items
- (xi) Handling/taking over procedures, closing of contracts
- (xii) Legal issues of contracts and arbitration
- (xiii) CVC Guidelines.

XI Disaster Management: 3
- (i) Institutional set-up for disaster management
- (ii) Impact of different types of disasters

(iii) Trigger mechanism and warning system
(iv) Check list and preparedness to address disasters.
(v) First aid techniques.

XII	Electrical Safety Aspects: (i) Basic principles of safety, importance of safety rules and their observance. (ii) List of safety equipment, their use and maintenance thereof. (iii) Permit procedure- self permit, permit on phone and procedures to be observed. (iv) Electric shock, safety and procedure for recovery/ resuscitation. (v) Causes of accidents, safe working procedures to avoid accidents. (vi) Principle and causes of fire, and precautions to be taken to avoid fires.	6
XIII	Field Visits and On-Job Training: (i) Familiarisation with layout of sub-stations and equipments (ii) Operational aspects of equipments/ systems and synchronization (iii) Line/ feeder connections, protection schemes, loading aspects, balancing of loads (iv) Planning shift operations. (v) Maintenance schedules (vi) Procedures for permit to work/ line clear (vii) Testing lab facilities, testing and commissioning. (viii) Maintenance of Log Books/ history records and adherence to the timely recording. (ix) Familiarization with IT tools.	60
	Total	120 Hours ≅ 4 Weeks

Part VI

SYLLABUS FOR TECHNICIANS ENGAGED IN THE OPERATION AND MAINTENANCE OF SUB-TRANSMISSION AND DISTRIBUTION SYSTEM

Item No.	Particulars	Number of Hours
1	2	3
I	Overview of Power Sector Scenario: (i) Growth of Power Industry in India. (ii) Organisation/ Power Sector set-up in India. (iii) Electricity Distribution in India (iv) Private Participation in Distribution. (v) Distribution Reforms in India.	3
II	Sub-transmission and Distribution Lines: (i) Survey for lines at voltage upto 250 V, lines at voltage above 650 Volts but less than 33kV and for service lines and cables and crossings such as road, railway, river and other power and telecom lines. (ii) Selection of line materials and towers/ poles and safe handling of the same. (iii) Erection of towers/ poles – size of pit, concreting and pole/tower alignment, etc. (iv) Line Conductors – types, selection criteria, conductor stringing, jointing/ binding, sagging and tensioning, clipping and jumpering and earthing arrangements. (v) Types of stays, its marking, grouting, stay insulator, binding, etc. (vi) Cable – types, selection, cable trenches, cable routing and laying, cable jointing and junction box, etc. (vii) Types of guarding and clearances, earth wire/ neutral wire, anti-climbing devices and danger boards and their erection. (viii) Selection and fixing of control devices, viz. Gang Operating Switches, fuses, Isolators and earthing switches, lightning arrestors, and distribution box, etc. (ix) Installation of service lines. (x) Street lighting – layout methods. (xi) Line meggering and commissioning of distribution lines. (xii) Line patrolling, inspection, periodicity, work permit, line clear and authorisation, tree cutting and safe clearances, erection of temporary earth, attending to breakdowns and restoration of supply. (xiii) Maintenance T&P and safety devices, Thermo vision scanning, hot spots, etc. (xiv) Hot line maintenance.	9
III	Electric Sub-Stations (33 kV and below): (i) Type, site selection, layout and civil Engineering requirements.	9

(ii) Bus bar arrangement, sub-station equipment, viz. transformers, circuit breakers, isolator, lightning arrestors, CTs, PTs and power capacitors, etc.,
(iii) Types of transformers, their erection and parallel operation, testing, maintenance, protection and failure.
(iv) Auxiliary systems, viz. DG set, battery system and fire fighting system, etc. – need, functions, commissioning and maintenance.
(v) Control panels, meters, indicators, recorders and relays, etc. – operation, maintenance and recording readings, etc.
(vi) Control and power cables – types, laying of and jointing.
(vii) Installation , operation and maintenance of all equipments.
(viii) Cooling and drying out of transformers, transformer oil and its testing.
(ix) Erection of DP structure for transformer.
(x) High Voltage Distribution System (HVDS) – erection and connecting the Consumers.
(xi) Sub-station earthing, equipment earthing and Consumer's earthing, and use of Megger and procedure and materials for improving quality of earth resistance.
(xii) Fire fighting equipment, their type, use and periodical maintenance, indicators and recorders and relays, etc.

IV Metering Requirements: 3
(i) Type of metering, viz. DT metering, feeder metering and Consumer metering.
(ii) Regulations on installation of meters and technical standards
(iii) Meter types, their settings and operation, testing and sealing.
(iv) Computerised billing.

V Concept of Losses and Loss Reduction Measures: 3
(i) Concept of AT&C losses.
(ii) Detection of thefts, tampering, unauthorized loads.
(iii) Anti-theft measures and case studies.

VI Reliability issues, Quality of Power Supply, Customer Awareness and Satisfaction: 3
(i) Introduction to reliability and quality of power supply.
(ii) Causes and cures for breakdowns, tripping and voltage and frequency fluctuation.
(iii) Prompt attention to faults and customer care.

VII Electrical Safety Aspects: 12
(i) Basic principles of safety, importance of safety rules and their observance.

	(ii) List of safety equipment, their use and maintenance thereof.	
	(iii) Permit procedure- self permit, permit on phone and procedures to be observed.	
	(iv) Electric shock, safety and procedure for recovery/ resuscitation.	
	(v) Causes of accidents, safe working procedures to avoid accidents.	
	(vi) Principle and causes of fire, and precautions to be taken to avoid fires.	
VIII	Rural Electrification:	3
	(i) Separation of rural and urban supply systems.	
	(ii) Rajiv Gandhi Grameen Vidyutikaran Yojana.	
IX	Disaster Management:	3
	(i) Impact of different types of disasters.	
	(ii) Check list and preparedness to address disasters.	
	(iii) First aid techniques.	
X	Field Visits and On Job Training:	60
	(i) Familiarisation with layout of sub-stations and equipments.	
	(ii) Operational aspects of equipments/ systems and synchronization.	
	(iii) Line/ feeder connections, protection schemes, loading aspects, balancing of loads.	
	(iv) Adherence to shift system.	
	(v) Maintenance schedules.	
	(vi) Procedures for permit to work/ line clear.	
	(vii) Testing lab facilities, testing and commissioning.	
	(viii) Safety aspects and safety drill.	
	(ix) Hot line maintenance.	
	(x) Maintenance of Log Books/ history records and adherence to the timely recording.	
	(xi) Familiarisation with Tools and Plants (T&P).	
	(xii) Familiarisation with IT tools.	
	Total	108 Hours ≅ 4 Weeks

Schedule-III

Handling of electric supply lines and apparatus

[See sub-regulation (3) of regulation (19)]

Precautions to be observed

(1) Hotline Maintenance trained personnel only are designated to do work on line.

(2) Work permit will be taken from the terminal substations at each end of the line.

(3) Work shall be performed with proper planning and prior understanding and clarity.

(4) Favourable climatic condition for hotline operations is sunny weather. If the weather forecasts rain or thunderstorms work will not begin.
(5) Organisation of work shall be discussed among the members and responsibility of each team member fixed.
(6) Before going to the work site all equipment and tools shall be inspected and checked for correct operation.
(7) Auto re-closure shall be in 'OFF' position for the line at both ends.
(8) The work procedure shall be discussed with the team member at the tower location and the responsibility of each member shall be properly defined.
(9) The land in close vicinity to the tower shall be cleared to provide a site area for the required tools.
(10) All cleaned hot sticks, strain carrier and other assemblies shall be kept on the hotline tool rack to avoid ground contact.
(11) Wear helmet, safety shoes and safety belt shall compulsorily be used.
(12) All hot sticks and ladders shall be cleaned and checked for integrity by the hot sticks Tester.
(13) All linemen in the hotline team shall be equipped with personal protective equipment during the work.
(14) No live-line team members on the tower and conductor shall wear any metallic chain, wristwatch or ring to avoid any circulating current.
(15) The team linemen will wear conductive socks, boots, helmets and hand gloves. The 'hot-end' lineman shall wear complete bare hand suit.
(16) Tarpaulin sheet should be laid on the work area.
(17) A light vehicle shall be kept nearby during entire work period.

<u>Tools normally required for hot line maintenance operation</u> :

The following tools conforming to relevant Indian Standard or equivalent specifications shall be used in on-line working.

(1) Wire tongs
(2) Wire tongs saddle
(3) Tie sticks
(4) Strain link sticks
(5) Roller link sticks
(6) Suspension link sticks
(7) Auxiliary arms
(8) Strain carrier
(9) Gin poles
(10) Cum-a-along clamp
(11) Safety equipment like conductor guards, X-arm guards, insulator covers, hand gloves etc.
(12) Hot sticks

Schedule-VII

Minimum safety working clearances where electricity at voltage exceeding 650 V is supplied, converted, transformed or used

[See sub-regulation (2)(iii) of regulation (44)]

Highest System Voltage (kV)	Safety Working Clearance (Metres)
12	2.6
36	2.8
72.5	3.1
145	3.7
245	4.3
420	6.4
800	10.3

(1) The above values are valid for altitude not exceeding 1000 m. A correction factor of 1.25 per cent per 100 m is to be applied for increasing the clearance for altitude more than 1000 m and upto 3000 m;

(2) The above safety working clearances are based on an insulation height of 2.44 m which is the height of lowest point on the insulator, where it meets the earthed metal, from the ground;

(3) "Safety Working Clearance" is the minimum clearance to be maintained in air between the live part of the equipment on one hand and earth or another piece of equipment or conductor on which it is necessary to carry out the work, on the other;

(4) The "Highest System Voltage" is defined as the highest rms phase to phase voltage which occurs under normal operating conditions at any time and at any point of the system. It excludes voltage transients (such as those due to system switching) and temporary voltage variations due to abnormal system conditions (such as those due to fault conditions or the sudden disconnection of large loads).

Schedule-VIII

Minimum safety clearances to be maintained for bare conductors or live parts of any apparatus in out-door sub-stations, excluding overhead lines of HVDC installations

[See sub-regulation (5) of regulation (44)]

S.No.	DC Voltage (kV)	Pole to Earth Clearance (Metres)	Ground Clearance (Metres)
1.	100 kV	1.17	4.55
2.	200 kV	1.80	5.65
3.	300 kV	2.45	6.75
4.	400 kV.	3.04	8.00
5.	500 kV	3.65	9.00
6.	600 kV	3.98	10.1
7.	800 kV	5.3	11.2

(1) The above ground clearances are not applicable to equipment that are housed within fence or a building and where access is prevented under energised condition through a suitable safety interlocking scheme;

(2) The above pole to earth clearances are for conductor-structure electrode configuration using gap factor k equal to 1.35.

(3) It is recognised that within a substation many different types of electrode configurations shall be there with different values of k, therefore, the above clearance shall be modified based upon the values of gap factor for a particular electrode configuration subjected to the minimum ground clearance.

(4) Clearance shall be provided for electrical apparatus so that sufficient space is available for easy operation and maintenance without any hazard to the operating and maintenance personnel working near the equipment and for ensuring adequate ventilation.

Schedule-IX

Form for reporting failure of Transformers or Reactors of rating 20 MVA/MVAR and above

[See sub-regulation (8) of regulation (46)]

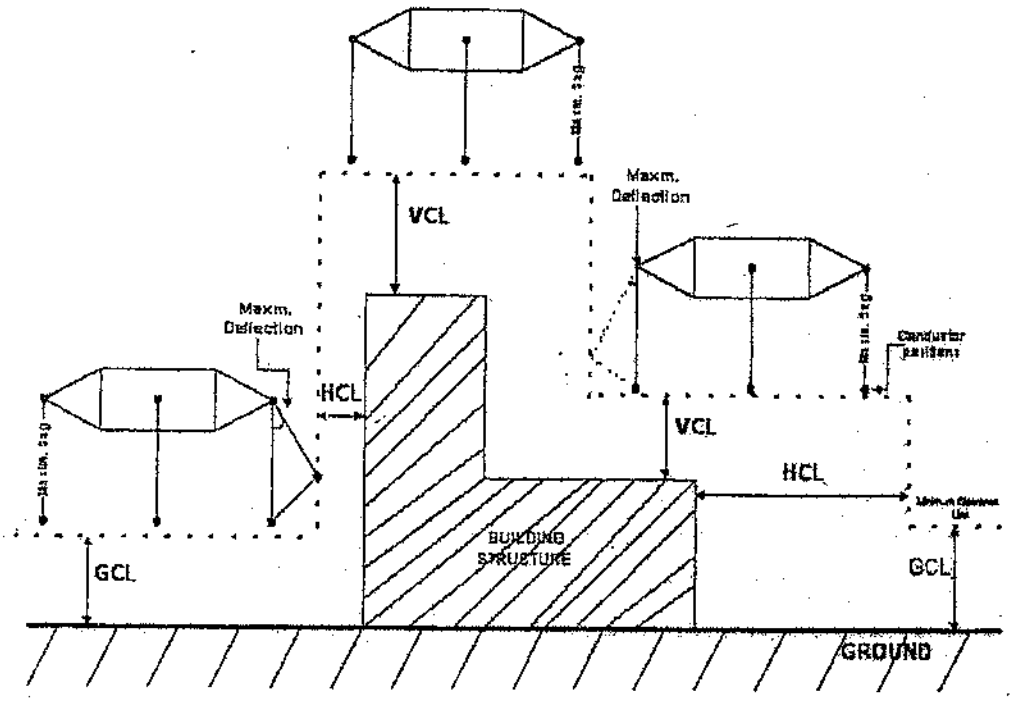
(1) Type of Equipment (Transformer or Reactor)
(2) Capacity (MVA/MVAR)
(3) Location (Address)
(4) Owner and address of owner
(5) Date of failure
(6) Year of manufacture
(7) Date of Installation
(8) Make
(9) Reasons for failure
(10) Measures being taken to avoid recurrence of failure

Date :

(Signature and name of Manager/Executive Engineer of the installation)

Schedule-X

Ground, Vertical and Horizontal clearances
[See sub-regulation (6) of regulation 58, sub-regulation (5) of regulation (60) and sub-regulation (5) of regulation 61]

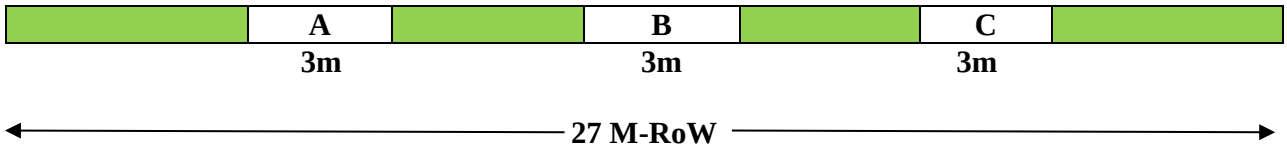


GCL: Clearances as per Regulation 59
VCL: Clearances as per Regulation 60 & 61
HCL: Clearances as per Regulation 60 & 61

Annexure-8

Right of Way/Width (RoW) in Forest: 132 kV S/C Line

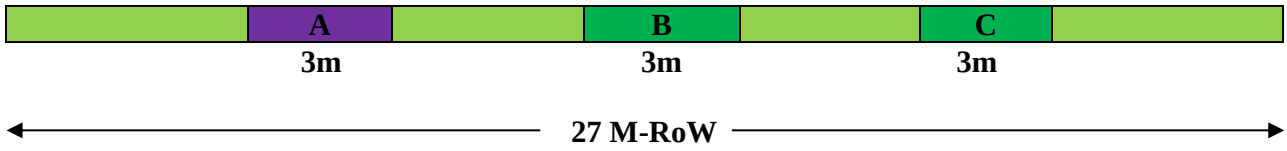
DURING CONSTRUCTION



Area where trees are lopped/pruned/pollarded.

Area where trees are completely felled.

AFTER CONSTRUCTION



Area where trees are lopped/pruned/pollarded.

Area kept clear of trees for O & M

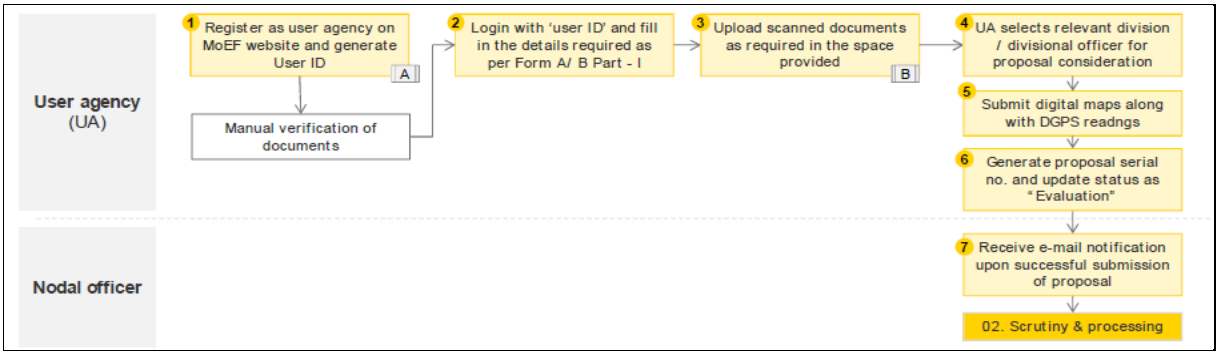
Area left for natural generation

Note: RoW for : 132 kV-27M 220 kV-35M, 400kV S/C-52M, 400kV D/C-46M

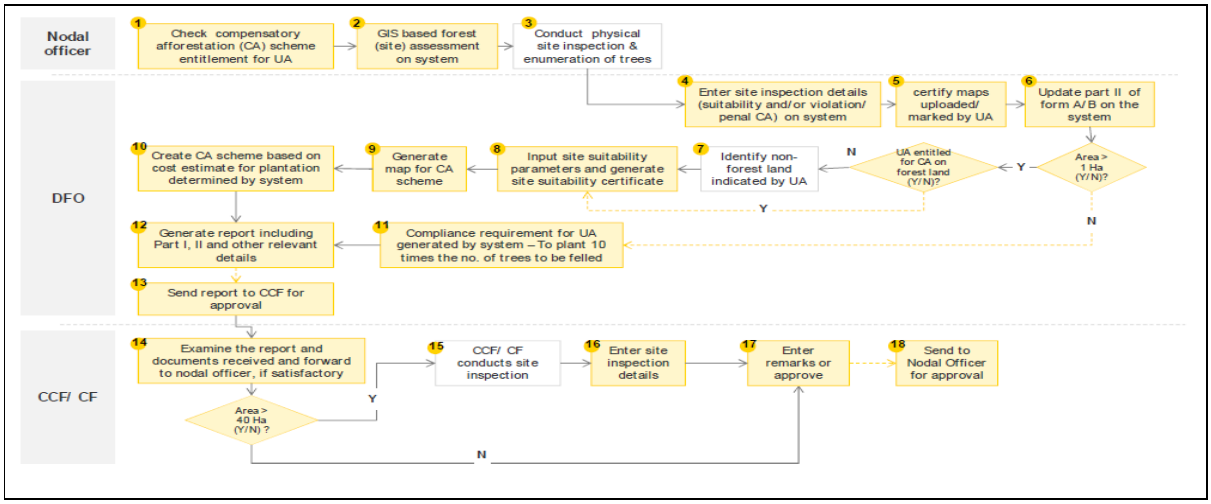
ANNEXURE - 9

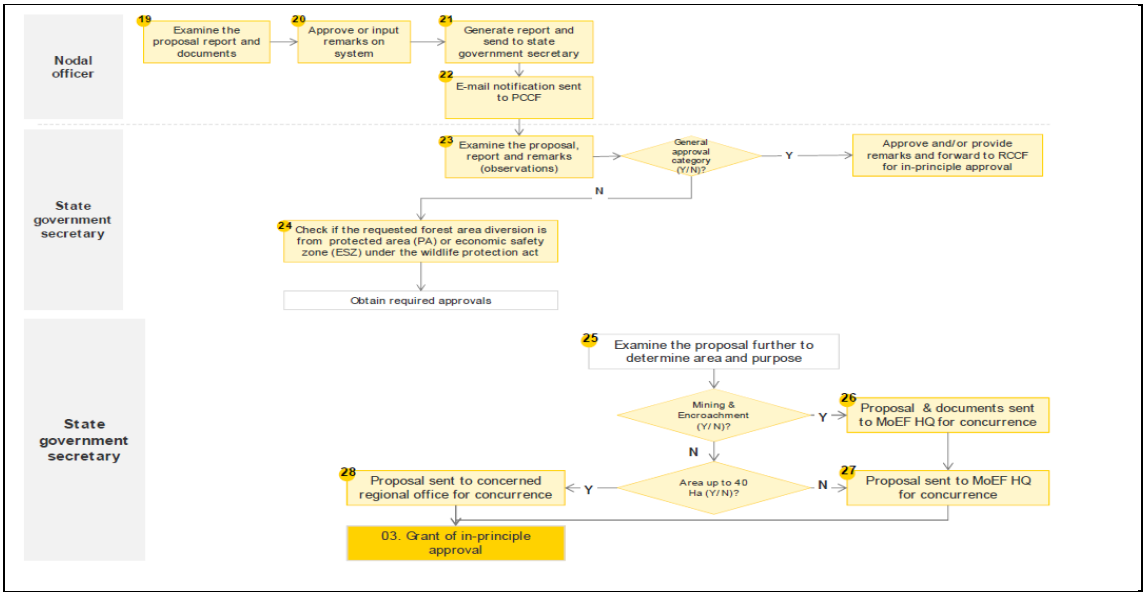
FOREST CLEARANCE PROCESS

Submission of Proposal



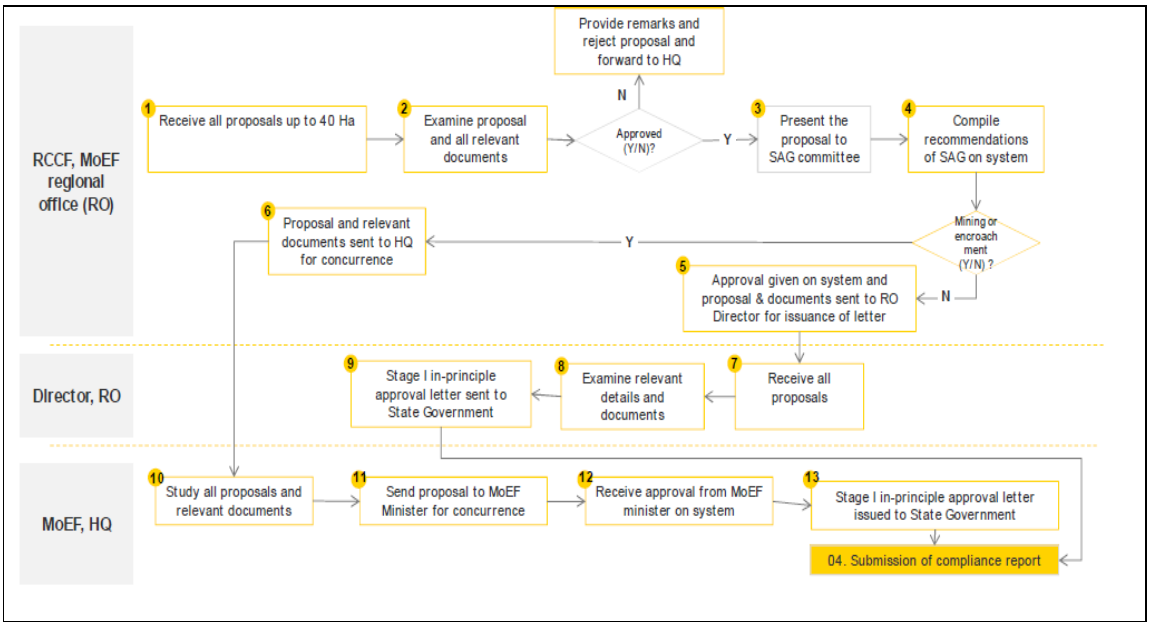
Scrutiny & Processing



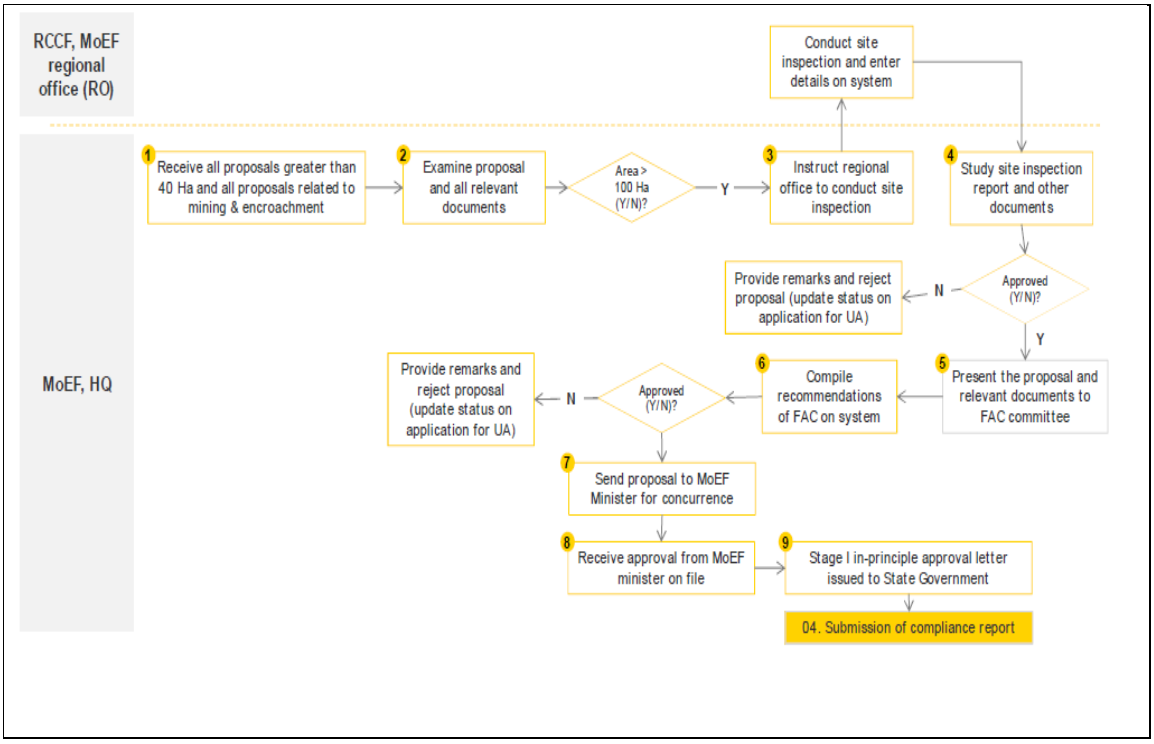


Grant in Principal Approval

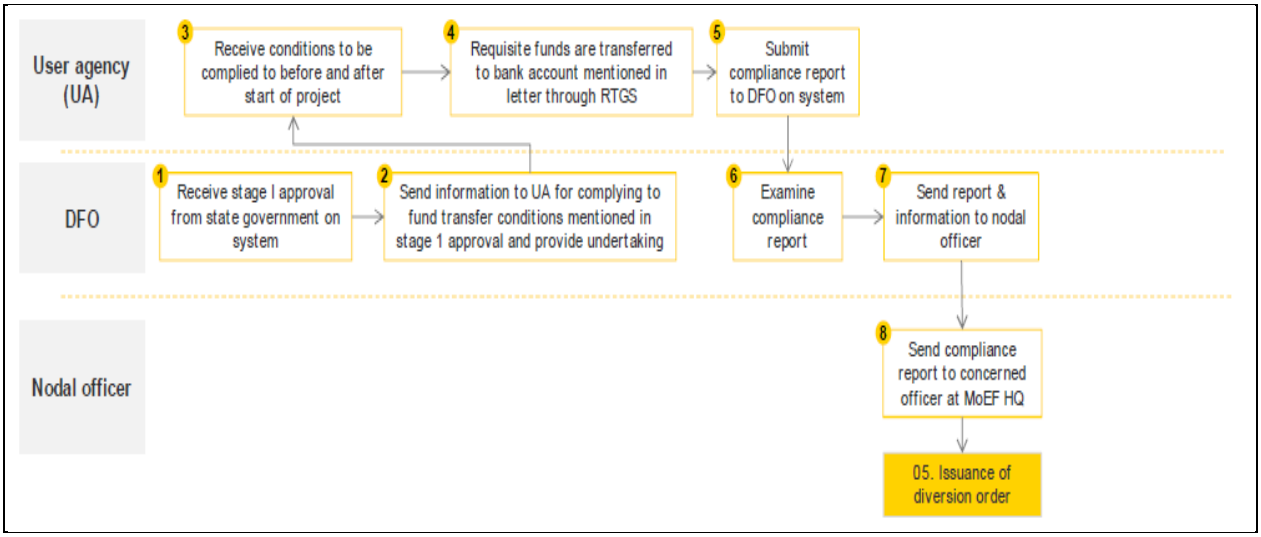
Case I Forest Proposal upto 40 ha



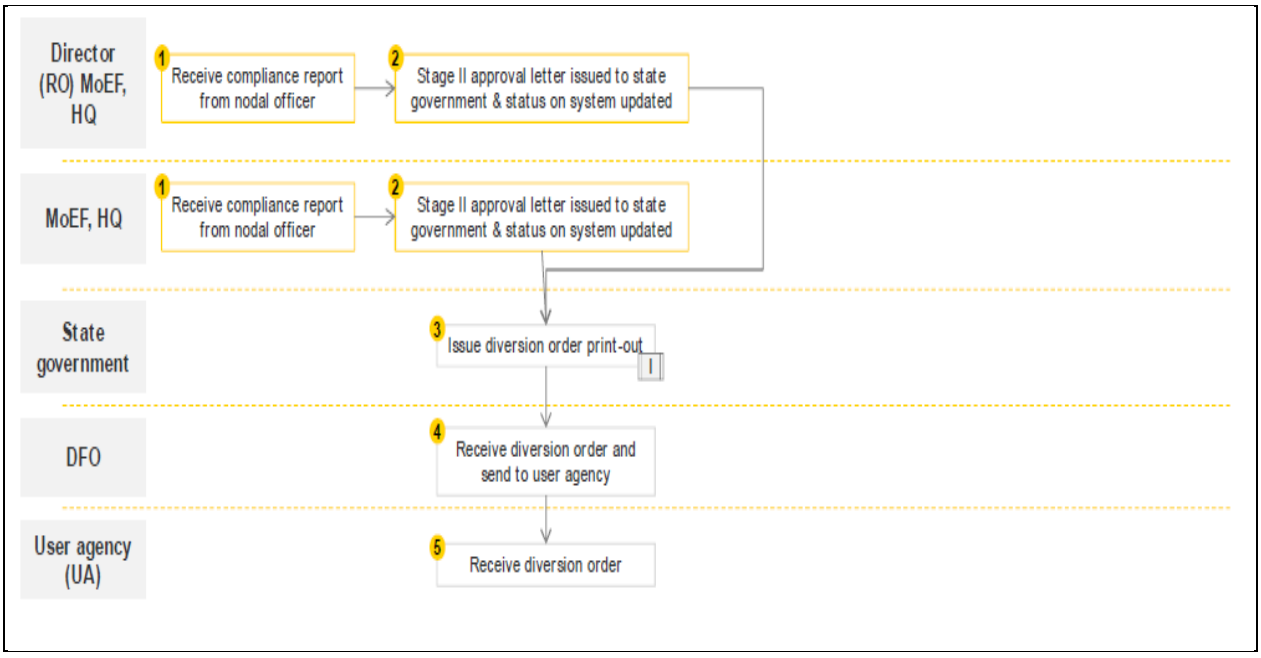
Case II : More than 40 ha



Submission of Compliance Report



Issuance of Diversion Order



Note : As per MoEF gazette notification dated 10.10.2014, processing & approval of forest proposal of all linear projects transmission and distribution line irrespective of area involved shall be respective Regional Offices.

Annexure-9a

ABOUT THE MANUAL

Audience

This manual is meant for User Agencies/Stake Holders that are supposed to submit application for seeking prior forests clearances for diverting forest land for non-forestry purposes.

Purpose

The purpose of this document is to provide an interface between user and OSMFC, an "Online Submission and Monitoring of Forest Clearances Proposals". It will help the user to understand major features, benefits and workflow of the system. It will also help to submit the details of the proposal along with all annexures and later on status of the proposal can be tracked.

Authorship

This manual has been prepared by Ministry of Environment, Forests and Climate Change, Government of India, New Delhi – 110003.

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• ABOUT FORESTS CLEARANCE PORTAL

- INTRODUCTION

In order to bring more transparency and accountability in the forests clearance process, Ministry of Environment, Forests and Climate change, Government of India has rolled out a portal named "**Online Submission and Monitoring of Forests Clearances Proposals"(OSMFCP)**.

OSMFC is a web based, role based, G2C and G2G workflow application that are developed for online submission and monitoring of the proposals submitted by the user agencies for seeking forests clearances, for diverting forest land for non- forestry purposes. It automates the entire tracking of proposals which includes online submissions of a new proposal, editing/updating the details of proposals and displays status of the proposals at each stage of the workflow. The system is based on the Web Architecture. It uses dotNET as an application server and SQL as a database server.

- OBJECTIVE

The following are the main objectives of the SYSTEM:

- Enhance efficiency, transparency and accountability in the forest clearance process.
- Reduction in turnaround time for activity.
- Enhance responsiveness through workflows automation and availability of real time information.
- Enhance ease and convenience of citizens and businesses in accessing information and services.
- Achieve standardization in processes across regional and state level.

- CORE FEATURES OF PORTAL

  - A role based workflow application that helps User Agencies in online submission of the proposals seeking forest clearances for non-forestry purposes and tracking the proposals.
  - Facilitate management in effective monitoring.
  - Delays in the clearance process can be ascertained
  - Accessible from any PC having internet facility
  - 24x7 Online

- ROLES

The following Roles have been defined as per the responsibility:

- **USER AGENCY**

Any user Agency have to register with the FC portal before submitting any proposal for seeking prior approval of Central Government for the diversion of forests land for non-forestry purposes. When, UA register with the portal an acknowledgement slip containing user-id and password would be sent by the system automatically to UA's registered email id. UA can login into FC portal by using user-id and password communicated through email and then UA can upload Form-A online along with all relevant documents. The User Agency can track the status of the proposal after submitting it online.

- **NODAL OFFICER (STATE FOREST DEPTT)**

After receiving the proposal online, Nodal Officer can examine the proposal for its completeness and the same will be forwarded (after assigning State Serial No.) by him/her to the divisions affected with the diversion of forest land. If proposal is not complete, Nodal Officer can raise query and may ask UA to submit the complete proposal.

The proposal will come again to Nodal Officer after the completion of process from Circle Office. After receiving the proposal from CF/CCF, the concerned Nodal Officer would process it and will upload his/her recommendations/SIR. When, Nodal officer upload these details, the proposal would be forwarded automatically to State Secretary.

- **DFO/DCF**

After receiving the proposal online from Nodal Officer, the concerned DFO can view the proposal (Form-A submitted by UA) and then may upload his/her Recommendations and Site Inspection Report. DFO level user does not have privileges to make any modification in the proposal, they can only fill up Part II of Form-A. When, DFO upload recommendation and SIR, the proposal would be forwarded to concerned Circle Officer (CF/CCF).

- **CF/CCF**

After receiving the proposal online from DFO/DCF, the concerned CF/CCF can view the proposal (Form-A submitted by UA) and recommendations of DFO and then may upload his/her Recommendations and Site Inspection Report. CF/CCF level user does not have privileges to make any modification in the proposal, they can only fill up Part III of Form-A. Or he/she may raise any query to concerned division, if required. When, Circle Officer uploads his/her recommendation and SIR, the proposal would be forwarded to concerned Nodal Officer.

- **STATE SECRETARY (STATE GOVT)**

After receiving the proposal online from Nodal Officer, the concerned State Secretary can view the proposal (Form-A submitted by UA) and recommendations of DFO, Circle and Nodal Officer and then may upload his/her Recommendations. When, State Secretary uploads these details, the proposal would be forwarded to either Regional Office or Head Office of Ministry depending upon the category and area of the project.

- **REGIONAL OFFICE**

After receiving the proposal online from State Secretary, the concerned RO can view the proposal (Form-A submitted by UA) and recommendations of DFO, Circle, Nodal Officer and State Secretary. RO level user may upload the State Advisory Group agenda, minutes on portal and then can send SAG approved

proposals to RO (HQ), Delhi for the recommendation of the Competent Authority of the Ministry of Environment, Forests & Climate Change (MoEFCC).

- **REGIONAL OFFICE (HQ), NEW DELHI**

After receiving the proposal online from RO, the RO (HQ) level user can view the proposal (Form-A submitted by UA) and recommendations of DFO, Circle, Nodal Officer, State Secretary and RO. RO(HQ) level user then process the file and process it for the approval for the Competent Authority of the MoEFCC. After taking approval of the Competent Authority, the status is updated on the portal and the proposal is forwarded to RO for issuing the Stage-I clearance.

- **MoEF HEAD OFFICE, NEW DELHI**

After receiving the proposal online from RO, the MoEFCC (HO) level user can view the proposal (Form-A submitted by UA) and recommendations of DFO, Circle, Nodal Officer, State Secretary and RO. MoEFCC (HO) level user then process the file and process it for the approval of the Competent Authority of MoEF CC. After taking approval of the Competent Authority, he/she has to update the status of the proposal and upload the approval letter on the portal.

- **District Collector (DC)**

After viewing the proposal, DC may upload FRA document. The same could be uploaded by Nodal Officer also.

- ## WORK FLOW

User Agency can register to get the login credentials from http://forestsclearance.nic.in. Thereafter, project details can be submitted along with all required documents [Form-A (Part-I) etc.]. When UA submits all these details, an acknowledgement letter would be sent (by System) to email-id of User Agency. Acknowledgement letter may contain some information including unique proposal number. UA may refer this unique proposal number for future reference.

Nodal Officer scrutinizes the proposal (within 10 days) and sends an acceptance letter to User Agency, if all relevant documents are uploaded properly by UA. If any document is missing or any other information is needed, Nodal Officer may ask UA to upload those missing information. Timeline will start only, if Nodal officer accepts the proposal.

When, Nodal Officer sends the acceptance letter to UA, proposal details are forwarded automatically to concerned DFOs and DCs for their necessary action.

DFO can view the proposal after logging in to portal and can take print out (if needed) of the entire details and then process it. After that, he/she uploads the part-II of Form-A on the portal along with his/her recommendation and Site Inspection report.

When, DFO uploads his/her recommendation and Site Inspection Reports on the portal, proposal details are forwarded automatically to concerned CF/CCF for the necessary action.

District Collector (DC) can view the proposal after logging in to portal. He/she may upload FRA document (that must include Forest rights settlement details) on the portal. This document can be uploaded by Nodal Officer also when proposal reaches to him after processing by Circle office.

CF/CCF can view the proposal and recommendation of DFO after logging in to portal and can take print out (if needed) of the entire details and then process it. After that, he/she uploads the part-III of Form-A on the portal along with his/her recommendation and Site Inspection report (if site inspection done).

When, CF/CCF uploads his/her recommendation and Site Inspection Reports on the portal, proposal details are forwarded automatically to concerned Nodal Officer for the necessary action.

Nodal Officer can view the proposal and recommendations of DFO and CF/CCF after logging in to portal and can take print out (if needed) of the entire details and then process it. After that, he/she uploads the part-IV of Form-A on the portal along with his/her recommendation and Site Inspection report (if site inspection done).

When, Nodal Officer uploads his/her recommendation and Site Inspection Reports on the portal, proposal details are forwarded automatically to concerned State Secretary for the necessary action.

State Secretary can view the proposal and recommendations of DFO, CF/CCF and Nodal Officer after logging in to portal and can take print out (if needed) of the entire details and then process it. After that, he/she uploads the part-V of Form-A on the portal along with his/her recommendation.

When, State Secretary uploads his/her recommendation on the portal, proposal details are forwarded automatically to concerned Regional Office or Head Office, Delhi as per the flow defined in the system.

Note:

- All proposals related with diversion of forest land from 0 to 40 ha are forwarded to Regional Office.

- All proposals related with diversion of forest land for more than 40 ha are forwarded directly to Head Office, Delhi for the processing at Head Office (MoEF, Delhi).

Regional Office can view the proposal and recommendations of DFO, CF/CCF, Nodal Officer and State Secretary after logging in to portal and can take print out (if needed) of the entire details and then process it.

- The fate of the proposals related with diversion of forest land up to 5 ha (except mining and regularization of encroachments) is decided at RO (without any State Advisory Group/Regional Empowered Committee meeting).

- RO conducts SAG/REC meetings for the proposals related with diversion of forest land up to 5 ha (Mining and regularization of encroachments only) and all other projects related with diversion of forest land from 5 to 40 ha. Then, RO forwards these proposals (along with recommendation of SAG/REC) to RO(HQ), Delhi for the approval of Competent Authority of Ministry of Environment, Forests & Climate Change.

Regional Office (HQ), Delhi can view the proposal and recommendations of DFO, CF/CCF, Nodal Officer, State Secretary and Regional Office after logging in to portal and can take print out (if needed) of the entire details and then process it for the approval of the Competent Authority of the MoEFCC.

HO (Delhi)can view the proposal and recommendations of DFO, CF/CCF, Nodal Officer, State Secretary and Regional Office after logging in to portal and

can take print out (if needed) of the entire details and then conducts FAC meetings.

- HO may ask Regional Office to upload site inspection reports in cases in which area is more than 100 ha.

- FAC recommendations (along with decision of Competent Authority) and agenda and minutes of the meeting are uploaded on portal.

Automatic mailer notifications will be triggered for each and every transaction committed in the OSMFC System.

The status of proposal will be updated at each transaction and the same would be reflected automatically in the reports available in public domain.

• NEW USER AGENCY REGISTRATION AND LOGIN

- NEW REGISTRATION

User Agency: For submitting the proposal, a user agency has to register Online at FC portal. Registration can be done in the following manner:

- Type http://forestsclearance.nic.in in the address bar of the web browser i.e. Internet Explorer, Mozilla Firefox, Google Chrome etc. and press Enter.

A **Home** page of OSMFCP portal will appear as shown in Figure-2.1.

- Click on Register New User Agency as shown in the Figure-2.1.

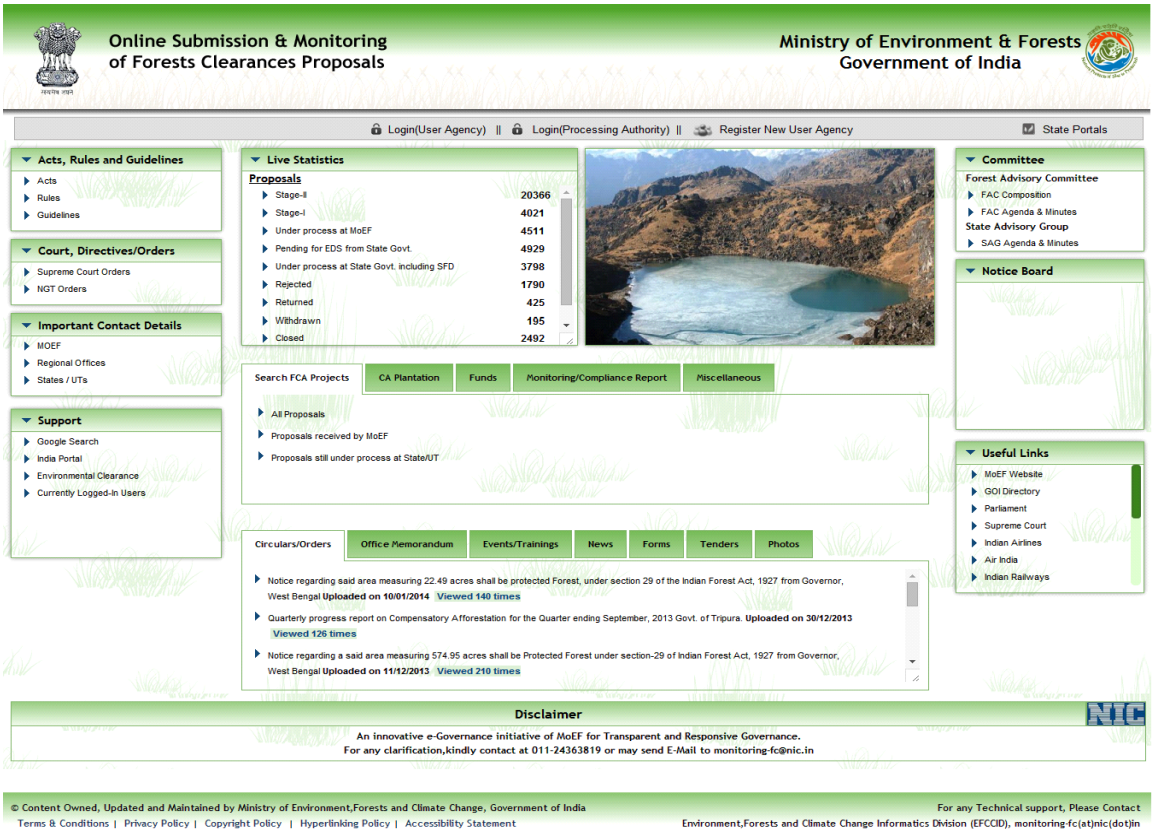

Figure-2.1: Home Page of OSMFCP portal

New User Registration Form of the **Online Submission and Monitoring of Forests Clearances Proposals** portal will appear as shown in Figure-2.2.

Figure-2.2 : New User Registration Form of OSMFCP

- Fill-in the data in the above mentioned form and then press '**SUBMIT**' button.

After successful registration, new user will get the notification on registered email-id.

- LOGIN

To login into the FC portal, do the following:

- Click on the Login (User Agency) as shown in figure 2.3.

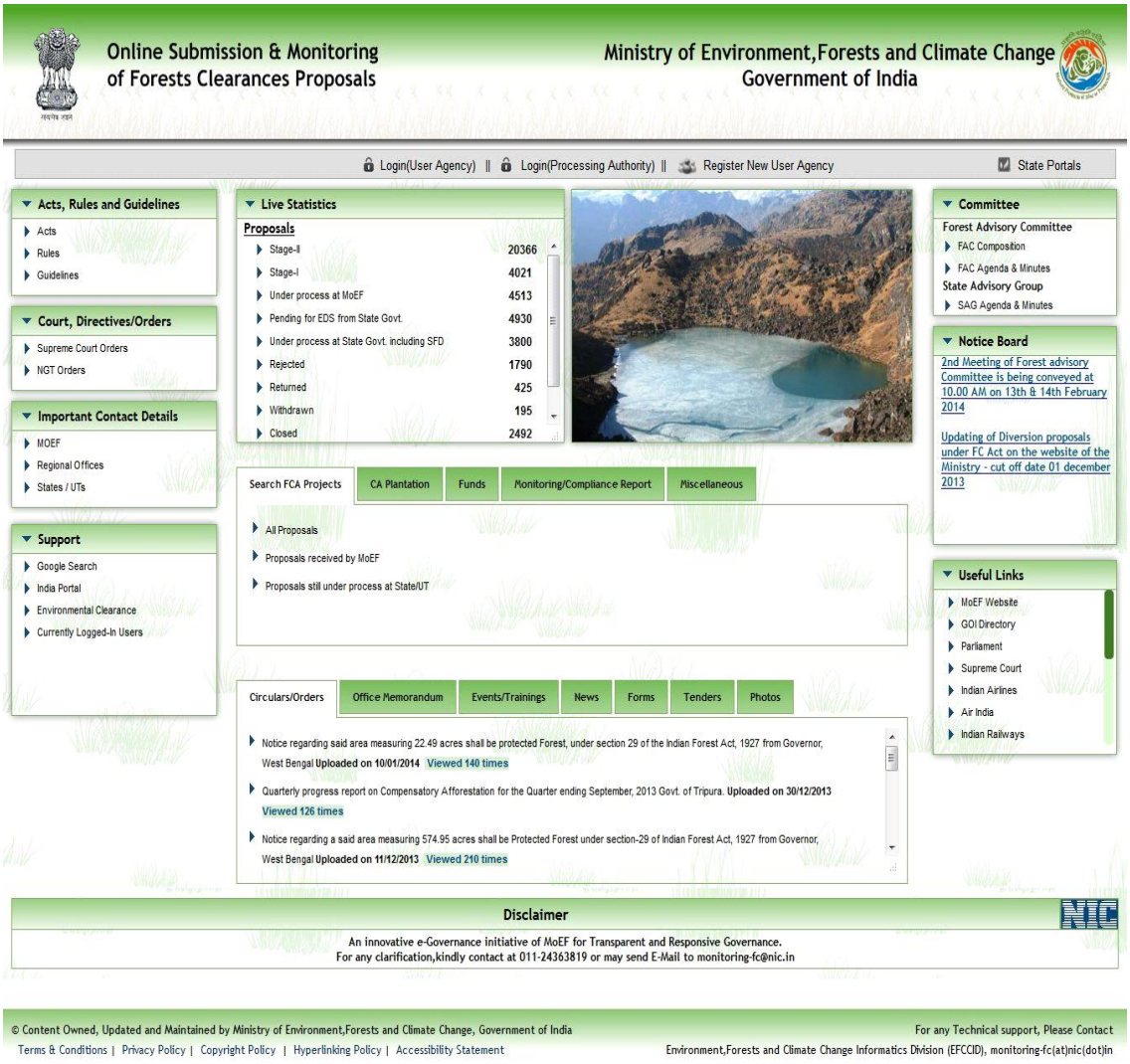

Figure-2.3: Home Page of OSMFCP

Login Form of FC portal will appear as shown in the figure 2.4

Figure-2.4: Login Page of OSMFCP

- Type the user id in the text box.
- Type the password in the **Password** text box.
- Type the code in the text box shown in the **Captcha** image below it.
- Click on **Login** button as shown in Figure-2.4.

After successful login, Change password page will be displayed as shown in figure 2.5

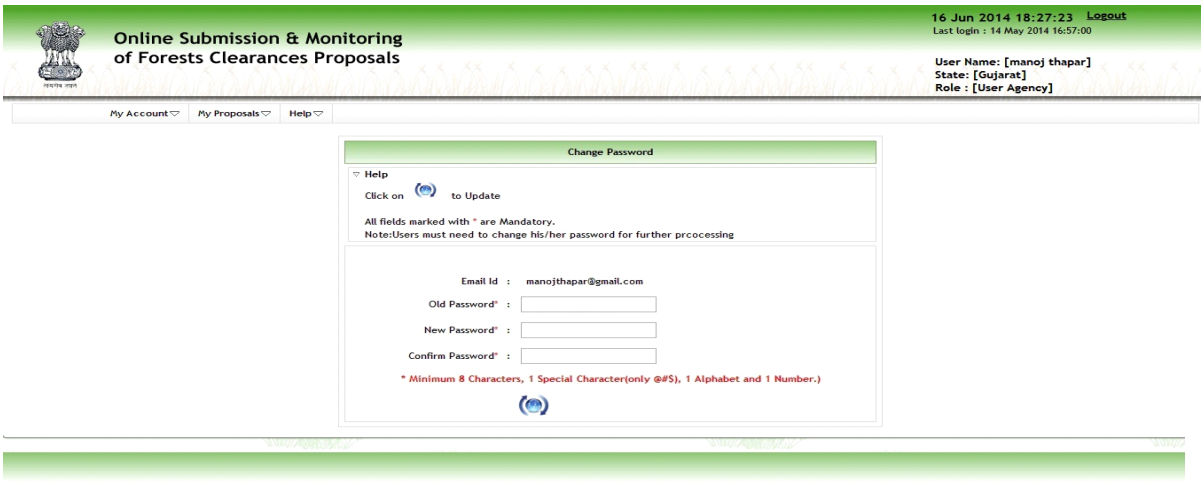

Figure- 2.5: Change password screen

User Agency has to change password assigned through email generated after registration. When User Agency changes the password, the following page (Figure-2.6) would be displayed on screen.

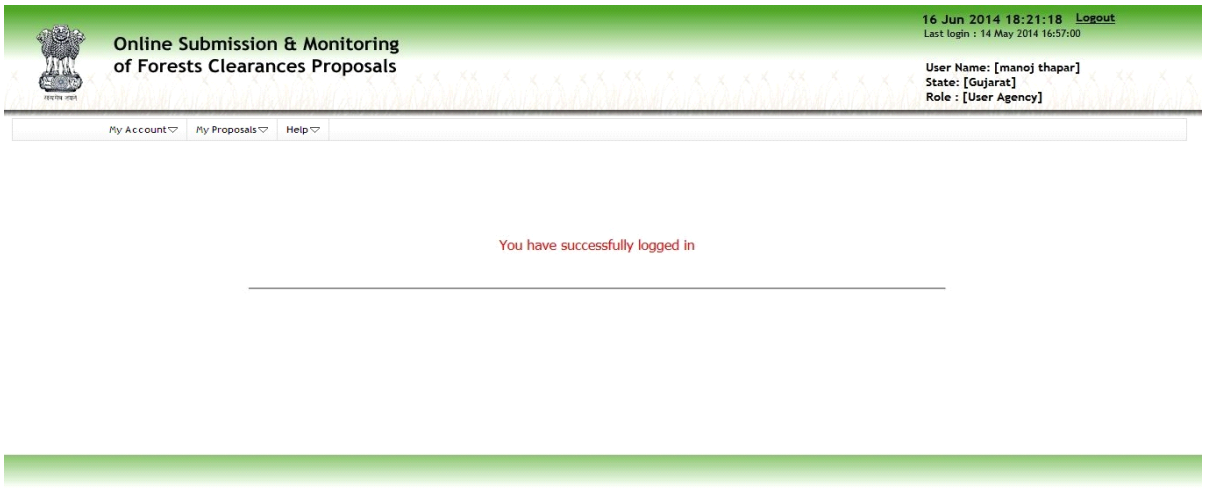

Figure- 2.6: First time logged in page for the UA

The option for changing password is available under '**My Account'** tab also as shown in the figure 2.7.

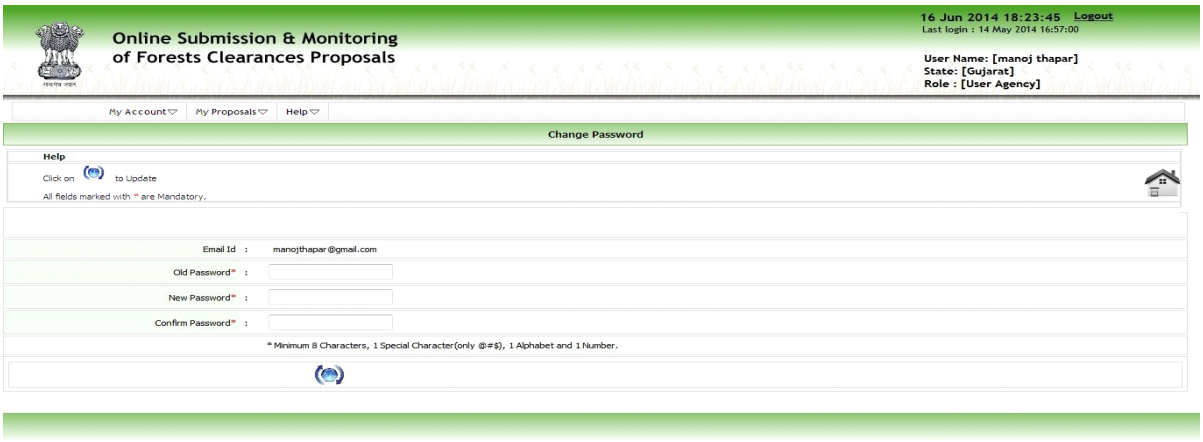

Figure- 2.7: Change password screen

- LOGOUT

To logout from OSMFCP portal, click on the option **"Logout"** at the right corner of the screen as shown in the figure 2.6.

• ADDING, EDITING &TRACKING PROPOSALS

- ADD NEW PROPOSAL

User Agency can submit details of the proposals (Form-A, Part-I) seeking prior forests clearance for the diversion of forests land to be diverted for non-forestry purposes. After submitting the proposal details, UA can track the status of the proposal submitted as per the flow defined in the system. They are supposed to check their emails and SMSs for further action at their end. To submit a new proposal, following procedure may be adopted:

- To add a new proposal, click on '**My Proposals**' tab. Then click on the **Allocation of Fresh Forest land (Form-A)** link available under '**Add New Proposal'** link as shown in Figure 3.1.

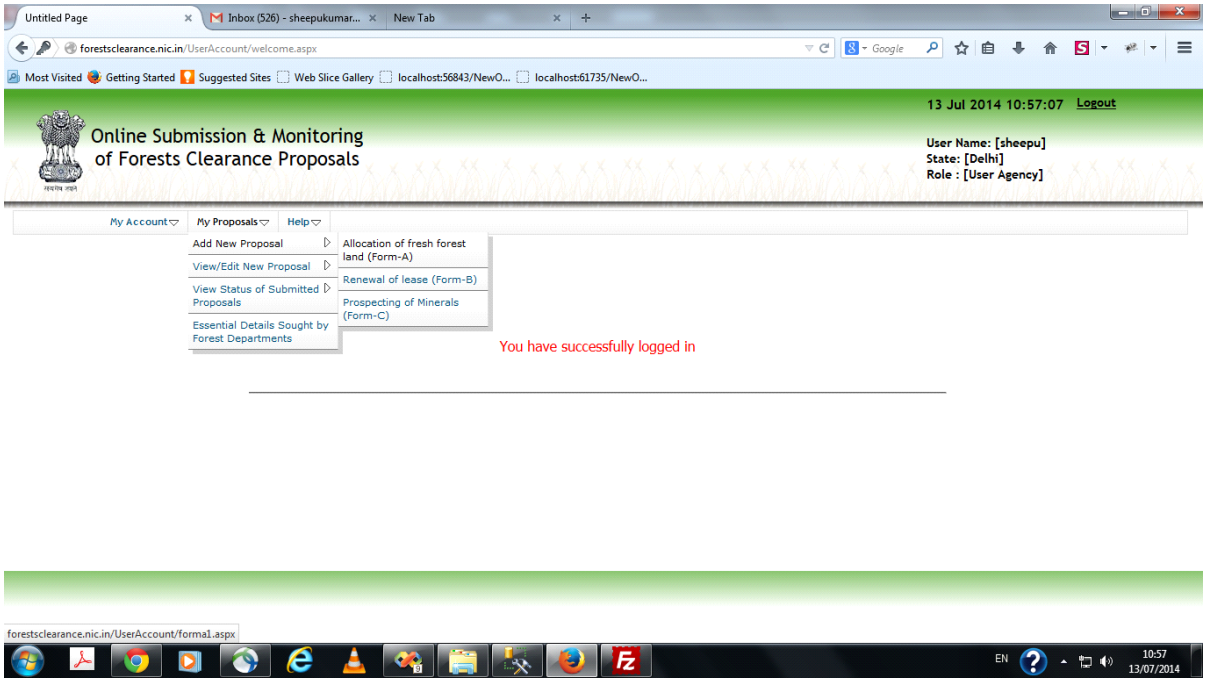

Figure 3.1: First screen for Adding New Proposal

- After clicking on '**Allocation of Fresh Forest land (Form-A)**', Form-A will be displayed on screen as shown in figure-3.2.

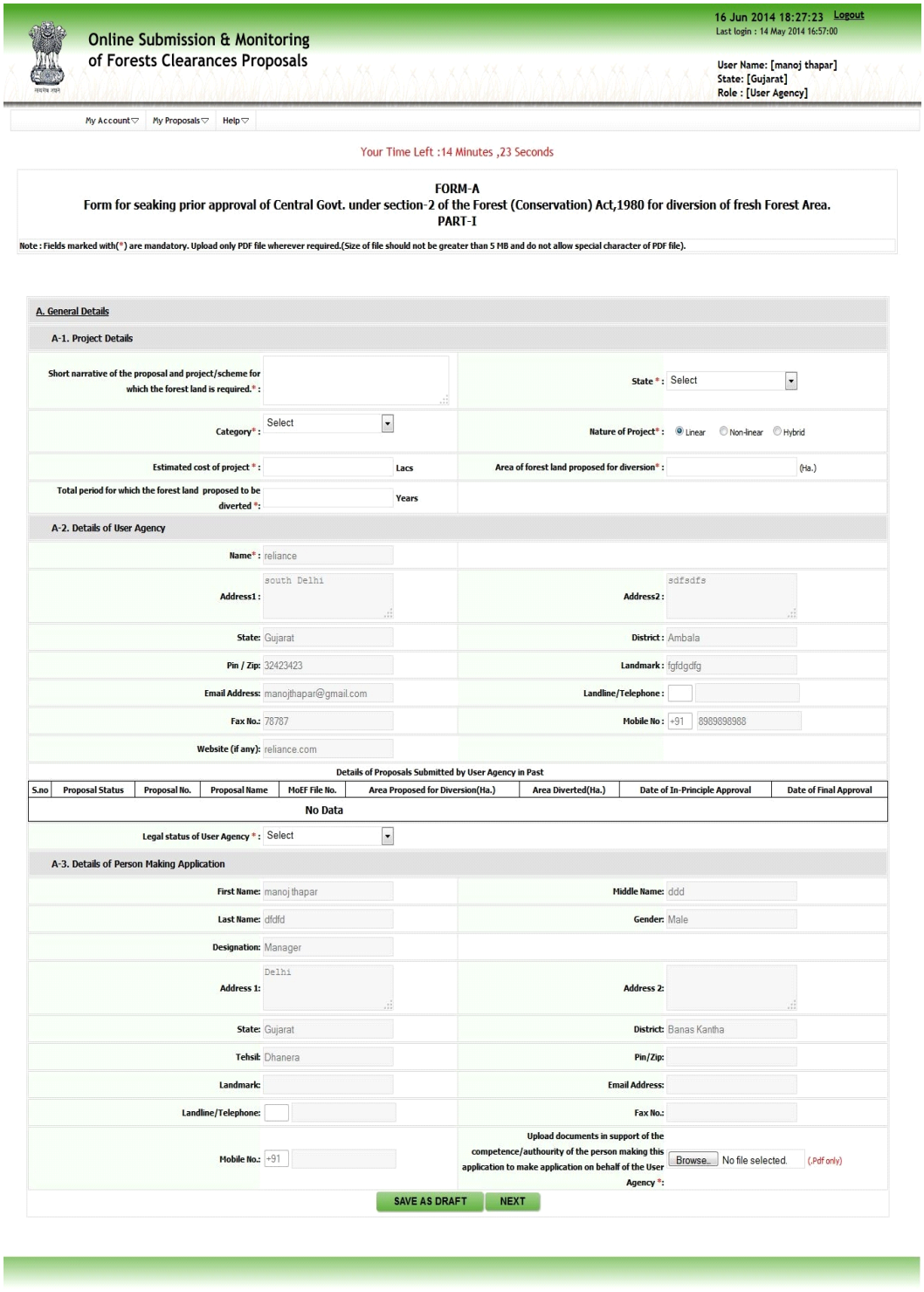

Figure: 3.2 Details of Form-A, Part-I to be filled in by UA

- Fill up the form (Form-A, Part-I) displayed at Figure 3.2.

Note: Form-A contains four (7) pages for the proposals for all categories except Mining sector. Form-A for Mining cases contains Five (9) pages. User Agency is advised to follow all the instructions given on the pages. The parameters marked with * are mandatory.

- User Agency can save the proposal in Draft mode by clicking on '**Save as Draft**' button available on first page of Form-A, Part-I or they may click on '**Next**' button for filling up other pages. If '**Save as Draft**' button is clicked, a Unique proposal no. will be generated automatically by the system and the same would be communicated to the user through pop-up message. If user clicks on '**OK**' of pop-up message, control will come back to the first page. Then UA may fill up other pages by clicking on '**Next**' button.

- User Agency has to click on '**Save as Draft**' or '**Save and lock'** button available on last page for saving the entire form.

Note: Modifications can be made in the proposal, if it is saved by clicking on '**Save in Draft'** button. No change can be made in the proposal, if it is saved by clicking on '**Save & lock**' button. Please ensure that all details have been uploaded properly before saving in **lock** mode.

- After successfully addition of proposal, an acknowledgement letter is emailed automatically to the email-id of User Agency and the proposal is sent to the concerned Nodal Officer for further necessary action. Concerned Nodal Officer will get the email notification alert. User Agency can submit original proposal to Nodal Officer along with acknowledgement letter and other relevant documents. Similarly, other proposals (Form-B and Form-C) can be submitted through the portal.

- UPDATE NEW PROPOSAL

The details of the proposals can be updated by User Agency if these details have been submitted by clicking on '**Save as Draft**' button. No change can be made if proposal is **saved and locked**. To update the submitted proposal, the following procedure may be adopted:

Step 1: To update a proposal, click on '**My Proposals**' tab. Then click on the **View/Edit Form-A** link available under '**View/Edit New Proposal**' link as shown in Figure 3.4.

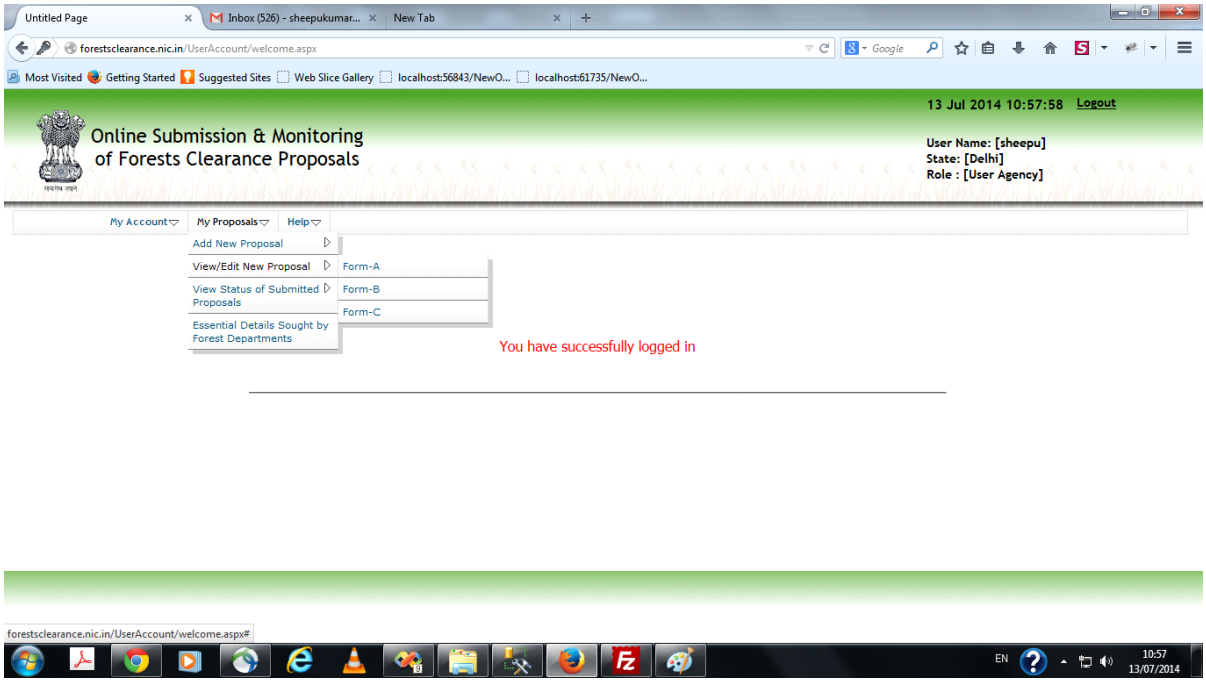

Figure 3.4: First screen for viewing/editing new proposal

Step 2: After clicking on '**View/Edit Form-A**' link, the following will be displayed on screen as shown in figure-3.5

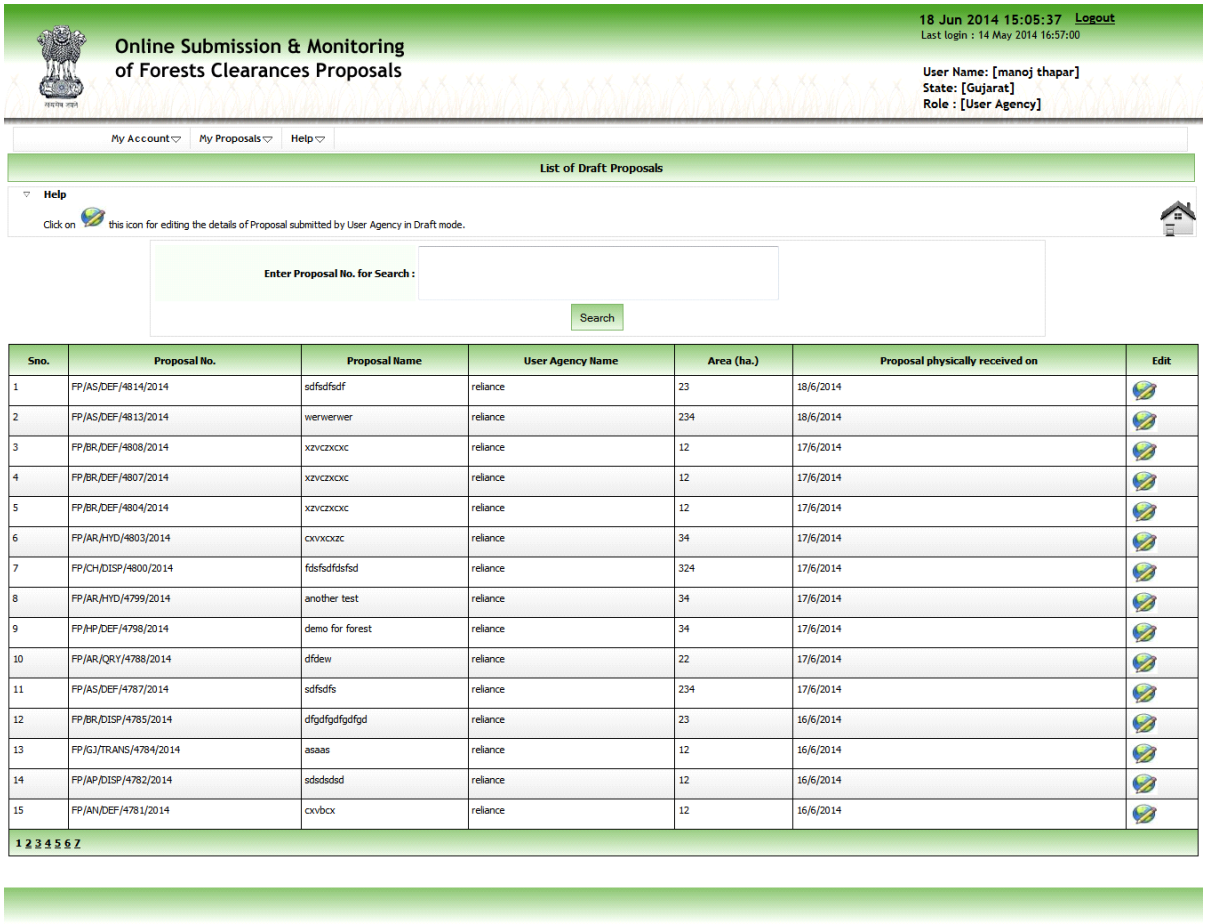

Figure 3.5: Second screen for viewing/editing new proposal

- Step 3: Click on Edit icon displayed against proposal no. to view/edit the proposal details. After clicking on Edit icon, Edit/View form will be displayed as shown in Figure-3.6. User Agency can update the information and then may submit it by clicking on '**Save & lock**' button. Once application is saved by using this option, no further changes can be made in the proposal. Similarly, other proposals (Form-B and Form-C) can be edited on the portal.

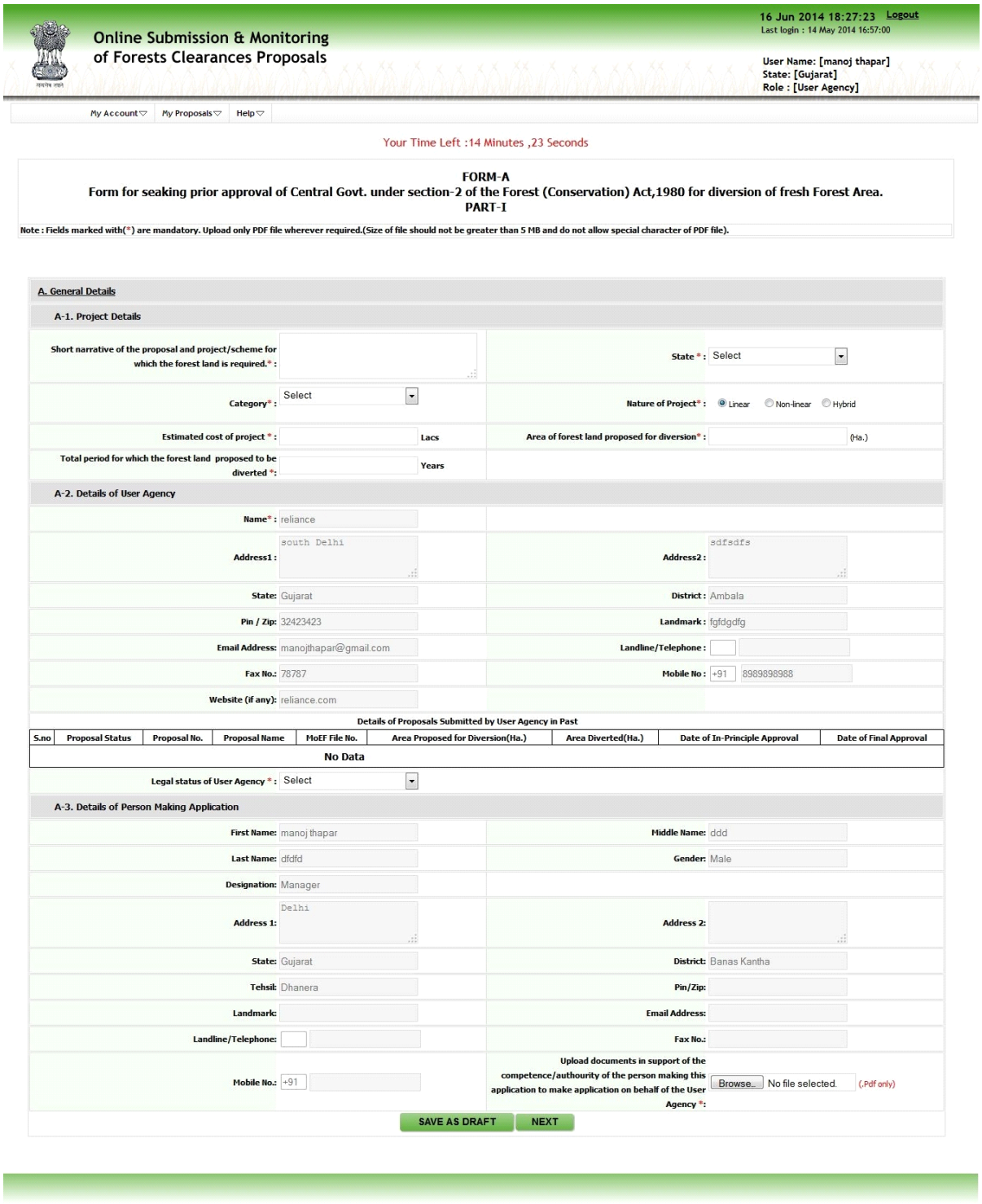

Figure 3.6: Second screen for viewing/editing new proposal

- VIEW STATUS OF SUBMITTED PROPOSALS

User Agency can see online decision and status of concerned submitted proposals by clicking on the **View Status of Submitted Proposals** link under **My Project** option as shown in the Figure 3.7. Similarly, status of other proposals (Form-B and Form-C) can also be viewed on portal.

Figure-3.7: Status of Submitted Proposals

- ESSENTAIL DETAILS SOUGHT BY FOREST DEPARTMENT

After submission of proposal successfully, Forest department may sought essential details from User Agency at any level (Nodal Officer/DFO/Circle etc) during processing of proposal. An email/sms alert will be sent by Forest department to User Agency for the same. User Agency can view the details needed by forest department for further processing. The following steps could be followed for the same.

- Click on **Essential Details Sought by Forest Department** link under **My Proposals**. Then, the following details will be displayed on screen.

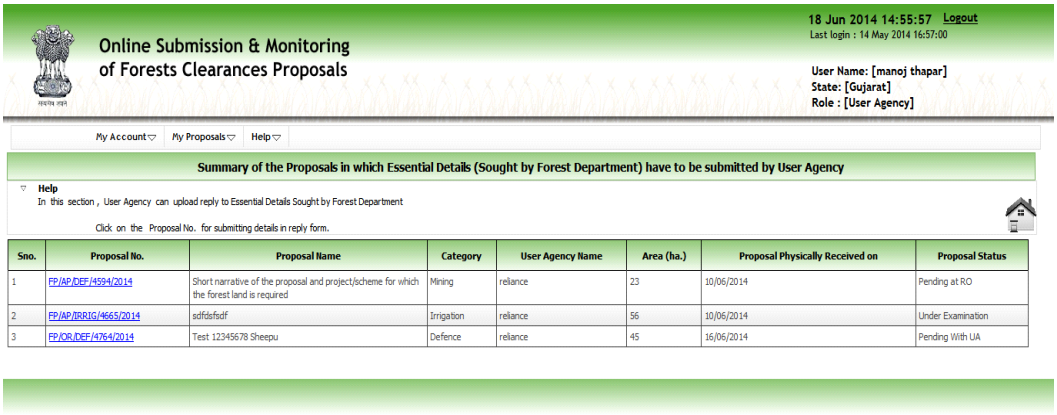

Figure-3.8 Screen showing summary of proposals in which essential details have to be submitted by UA

- User Agency can view the Essential Details Sought (EDS) by Forest department as shown in figure 3.9 and then may reply to the query. The system will show the status of the proposal as '**Pending at UA**" till the reply is uploaded on portal.

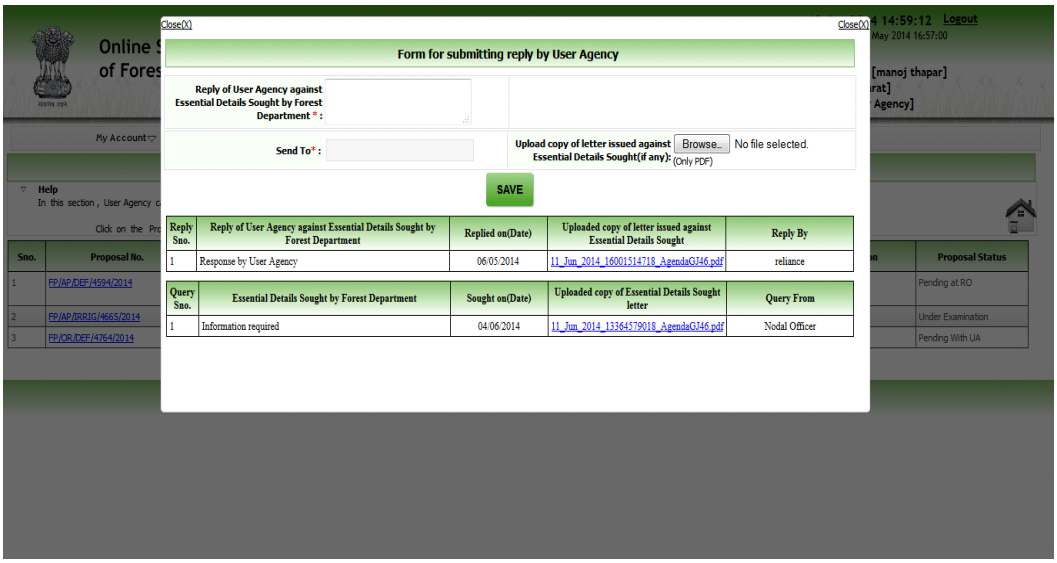

Figure-3.9Form for submitting reply by UA

This completes the process at User Agency.

• ANNEXURE A

Frequently Asked Questions (FAQs)

- **What does OSMFCP stand for?**

Ans. Online Submission and Monitoring of Forests Clearances Proposals.

- **What does UA stand for?**

Ans. User Agency.

- **How UA can register and login on the OMSFCP portal?**

Ans. User Agency can click on Register (New User Agency) tab available on main page of the portal (http://forestsclearance.nic.in). Then a registration form will be displayed on the screen. When UA submits Registration form, then a user-id (email of UA) and password will be emailed automatically to UA's email-id. UA can login with these credentials.

- **Where is all the information regarding the OSMFCP residing?**

Ans. All the proposal information is available on Forests Clearance portal. Click here to visit.

- **What are the key benefits for the department adopting the Online Submission and Monitoring of Forests Clearances Proposals?**

Ans. It provides transparency and efficiency in the working environment, minimizes the processing delay, helps in timely disposal of important issues, enables one to work from anywhere, anytime, leads to a paperless working and provides ease and flexibility in the retrieval of various reports.

- **Are all the necessary fields required to be filled while submitting the proposal online?**

Ans. All the required field should be filled otherwise system will not allow submitting the proposal.

- **Is it possible to add more proposals after the acceptance for consideration of the proposal submitted by UA?**

Ans. Yes, the UA can add more proposals after acceptance of a proposal by forest department.

- **How Forest department will inform UAs if any additional information is sought from them?**

Ans.UA will receive an email if any additional information is sought by forest department. The same could be viewed by UA by clicking on **Essential Details sought by Forest department** under **My proposals.**

- **Is it possible to see the contact detail of Ministry Nodal Officer for Private Entrepreneur?**

Ans. Yes, List of Nodal Officers is available on the website.

- **Can Private Entrepreneur/UA track the progress of their proposal?**

Ans. Yes, they can see the progress as well as the decisions.

- **Is Captcha code necessary?**

Ans. Yes, due to the Security Guidelines, it is necessary to insert the code at every transaction.

- **Is it mandatory to change the password from default given password?**

Ans. Yes, it is mandatory to change the password on first login after receiving the default password.

- **Is it possible to see the list of all the proposals submitted by UA?**

Ans. Yes, the list of projects considered by PMG is available on the website.

- **Can more than one proposal be added by one user agency?**

Ans. Yes, more than one proposal can be added by one user agency.

Annexure-10

SPECIFIED PROJECT CATEGORIES AS LISTED IN SCHEDULE OF ENVIRONMENT IMPACT ASSESSMENT NOTIFICATION, 2006 (MOEF) REQUIRE PRIOR ENVIRONMENTAL CLEARANCE

Project or Activity		**Category with threshold limit**		**Conditions if any**
		A	**B**	
1		**Mining, extraction of natural resources and power generation (for a specified production capacity)**		
(a) (1)	(2)	(3)	(4)	(5)
1 1(a)	Mining of minerals	≥ 50 ha. of mining lease area Asbestos mining irrespective of mining area	<50 ha ≥ 5 ha .of mining lease area.	General Condition shall apply Note Mineral prospecting (not involving drilling) are exempted provided the concession areas have got previous clearance for physical survey
1(b)	Offshore and onshore oil and gas exploration, development & production	All projects		Note Exploration Surveys (not involving drilling) are exempted provided the concession areas have got previous clearance for physical survey
1(c)	River Valley projects	(i) ≥ 50 MW hydroelectric power generation; (ii) ≥ 10,000 ha. of culturable command area	(i) < 50 MW ≥ 25 MW hydroelectric power generation; (ii) < 10,000 ha. of culturable command area	General Condition shall apply
1(d)	Thermal Power Plants	≥ 500 MW (coal/lignite/naphta & gas based); ≥ 50 MW (Pet coke diesel and all other fuels -)	< 500 MW (coal/lignite/naptha & gas based); <50 MW ≥ 5MW (Pet coke ,diesel and all other	General Condition shall apply

			fuels)	
1(e)	Nuclear power projects and processing of nuclear fuel	All projects	-	
2		**Primary Processing**		
2(a)	Coal washeries	≥ 1 million ton/annum throughput of coal	<1million ton/annum throughput of coal	General Condition shall apply (If located within mining area the proposal shall be appraised together with the mining proposal)
2 (b)	Mineral beneficiation	≥ 0.1million ton/annum mineral throughput	< 0.1million ton/annum mineral throughput	General Condition shall apply (Mining proposal with Mineral beneficiation shall be appraised together for grant of clearance)
3		**Materials Production**		
3(a)	Metallurgical industries (ferrous & non ferrous)	a)Primary metallurgical industry All projects b) Sponge iron manufacturing ≥ 200TPD c)Secondary metallurgical processing industry All toxic and heavy metal producing units ≥ 20,000 tonnes /annum -	 Sponge iron manufacturing <200TPD Secondary metallurgical processing industry i.)All toxic andheavymetal producing units <20,000 tonnes /annum ii.)All other non –toxic secondary metallurgical processing industries >5000 tonnes/annum	 General Condition shall apply for Sponge iron manufacturing

3(b)	Cement plants	≥ 1.0 million tonnes/annum production capacity	<1.0 million tonnes/annum production capacity. All Stand alone grinding units	General Condition shall apply
4		**Materials Processing**		
(1)	(2)	(3)	(4)	(5)
4(a)	Petroleum refining industry	All projects	-	-
4(b)	Coke oven plants	≥2,50,000 tonnes/annum	<2,50,000 & ≥25,000 tonnes/annum	-
4(c)	Asbestos milling and asbestos based products	All projects	-	-
4(d)	Chlor-alkali industry	≥300 TPD production capacityor a unit located out side the notified industrial area/ estate	<300 TPD production capacity and located within a notified industrial area/ estate	Specific Condition shall apply No new Mercury Cell based plants will be permitted and existing units converting to membrane cell technology are exempted from this Notification
4(e)	Soda ash Industry	All projects	-	-
4(f)	Leather/skin/hide processing industry	New projects outside the industrial area or expansion of existing units out side the industrial area	All new or expansion of projects located within a notified industrial area/ estate	Specific condition shall apply
5		**Manufacturing/Fabrication**		
5(a)	Chemical fertilizers	All projects	-	-
5(b)	Pesticides industry and pesticide specific intermediates (excluding formulations)	All units producing technical grade pesticides	-	-
5(c)	Petro-chemical complexes (industries based on processing of petroleum fractions & natural gas and/or	All projects -	-	-

	reforming to aromatics)			
5(d)	Manmade fibres manufacturing	Rayon	Others	General Condition shall apply
5(e)	Petrochemical based processing (processes other than cracking & reformation and not covered under the complexes)	Located out side the notified industrial area/ estate -	Located in a notified industrial area/ estate	Specific Condition shall apply
5(f)	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	Located out side the notified industrial area/ estate	Located in a notified industrial area/ estate	Specific Condition shall apply
5(g)	Distilleries	(i)All Molasses based distilleries (ii) All Cane juice/ non-molasses based distilleries ≥30 KLD	All Cane juice/non-molasses based distilleries – <30 KLD	General Condition shall apply
5(h)	Integrated paint industry	-	All projects	General Condition shall apply
5(i)	Pulp & paper industry excluding manufacturing of paper from waste paper and manufacture of paper from ready pulp with out bleaching	Pulp manufacturing and Pulp& Paper manufacturing industry -	Paper manufacturing industry without pulp manufacturing	General Condition shall apply
5(j)	Sugar Industry	- -	≥ 5000 tcd cane crushing capacity	General Condition shall apply
5(k)	Induction/arc furnaces/cupola furnaces 5TPH or more	- -	All projects	General Condition shall apply

6		**Service Sectors**		
6(a)	Oil & gas transportation pipe line (crude and refinery/ petrochemical products), passing through national parks /sanctuaries/coral reefs /ecologically sensitive areas including LNG Terminal	All projects		-
6(b)	Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	-	All projects	General Condition shall apply
7		**Physical Infrastructure including Environmental Services**		
7(a)	Air ports	All projects	-	-
7(b)	All ship breaking yards including ship breaking units	All projects	-	-
7(c)	Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes.	If at least one industry in the proposed industrial estate falls under the Category A, entire industrial area shall be treated as Category A, irrespective of the area. Industrial estates with area greater than 500 ha. and housing at least one Category B industry.	-Industrial estates housing at least one Category B industry and area <500 ha. Industrial estates of area> 500 ha. and not housing any industry belonging to Category A or B.	Special condition shall apply Note: Industrial Estate of area below 500 ha. and not housing any industry of category A or B does not require clearance.
7(d)	Common hazardous waste	All integrated facilities having incineration	All facilities having land fill only	General Condition shall apply

	treatment, storage and disposal facilities (TSDFs)	&landfill or incineration alone		
7(e)	Ports, Harbours	≥ 5 million TPA of cargo handling capacity (excluding fishing harbours)	< 5 million TPA of cargo handling capacity and/or ports/ harbours ≥10,000 TPA of fish handling capacity	General Condition shall apply
7(f)	Highways	i) New National High ways; and ii) Expansion of National High ways greater than 30 KM, involving additional right of way greater than 20m involving land acquisition and passing through more than one State.	i) New State High ways; and ii) Expansion of National / State Highways greater than 30 km involving additional right of way greater than 20m involving land acquisition.	General Condition shall apply
7(g)	Aerial ropeways		All projects	General Condition shall apply
7(h)	Common Effluent Treatment Plants (CETPs)		All projects	General Condition shall apply
7(i)	Common Municipal Solid Waste Management Facility (CMSWMF)		All projects	General Condition shall apply
8		**Building /Construction projects/Area Development projects and Townships**		
8(a)	Building and Construction projects		≥20000 sq.mtrs and <1,50,000 sq.mtrs. of built-up area#	#(built up area for covered construction; in the case of facilities open to the sky, it will be the activity area)
8(b)	Townships and Area Development projects.		Covering an area ≥ 50 ha and or built up area ≥1,50,000 sq .mtrs ++	++All projects under Item 8(b) shall be appraised as Category B1

Projects requiring Site Clearance from MoEF:

Site clearance from the MoEF is to be obtained in case of the following projects:

- Mining;
- Pit-Head thermal power stations;
- Hydropower, major irrigation projects and/or their combination including flood control;

- Ports and harbours (excluding minor ports);
- Prospecting and exploration of major minerals in areas more that 500 hectares.
- Industrial Estate

For obtaining site clearance, application is to be submitted giving the location of the project along with requisite details, to the MoEF. MoEF will convey its decision about the suitability of the proposed site within a maximum period of 30 days.

Annexure-11

FORM –8 FOR DISPOSAL OF BATTERIES
MINISTRY OF ENVIRONMENT AND FORESTS
NOTIFICATION
New Delhi, the 16th May, 2001

FORM – VIII

[see rule 10 (2)(ii)]

FORM FOR FILING RETURNS OF USED BATTERIES

[To be submitted by the bulk consumer to the State Pollution Control Board (SPCB) by 30th June (for the period October-March) and 31st December (for the period April-September) every year]

1.	Name and address of the bulk consumer	
2.	Name of the Authorised person and full address with telephone and fax number	
3.	Number of new batteries of different categories purchased from the manufacturer / importer / dealer or any other agency during October-March and April-September Category : Automotives Four wheeler Two wheeler Industrial UPS Motive Power Stand-by Others	(i) No. of Batteries (ii) Approximate weight (in Metric Tonnes)
4.	Number or used batteries of categories mentioned in Sl. No. 3 and Tonnage of scrap sent to manufacturer / dealer / importer / registered recycler / or any other agency to whom the used batteries scrap was sent	

Place _____ Signature of the authorised person

Date _____

Enclose list of manufacture / dealer / importer / registered recyclers / or any other agency to whom the used batteries scrap was sent.

Annexure-12

MINISTRY OF ENVIRONMENT AND FORESTS

NOTIFICATION

New Delhi, the 24th September, 2008

S. O. 2265(E).—Whereas the draft rules, namely, the Hazardous Material (Management, Handling and Transboundary Movement) Rules 2007 was published by the Government of India in the Ministry of Environment and Forest vide number S.O.1676(E),dated 28th September,2007 in the Gazette of India, Extraordinary of the same date inviting objection and suggestions from all persons likely to be affected thereby, before the expiry of the period of sixty days from the date on which copies of the Gazette containing the said notification were made available to the public;

AND WHEREAS copies of the said Gazette were made available to the public on the 28th day of September,2007;

AND WHEREAS the objections and suggestions received within the said period from the public in respect of the said draft rules have been duly considered by the Central Government;

NOW, THEREFORE, in exercise of the powers conferred by sections 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Hazardous Wastes (Management and Handling) Rules, 1989, excepts in respect of things done or omitted to be done before such supersession, the Central Government hereby makes the following rules, namely:-

CHAPTER – I
PRELIMINARY

1. Short title and commencement: - (1) These rules may be called the Hazardous Wastes(Management, Handling and Transboundary Movement) Rules, 2008.

(2) They shall come into force on the date of their publication in the official Gazette.

2. Application: - These rules shall apply to the handling of hazardous wastes as specified in Schedules and shall not apply to -

(a) waste-water and exhaust gases as covered under the provisions of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974) and the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder;

(b) wastes arising out of the operation from ships beyond five kilometres of the relevant baseline as covered under the provisions of the Merchant Shipping Act, 1958 (44 of 1958) and the rules made thereunder;

(c) radio-active wastes as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and the rules made thereunder;

(d) bio-medical wastes covered under the Bio-Medical Wastes (Management and Handling) Rules, 1998 made under the Act; and

(e) wastes covered under the Municipal Solid Wastes (Management and Handling) Rules, 2000 made under the Act;

3. Definitions: - (1) In these rules, unless the context otherwise requires, -

(a) "Act" means the Environment (Protection) Act, 1986 (29 of 1986);

(b)"authorisation" means permission for generation, handling, collection, reception, treatment, transport, storage, recycling, reprocessing, recovery, reuse and disposal of hazardous wastes granted under sub-rule (4) of rule 5;

(c) "Basel Convention" is the United Nations Environment Programme Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal;

(d) "Central Pollution Control Board" means the Central Pollution Control Board constituted under sub-section (1) of section 3 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974);

(e) "disposal" means any operation which does not lead to recycling, recovery or reuse and includes physico chemical, biological treatment, incineration and disposal in secured landfill;

(f) "export" with its grammatical variations and cognate expressions, means taking out of India to a place outside India;

(g) "exporter" means any person under the jurisdiction of the exporting country who exports hazardous waste including the country, which exports hazardous waste;

(h) "environmentally sound management of hazardous wastes" means taking all steps required to ensure that the hazardous wastes are managed in a manner which shall protect health and the environment against the adverse effects which may result from such waste;

(i) "environmentally sound technologies" means any technology approved by the Central Government from time to time;

(j) "facility" means any establishment wherein the processes incidental to the handling, collection, reception, treatment, storage, recycling, recovery, reuse and disposal of hazardous wastes are carried out;

(k) "Form" means a form appended to these rules;

(l) "hazardous waste" means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include –

(i) waste specified under column (3) of Schedule-I,

(ii) wastes having constituents specified in Schedule-II if their concentration is equal to or more than the limit indicated in the said Schedule, and

(iii) wastes specified in Part A or Part B of the Schedule-III in respect of import or export of such wastes in accordance with rules 12,13 and 14 or the wastes other than those specified in Part A or Part B if they possess any of the hazardous characteristics specified in Part C of that Schedule;

(m) "hazardous waste site" means a place of collection, reception, treatment, storage of hazardous wastes and its disposal to the environment which is approved by the competent authority;

(n) "import" with its grammatical variations and cognate expressions, means bringing into India from a place outside India;

(o) "importer" means an occupier or any person who imports hazardous waste;

(p) "manifest" means transporting document prepared and signed by the occupier or his representative authorized in accordance with the provisions of these rules.

(q) "occupier" in relation to any factory or premises, means a person who has, control over the affairs of the factory or the premises and includes in relation to any hazardous waste the person in possession of the hazardous waste;

(r) "operator of disposal facility" means a person who owns or operates a facility for collection, reception, treatment, storage or disposal of hazardous wastes;

(s) "recycler or reprocessor or actual user " means an occupier who procures and processes hazardous waste for recycling or recovery or re-use;

(t) "recycling" means reclamation and reprocessing of hazardous waste in an environmentally sound manner for the original purpose or for other purposes;

(u) "reuse" means use of hazardous waste for the purpose of its original use or other use;

(v) "recovery" means any operation in the recycling activity wherein specific materials are recovered;

(w) "Schedule" means a Schedule appended to these rules;

(x) "State Government" in relation to a Union territory means, the Administrator thereof appointed under article 239 of the Constitution;

(y) "State Pollution Control Board means the State Pollution Control Board or the Pollution Control Committee constituted under sub-section (1) of section 4 of the Water(Prevention and Control of Pollution) Act, 1974 (6 of 1974);

(z) "storage" means storing any hazardous waste for a temporary period, at the end of which such waste is processed or disposed of;

(za) "transboundary movement" means any movement of hazardous wastes from an area under the jurisdiction of one country to or through an area under the jurisdiction of another country or to or through an area not under the jurisdiction of any country, provided at least two countries are involved in the movement;

(zb) "transport" means off-site movement of hazardous wastes by air, rail, road or water;

(zc) "transporter" means a person engaged in the off-site transportation of hazardous waste by air, rail, road or water;

(zd) "treatment" means a method, technique or process, designed to modify the physical, chemical or biological characteristics or composition of any hazardous waste so as to reduce its potential to cause harm;

(ze) "used oil" means any oil -

(a) derived from crude oil or mixtures containing synthetic oil including used engine oil, gear oil, hydraulic oil, turbine oil, compressor oil, industrial gear oil, heat transfer oil, transformer oil, spent oil and their tank bottom sludges; and
(b) suitable for reprocessing, if it meets the specification laid down in Part-A of Schedule -V but does not include waste oil;

(zf) "waste oil" means any oil which includes spills of crude oil, emulsions, tank bottom sludge and slop oil generated from petroleum refineries, installations or ships and can be used as fuel in furnaces for energy recovery, if it meets the specifications laid down in Part – B of Schedule-5 either as such or after reprocessing.

Words and expressions used in these rules and not defined but defined in the Act shall have the meanings respectively assigned to them in the Act.

CHAPTER II
PROCEDURE FOR HANDLING HAZARDOUS WASTES

4. Responsibilities of the occupier for handling of hazardous wastes.–

(1) The occupier shall be responsible for safe and environmentally sound handling of hazardous wastes generated in his establishment.

(2) The hazardous wastes generated in the establishment of an occupier shall be sent or sold to a recycler or re-processor or re-user registered or authorized under these rules or shall be disposed of in an authorized disposal facility.

(3) The hazardous wastes transported from an occupier's establishment to a recycler for recycling or reuse or reprocessing or to an authorized facility for disposal shall be transported in accordance with the provisions of these rules.

(4) The occupier or any other person acting on his behalf who intends to get his hazardous wastes treated and disposed of by the operator of a Treatment, Storage and Disposal Facility shall give to the operator of a facility, such information as may be determined by the State Pollution Control Board.

(5) The occupier shall take all adequate steps while handling hazardous wastes to:

(i) contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and

(ii) provide persons working on the site with the training, equipment and the information necessary to ensure their safety.

5. Grant of authorization for handling hazardous wastes.

(1) Every person who is engaged in generation, processing, treatment, package, storage, transportation, use, collection, destruction, conversion, offering for sale, transfer or the like of the hazardous waste shall require to obtain an authorization from the State Pollution Control Board.

(2) The hazardous waste shall be collected, treated, re-cycled, re-processed, stored or disposed of only in such facilities as may be authorized by the State Pollution Control Board for the purpose.

(3) Every person engaged in generation, processing, treatment, package, storage, transportation, use, collection, destruction, conversion, offering for sale, transfer or the like of the hazardous waste or occupier of the facility shall make an application in **Form 1** to the State Pollution Control Board for authorization within a period of sixty days from the date of commencement of these rules:

Provided that any person authorized under the provisions of the Hazardous Waste (Management and Handling) Rules , 1989, prior to the date of coming into force of these rules, shall not require to make an application for authorization till the period of expiry of such authorization.

(4) On receipt of the application complete in all respects for the authorization, the State Pollution Control Board may, after such inquiry as it considers necessary and on being satisfied that the applicant possesses appropriate facilities, technical capabilities and equipment to handle hazardous waste safely, grant within a period of one hundred and twenty days an authorization in **Form 2** to the applicant which shall be valid for a period of five years and shall be subject to such conditions as may be laid down therein.

(5) The State Pollution Control Board may after giving reasonable opportunity of being heard to the applicant refuse to grant any authorization.

(6) Every person authorized under these rules shall maintain the record of hazardous wastes handled by him in **Form 3** and prepare and submit to the State Pollution Control Board, an annual return containing the details specified in **Form 4** on or before the 30th day of June following to the financial year to which that return relates.

(7) An application for the renewal of an authorization shall be made in **Form 1**, before its expiry and the State Pollution Control Board may renew the authorization after examining each case on merit subject to the condition that there has been no report of violation of the provisions of the Act or the rules made thereunder or conditions specified in the authorization.

(8)The occupier or operator of the facility shall take all the steps, wherever required, for reduction and prevention of the waste generated or for recycling or reuse and comply the conditions specified in the authorization.

(9) The State Pollution Control Board shall maintain a register containing particulars of the conditions imposed under these rules for management of hazardous waste, and it shall be open for inspection during office hours to any person interested or affected or a person authorized by him on his behalf.

6. Power to suspend or cancel an authorization.

(1) The State Pollution Control Board, may, if in its opinion the holder of the authorization has failed to comply with any of the conditions of the authorization or with any provisions of the Act or these rules and after giving him a reasonable opportunity of being heard and after recording reasons thereof in writing cancel or suspend the authorization issued under rule – 4 for such period as it considers necessary in the public interest.

(2) Upon suspension or cancellation of the authorization the State Pollution Control Board may give directions to the person whose authorization has been suspended or cancelled for the safe storage of the hazardous wastes, and such person shall comply with such directions.

7. Storage of Hazardous Waste.

(1) The occupiers, recyclers, re-processors, re-users, and operators of facilities may store the hazardous wastes for a period not exceeding ninety days and shall maintain a record of sale, transfer, storage, recycling and reprocessing of such wastes and make these records available for inspection:
Provided that the State Pollution Control Board may extend the said period in following cases, namely:-

(i) small generators up to ten tones per annum;
(ii) recyclers, re-processors and facility operators up to six months of their annual capacity;
(iii) generators who do not have access to any Treatment, Storage, Disposal Facility in the concerned State; or
(iv) the waste which needs to be specifically stored for development of a process for its recycling, reuse.

CHAPTER – III

PROCEDURE FOR RECYCLING , REPROCESSING OR REUSE OF HAZARDOUS WASTES

8. Procedure for grant of registration :

(1) Every person desirous of recycling or reprocessing the hazardous waste specified in Schedule –IV may make an application in **Form 5** accompanied with a copy each of the following documents for the grant or renewal of the registration:-

(a) consent to establish granted by the State Pollution Control Board under the Water (Prevention and Control of Pollution) Act, 1974 (25 of 1974) and the Air (Prevention and Control of Pollution) Act, 1981(21 of 1981);

(b) certificate of registration issued by the District Industries Centre or any other government agency authorised in this regard;

(c) proof of installed capacity of plant and machinery issued by the District Industries Centre or any other government agency authorised in this behalf; and

(d) in case of renewal, certificate of compliance of effluent, emission standards and treatment and disposal of hazardous wastes, as applicable, from the State Pollution Control Board or the Concerned Zonal Office of Central Pollution Control Board.

(2) The Central Pollution Control Board, on being satisfied that the applicant is utilizing environmentally sound technologies and possesses adequate technical capabilities, requisite facilities, and equipment to recycle, reprocess or reuse hazardous wastes, may grant registration to such applicants stipulating therein necessary conditions for carrying out safe operations in the authorized place only.

(3) The Central Pollution Control Board shall dispose of the application for registration within a period of one hundred twenty days from the date of the receipt of such application complete in all respects.

(4) The registration, issued under sub-rule (2) shall be valid for a period of five years from the date of its issue, unless the operation is discontinued by the unit or the registration is suspended or cancelled by the Central Pollution Control Board.

(5) The Central Pollution Control Board may cancel or suspend the registration granted under these rules, if it has reasons to believe that the recycler or re-processor has failed to comply with any of the conditions of the registration, or with any provision of the Act or rules made thereunder.

(6) The Central Pollution Control Board may after giving a reasonable opportunity of being heard to the applicant, by order, refuse to grant or renew the registration.

(7) The recycler or re-processor shall maintain records of hazardous wastes purchased and processed and shall file an annual return of its activities of previous year in Form 6 to the State Pollution Control Board, on or before the 30th day of June of every year.

9. Conditions for sale or transfer of Hazardous Wastes for recycling.-

The occupier generating the hazardous wastes specified in Schedule-IV may sell it only to the recycler having a valid registration from the Central Pollution Control Board for recycling or recovery.

10. Standards for recycling.-

The Central Government and Central Pollution Control Board may issue the guidelines for standards of performance for recycling processes from time to time.

11. Utilization of hazardous wastes.-

The utilisation of hazardous wastes as a supplementary resource or for energy recovery, or after processing shall be carried out by the units only after obtaining approval from the Central Pollution Control Board.

CHAPTER IV
IMPORT AND EXPORT OF HAZARDOUS WASTES

12. Import and export (transboundary movement) of hazardous wastes.-

The Ministry of Environment and Forests shall be the nodal Ministry to deal with the trans-boundary movement of the hazardous wastes and to grant permission for transit of the hazardous wastes through any part of India.

13. Import and export of hazardous wastes. –

(1) No import of the hazardous wastes from any country to India for disposal shall be permitted.

(2) The import of Hazardous Waste from any country shall be permitted only for the recycling or recovery or reuse.

(3) The export of hazardous wastes from India may be allowed to an actual user of the wastes or operator of a disposal facility with the Prior Informed Consent of the importing country to ensure environmentally sound management of the hazardous waste in question.

(4) No import or export of the hazardous wastes specified in Schedule –VI shall be permitted.

14. Import or export of Hazardous Waste for recycling, recovery and reuses.-

(1) The import and export of the hazardous wastes specified in Schedule – III, shall be regulated in accordance with the conditions laid down in the said schedule:

(2) Subject to the provisions contained in sub-rule (1), -

(i) the import or export of the Hazardous wastes specified in Part A of Schedule – III shall require Prior Informed Consent of the country from where it is imported or exported to, and shall require the license from the Directorate General of Foreign Trade and the prior written permission of the Central Government;

(ii) the import of the hazardous wastes specified in Part B of Schedule III shall not require Prior Informed Consent of the country from where it is imported;.

(iii) the import and export of the hazardous wastes not specified in Part A and Part B of Schedule III but having the hazardous characteristics outlined in Part C of the said Schedule shall require the prior written permission of the Central Government, before it is imported into or exported from India, as the case may be.

15. Procedure for export of Hazardous Wastes from India.–

(1) Any person intending to export hazardous wastes specified in Schedule-III shall apply in **Form 7** and **Form 8** along with full cover insurance policy for consignment to the Central Government for the proposed transboundary movement of the hazardous wastes together with the Prior Informed Consent in writing from the importing country.

(2) On receipt of such application, the Central Government may give a 'No Objection Certificate' for the proposed export within a period of sixty days from the date of submission of the application and may impose conditions as it may consider necessary.

(3) The Central Government, shall forward a copy of the 'No Objection Certificate' granted under sub-rule (2), to the Central Pollution Control Board, the concerned State Pollution Control Board and the concerned Port and Customs authorities for ensuring compliance of the conditions, if any, of the export and to take appropriate steps for the safe handling of the waste shipment.

(4) The exporter shall ensure that no consignment is shipped before the 'No Objection Certificate' is received from the importing country.

(5) The exporter shall also ensure that the shipment is accompanied with the Movement Document in **Form 9.**

(6) The exporter shall inform the Ministry of Environment and Forest upon completion of the trans-boundary movement.

(7) The exporter of the hazardous wastes shall maintain the records of the hazardous wastes exported by him in **Form 10** and the record so maintained shall be available for inspection..

16. **Procedure for import of Hazardous Waste –**

(1) A person intending to import or transit for trans-boundary movement of hazardous wastes specified in Schedule-III shall apply in **Form 7** and **Form 8** to the Central Government of the proposed import wherever applicable, together with the Prior Informed Consent, which ever applicable and shall send a copy of the application, simultaneously, to the concerned State Pollution Control Board to enable them to send their comments and observations, if any, to the Ministry of Environment and Forests within a period of thirty days.

(2) On receipt of the application in complete, the Ministry of Environment and Forests shall examine the application considering the comments and observations, if any, received from the State Pollution Control Boards, and may grant the permission for import within a period of sixty days subject to the condition that the importer has -

(i) the environmentally sound recycling, recovery or reuse facilities;
(ii) adequate facilities and arrangement for treatment and disposal of wastes generated; and
(iii) a valid registration from the Central Pollution Control Board and a proof of being an actual user, if required under these rules.

(3) The Ministry of Environment and Forests shall forward a copy of the permission granted under sub-rule (2) to the Central Pollution Control Board, the concerned State Pollution Control Board and the concerned Port and Customs authorities for ensuring compliance of the conditions of imports and safe handling of the hazardous waste.

(4) The Ministry of Environment and Forests shall communicate the permission to the importer.

(5) The Port and Customs authorities shall ensure that shipment is accompanied by the Movement Document in **Form 9** and the test report of analysis of the hazardous waste consignment in question, from a laboratory accredited by the exporting country.

(6) The Customs authority shall collect three randomly drawn samples of the consignment (prior to clearing the consignment as per the provisions laid down under the Customs Act, 1962) for analysis and retain the report for a period of two years, in order to ensure that in the event of any dispute, as to whether the consignment conforms or not to the declaration made in the application and Movement Document.

(7) The importer of the hazardous waste shall maintain records of the hazardous waste imported by him in **Form 10** and the record so maintained shall be available for inspection.

(8) The importer shall also inform the concerned State Pollution Control Board and the Central Pollution Control Board, the date and time of the arrival of the consignment of the hazardous waste ten days in advance.

17. **Illegal Traffic.–**

(1) The export and import of hazardous wastes from and into India shall be deemed illegal if-

(i) it is without permission of the Central Government in accordance with these rules, or

(ii) the permission has been obtained through falsification, mis-representation or fraud; or

(iii) it does not conform to the shipping details provided in the movement documents; or

(iv) it results in deliberate disposal (i.e., dumping) of hazardous wastes in contravention of the Basel Convention and of general principles of International or National Law.

(2). In case of illegal import of the hazardous wastes, the importer shall re-export the waste in question at his cost within a period of ninety days from the date of its arrival into India and its implementation will be ensured by the concerned State Pollution Control Board.

CHAPTER – V

TREATMENT, STORAGE AND DISPOSAL FACILITY FOR HAZARDOUS WASTES

18. **Treatment, Storage and Disposal Facility for hazardous wastes.-**

(1) The State Government, occupier, operator of a facility or any association of occupiers shall individually or jointly or severally be responsible for, and identify sites for establishing the facility for treatment, storage and disposal of the hazardous wastes in the State.

(2) The operator of common facility or occupier of a captive facility, shall design and set up the Treatment, Storage and Disposal Facility as per technical guidelines issued by the Central Pollution Control Board in this regard from time to time and shall obtain approval from the State Pollution Control Board for design and layout in this regard from time to time.

(3) The State Pollution Control Board shall monitor the setting up and operation of the Treatment, Storage and Disposal Facilities regularly.

(4) The operator of the Treatment, Storage and Disposal Facility shall be responsible for safe and environmentally sound operation of the Treatment, the Storage and Disposal Facility and its closure and post closure phase, as per guidelines issued by the Central Pollution Control Board from time to time.

(5) The operator of the Treatment, Storage and Disposal Facility shall maintain records of hazardous wastes handled by him in **Form 10.**

CHAPTER – VI

PACKAGING, LABELLING, AND TRANSPORT OF HAZARDOUS WASTE .

19. Packaging and labeling.-

(1) The occupier or operator of the Treatment, Storage and Disposal Facility or recycler shall ensure that the hazardous waste are packaged and labeled, based on the composition in a manner suitable for safe handling, storage and transport as per the guidelines issued by the Central Pollution Control Board from time to time.

(2) The labeling and packaging shall be easily visible and be able to withstand physical conditions and climatic factors.

20. Transportation of Hazardous waste.-

(1) The transport of the hazardous wastes shall be in accordance with the provisions of these rules and the rules made by the Central Government under the Motor Vehicles Act, 1988 and other guidelines issued from time to time in this regard.

(2) The occupier shall provide the transporter with the relevant information in **Form 11,** regarding the hazardous nature of the wastes and measures to be taken in case of an emergency and shall mark the hazardous wastes containers as per **Form 12.**

(3) In case of transport of hazardous wastes for final disposal to a facility for treatment, storage and disposal existing in a State other than the State where the hazardous waste is generated, the occupier shall obtain 'No Objection Certificate' from the State Pollution Control Board of both the States.

(4) In case of transportation of hazardous wastes through a State other than the State of origin or destination, the occupier shall intimate the concerned State Pollution Control Boards before he hands over the hazardous wastes to the transporter.

21. Manifest system (Movement Document to be used within the country only).-

(1) The occupier shall prepare six copies of the manifest in **Form 13** comprising of colour code indicated below and all six copies shall be signed by the transporter:

Copy number with colour code (1)	Purpose (2)
Copy 1 (White)	To be forwarded by the occupier to the State Pollution Control Board or Committee.
Copy 2 (Yellow)	To be carried by the occupier after taking signature on it form the transporter and the rest of the four copies to be carried by the transporter.
Copy 3 (pink)	To be retained by the operator of the facility after signature.
Copy 4 (orange)	To be returned to the transporter by the operator of facility/recycler after accepting waste.
Copy5(green)	To be returned by the operator of the facility to State Pollution Control Board/Committee after treatment and disposal of wastes.
Copy6(blue)	To be returned by the operator of the facility to the occupier after treatment and disposal of hazardous materials/wastes.

(2) The occupier shall forward copy 1 (white) to the State Pollution Control Board, and in case the hazardous wastes is likely to be transported through any transit State, the occupier shall prepare an additional copy each for intimation to such State and forward the same to the concerned State Pollution Control Board before he hands over the hazardous wastes to the transporter.

(3) No transporter shall accept hazardous wastes from an occupier for transport unless it is accompanied by copies 3 to 6 of the manifest.

(4) The transporter shall submit copies 3 to 6 of the manifest duly signed with date to the operator of the facility along with the waste consignment.

(5) Operator of the facility upon completion of treatment and disposal operations of the hazardous wastes shall forward copy 5 (green) to the State Pollution Control Board and copy 6 (blue) to the occupier and the copy 3 (pink) shall be retained by the operator of the facility.

CHAPTER VII
MISCELLANIOUS

22. Records and returns.-

(1) The occupier generating hazardous wastes and operator of the facility for disposal of hazardous waste shall maintain records of such operations in **Form 3.**

(2) The occupier and operator of a facility shall send annual returns to the State Pollution Control Board in **Form 4.**

(3) The State Pollution Control Board shall prepare an inventory of the hazardous wastes within its jurisdiction and compile other related information like recycling of the hazardous wastes and treatment and disposal of the hazardous wastes based on the returns filed by respective occupier and operator of the facility .

23. Responsibility of Authorities.-The Authority specified in column 2 of the Schedule VII shall perform the duties as specified in column 3 of the Schedule subject to the provisions of these rules.

24. Accident reporting and follow-up.- Where an accident occurs at the facility or on a hazardous waste site or during transportation of the hazardous waste, the occupier or operator of the facility or the transporter, as the case may be, shall report immediately to the State Pollution Control Board about the accident in **Form14.**

25. Liability of occupier, transporter, operator of a facility and importer.-

(1) The occupier, importer, transporter and operator of the facility shall be liable for all damages caused to the environment or third party due to improper handling of the hazardous wastes or disposal of the hazardous wastes.

(2) The occupier and the operator of the facility shall be liable to pay financial penalties as levied for any violation of the provisions under these rules by the State Pollution Control Board with the prior approval of the Central Pollution Control Board.

26. Appeal. –

(1) Any person aggrieved by an order of suspension or cancellation or refusal of authorization or its renewal passed by the State Pollution Control Board, may, within a period of thirty days from the date on which the order is communicated to him, prefer an appeal in **Form 15** to the Appellate Authority comprising of the Environment Secretary of the State.

(2) Any person aggrieved by an order of suspension or cancellation or refusal of registration or its renewal passed by the Central Pollution Control Board, may, within a period of thirty days from the date on which the order is communicated to him, prefer an appeal in **Form 15** to the Appellate Authority comprising of the Secretary, to the Government of India in the Ministry of Environment and Forests.

(3) The Appellate Authority may entertain the appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

(4) Every appeal filed under this rule shall be disposed of within a period of sixty days from the date of its filing.

Schedule 1

[See rules 3 (l)]

List of processes generating hazardous wastes

S.No.	Processes	Hazardous Waste *
1.	Petrochemical processes and pyrolytic operations	1.1 Furnace/reactor residue and debris 1.2 Tarry residues 1.3 Oily sludge emulsion 1.4 Organic residues 1.5 Residues from alkali wash of fuels 1.6 Still bottoms from distillation process 1.7 Spent catalyst and molecular sieves 1.8 Slop oil from wastewater
2.	Drilling operation for oil and gas production	2.1 Drill cuttings containing oil 2.2 Sludge containing oil 2.3 Drilling mud and other drilling wastes

3.	Cleaning, emptying and maintenance of petroleum oil storage tanks including ships	3.1 Oil-containing cargo residue, washing water and sludge 3.2 Chemical-containing cargo residue and sludge 3.3 Sludge and filters contaminated with oil 3.4 Ballast water containing oil from ships.
4.	Petroleum refining/re-processing of used oil/recycling of waste oil	4.1 Oily sludge/emulsion 4.2 Spent catalyst 4.3 Slop oil 4.4 Organic residues from process 4.5 Spent clay containing oil
5.	Industrial operations using mineral/synthetic oil as lubricant in hydraulic systems or other applications	5.1 Used/spent oil 5.2 Wastes/residues containing oil
6.	Secondary production and/or industrial use of zinc	6.1 Sludge and filter press cake arising out of production of Zinc Sulphate and other Zinc Compounds. 6.2 Zinc fines/dust/ash/skimmings (dispersible form) 6.3 Other residues from processing of zinc ash/skimmings 6.4 Flue gas dust and other particulates
7.	Primary production of zinc/lead/copper and other non-ferrous metals except aluminium	7.1 Flue gas dust from roasting 7.2 Process residues 7.3 Arsenic-bearing sludge 7.4 Non ferrous metal bearing sludge and residue. 7.5 Sludge from scrubbers
8.	Secondary production of copper	8.1 Spent electrolytic solutions 8.2 Sludges and filter cakes 8.3 Flue gas dust and other particulates
9.	Secondary production of lead	9.1 Lead bearing residues 9.2 Lead ash/particulate from flue gas
10.	Production and/or industrial use of cadmium and arsenic and their compounds	10.1 Residues containing cadmium and arsenic

11.	Production of primary and secondary aluminium	11.1. Sludges from off-gas treatment 11.2. Cathode residues including pot lining wastes 11.3. Tar containing wastes 11.4. Flue gas dust and other particulates 11.5. Wastes from treatment of salt slags and black drosses
12.	Metal surface treatment, such as etching, staining, polishing, galvanising, cleaning, degreasing, plating, etc.	12.1 Acid residues 12.2 Alkali residues 12.3 Spent bath/sludge containing sulphide, cyanide and toxic metals 12.4 Sludge from bath containing organic solvents 12.5 Phosphate sludge 12.6 Sludge from staining bath 12.7 Copper etching residues 12.8 Plating metal sludge
13.	Production of iron and steel including other ferrous alloys (electric furnaces; steel rolling and finishing mills; Coke oven and by product plant)	13.1 Sludge from acid recovery unit 13.2 Benzol acid sludge 13.3 Decanter tank tar sludge 13.4 Tar storage tank residue
14.	Hardening of steel	14.1 Cyanide-, nitrate-, or nitrite-containing sludge 14.2 Spent hardening salt
15.	Production of asbestos or asbestos-containing materials	15.1 Asbestos-containing residues 15.2 Discarded asbestos 15.3 Dust/particulates from exhaust gas treatment.
16.	Production of caustic soda and chlorine	16.1 Mercury bearing sludge 16.2 Residue/sludges and filter cakes 16.3 Brine sludge containing mercury
17.	Production of mineral acids	17.1 Residues, dusts or filter cakes 17.2 Spent catalyst
18.	Production of nitrogenous and complex fertilizers	18.1 Spent catalyst 18.2 Spent carbon 18.3 Sludge/residue containing arsenic 18.4 Chromium sludge from water cooling tower
19.	Production of phenol	19.1 Residue/sludge containing phenol

20.	Production and/or industrial use of solvents	20.1 Contaminated aromatic, aliphatic or napthenic solvents may or may not be fit for reuse. 20.2 Spent solvents 20.3 Distillation residues
21.	Production and/or industrial use of paints, pigments, lacquers, varnishes, plastics and inks	21.1 Process wastes, residues & sludges 21.2 Fillers residues
22.	Production of plastic raw materials	22.1 Residues of additives used in plastics manufacture like dyestuffs, stabilizers, flame retardants, etc. 22.2 Residues and waste of platicisers 22.3 Residues from vinylchloride monomer production 22.4 Residues from acrylonitrile production 22.5 Non-polymerised residues
23.	Production and/or industrial use of glues, cements, adhesive and resins	23.1 Wastes/residues (not made with vegetable or animal materials)
24.	Production of canvas and textiles	24.1 Chemical residues
25.	Industrial production and formulation of wood preservatives	25.1 Chemical residues 25.2 Residues from wood alkali bath
26.	Production or industrial use of synthetic dyes, dye-intermediates and pigments	26.1 Process waste sludge/residues containing acid or other toxic metals or organic complexes 26.2 Dust from air filtration system
27.	Production of organo-silicone compounds	27.1 process residues
28.	Production/formulation of drugs/ pharmaceuticals & health care product	28.1. Process Residues and wastes 28.2 Spent catalyst / spent carbon 28.3 Off specification products 28.4 Date-expired, discarded and off-specification drugs/ medicines 28.5. Spent organic solvents
29.	Production, and formulation of pesticides including stock-piles	29.1 Process wastes/residues 29.2 Chemical sludge containing residue pesticides 29.3 Date-expired and off-specification pesticides

30.	Leather tanneries	30.1 Chromium bearing residues and sludges
31.	Electronic Industry	31.1 Process residues and wastes 31.2 Spent etching chemicals and solvents
32.	Pulp & Paper Industry	32.1 Spent chemicals 32.2 Corrosive wastes arising from use of strong acid and bases 32.3 Process sludge containing adsorbable organic halides [AOx]
33.	Disposal of barrels / containers used for handling of hazardous wastes / chemicals	33.1 Chemical-containing residue arising from decontamination. 33.2 Sludge from treatment of waste water arising out of cleaning / disposal of barrels / containers 33.3 Discarded containers / barrels / liners contaminated with hazardous wastes/chemicals
34.	Purification and treatment of exhaust air, water & waste water from the processes in this schedule and common industrial effluent treatment plants (CETP's)	34.1 Flue gas cleaning residue 34.2 Spent ion exchange resin containing toxic metals 34.3 Chemical sludge from waste water treatment 34.4 Oil and grease skimming residues 34.5 Chromium sludge from cooling water
35.	Purification process for organic compounds/solvents	35.1 Filters and filter material which have organic liquids in them, e.g. mineral oil, synthetic oil and organic chlorine compounds 35.2 Spent catalyst 35.3 Spent carbon
36.	Hazardous waste treatment processes, e.g. incineration, distillation, separation and concentration techniques	36.1 Sludge from wet scrubbers 36.2 Ash from incineration of hazardous waste, flue gas cleaning residues 36.3 Spent acid from batteries 36.4 Distillation residues from contaminated organic solvents

* **The inclusion of wastes contained in this Schedule does not preclude the use of Schedule 2 to demonstrate that the waste is not hazardous. In case of dispute, the matter would be referred to the Technical Review Committee constituted by MoEF.**

Note: *The high volume low effect wastes such as fly ash, phosphogypsum, red mud, slags from pyrometallurgical operations, mine tailings and ore beneficiation rejects are excluded from the category of hazardous wastes. Separate guidelines on the management of these wastes shall be issued by CPCB.*

Schedule II

[*See* rule 3(l)]

List of Waste Constituents with Concentration Limits*

Class A

Concentration limit: □ 50 mg/kg

A1 Antimony and antimony compounds
A2 Arsenic and arsenic compounds
A3 Beryllium and beryllium compounds
A4 Cadmium and cadmium compounds
A5 Chromium (VI) compounds
A6 Mercury and mercury compounds
A7 Selenium and selenium compounds
A8 Tellurium and tellurium compounds
A9 Thallium and thallium compounds
A10 Inorganic cyanide compounds
A11 Metal carbonyls
A12 Napthalene
A13 Anthracene
A14 Phenanthrene
A15 Chrysene, benzo (a) anthracene, fluoranthene, benzo (a) pyrene, benzo (K) fluoranthene, indeno (1, 2, 3-cd) pyrene and benzo (ghi) perylene
A16 halogenated compounds of aromatic rings, e.g. polychlorinated biphenyls, polychloroterphenyls and their derivatives
A17 Halogenated aromatic compounds
A18 Benzene
A19 Organo-chlorine pesticides
A20 Organo-tin Compounds

Class B

Concentration limit: □ 5, 000 mg/kg

B1 Chromium (III) compounds
B2 Cobalt compounds
B3 Copper compounds
B4 Lead and lead compounds
B5 Molybdenum compounds
B6 Nickel compounds
B7 Inorganic Tin compounds
B8 Vanadium compounds
B9 Tungsten compounds
B10 Silver compounds
B11 Halogenated aliphatic compounds
B12 Organo phosphorus compounds

B13 Organic peroxides
B14 Organic nitro-and nitroso-compounds
B15 Organic azo-and azooxy compounds
B16 Nitriles
B17 Amines
B18 (Iso-and thio-) cyanates
B19 Phenol and phenolic compounds
B20 Mercaptans
B21 Asbestos
B22 Halogen-silanes
B23 Hydrazine (s)
B24 Flourine
B25 Chlorine
B26 Bromine
B27 White and red phosphorus
B28 Ferro-silicate and alloys
B29 Manganese-silicate
B30 Halogen-containing compounds which produce acidic vapours on contact with humid air or water, e.g. silicon tetrachloride, aluminium chloride, titanium tetrachloride

Class C
Concentration limit; □ 20, 000 mg/kg

C1 Ammonia and ammonium compounds
C2 Inorganic peroxides
C3 Barium compounds except barium sulphate
C4 Fluorine compounds
C5 Phosphate compounds except phosphates of aluminium, calcium and iron
C6 Bromates, (hypo-bromites)
C7 Chlorates, (hypo-chlorites) ,
C8 Aromatic compounds other than those listed under A12 to A18
C9 Organic silicone compounds
C10 Organic sulphur compounds
C11 Iodates
C12 Nitrates, nitrites
C13 Sulphides
C14 Zinc compounds
C15 Salts of per-acids
C16 Acid amides
C17 Acid anhydrides

Class D
Concentration limit: □ 50, 000 mg/kg

D1 Total Sulphur
D2 Inorganic acids

D3 Metal hydrogen sulphates
D4 Oxides and hydroxides except those of hydrogen, carbon, silicon, iron, aluminum, titanium, manganese, magnesium, calcium
D5 Total hydrocarbons other than those listed under A12 to A18
D6 Organic oxygen compounds
D7 Organic nitrogen compounds expressed as nitrogen
D8 Nitrides
D9 Hydrides

Class E

Regardless of concentration limit, Classified as hazardous wastes if the waste exhibits any of the following Characteristics.

E1 Flammable
Flammable wastes with flash point 65.6°c or below.

E2 Explosive
Wastes which may explode under the effect of flame, heat or photochemical conditions. Any other waste of explosive materials included in the Indian Explosive Act.

E3 Corrosive
Wastes which may be corrosive, by chemical action, will cause severe damage when in contact with living tissue.

E4 Toxic
Wastes containing or contaminated with established toxic and or eco- toxic constituents.

E5 Carcinogenicity, Mutagenecity and Endocrine disruptivity
Wastes contaminated or containing established carcinogens, mutagens and endocrine disruptors.

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*Waste constituents and their concentration limits given in this list are based on erstwhile BAGA (the Netherlands Environment Protection Agency) List of Hazardous Substances. In order to decide whether specific wastes listed above is hazardous or not, following points be taken into consideration:

(i) If a component of the waste appears in one of the five risk classes listed above (A,B,C,D or E) and the concentration of the component is equal to or more than the limit for the relevant risks class, the material is then classified as hazardous waste.
(ii) If a chemical compound containing a hazardous constituent is present in the waste, the concentration limit does not apply to the compound, but only to the hazardous constituent itself.
(iii) If multiple hazardous constituents from the same class are present in the waste, the concentrations are added together.
(iv) If multiple hazardous constituents from different classes are present in the waste, the lowest concentration limit corresponding to the constituent(s) applies.
(v) For determining the concentration of the hazardous constituents in the waste "Toxicity Characteristics Leaching Procedure (TCLP) as per ASTM-D5233-92 should be adopted.

Schedule III

[*See* rules 3(l),14(1),14(2) (i) ,(iii) and 15(1)]

PART A

Part A: List of Hazardous Wastes Applicable for Import with Prior Informed Consent [Annexure VIII of the Basel Convention*]

Basel No.	Description of Hazardous Wastes
AI	**Metal and Metal bearing wastes**
A1010	Metal wastes and waste consisting of alloys of any of the following
	- Antimony
	- Cadmium
	- Tellurium - Lead
A1020	Waste having as constituents or contaminants, excluding metal wastes in massive form as listed in B1020, any of the following:
	- Cadmium, cadmium compounds.
	- Antimony, antimony compounds.
	- Tellurium, tellurium compounds.
	- Lead, lead compounds.
A1040	Wastes having metal carbonyls as constituents
A1050	Galvanic sludges
A1060	Wastes Liquors from the pickling of metals.
A1070	Leaching residues from zinc processing, dusts and sludges such as jarosite, hematite etc.,
A1080	Waste Zinc residues not included on list B containing lead and cadmium in concentrations sufficient to exhibit hazard characteristics indicated in Part C of Schedule - 3
A1090	Ashes from the incineration of insulated copper wire
A1100	Dusts and residues from gas cleaning systems of copper smelters.
A1110	Spent electrolytic solutions from copper electrorefining and electrowinning operations
A1120	Waste sludges, excluding anode slimes, from electrolytic purification systems in copper electrorefining and electrowinning operations.
A1130	Spent etching solutions containing dissolved copper.
A1150	Precious metal ash from incineration of printed circuit boards not included in list' B'
A1160	Waste Lead acid batteries whole or crushed.
A1170	Unsorted waste batteries excluding mixtures of List B batteries.
A1180	Waste Electrical and electronic assembles or scrap containing, components such

	as accumulators and other batteries included on list A, mercury-switches, activated glass cullets from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Schedule 2 constituents (e.g. cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they exhibit hazard characteristics indicated in part C of this Schedule (refer B1110)
A2	**Wastes containing principally inorganic constituents, which may contain metals and organic materials**
A2010	Activated Glass cullets from cathode ray tubes and other activated glasses
A2030	Waste catalysts but excluding such wastes specified on List B of Schedule 3
A3	**Wastes containing principally organic constituents which may contain metals and inorganic materials**
A3010	Waste from the production or processing of petroleum coke and bitumen
A3020	Waste mineral oils unfit for their originally intended use
A3050	Wastes from production, formulation and use of resins, latex, plasticisers, glues/adhesives excluding such wastes specified in List B (B4020)
A3070	Waste phenol, phenol compounds including chlorophenol in the form of liquids or sludges
A3080	Waste ethers not including those specified in List B
A3120	Fluff: light fraction from shredding
A3130	Waste organic phosphorus compounds
A3140	Waste non-halogenated organic solvents but excluding such wastes specified on List B
A3160	Waste halogenated or unhalogenated non-aqueous distillation residues arising from organic solvent recovery operations
A3170	Waste arising from the production of aliphatic halogenated hydrocarbons (such as chloromethanes, dichloroethane, vinylchloride, vinylidene chloride, allyl chloride and epichlorhydrin)
A4	**Wastes which may contain either inorganic or organic constituents**
A4010	Wastes from the production and preparation and use of pharmaceutical products but excluding such wastes specified on List B
A4040	Wastes from the manufacture formulation and use of wood preserving chemicals
A4070	Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish excluding those specified in List B (B4010)
A4080	Wastes of an explosive nature excluding such wastes specified on List B
A4090	Waste acidic or basic solutions excluding those specified in List B (B2120)
A4100	Wastes from industrial pollution control devices for cleaning of industrial off-gases excluding such wastes specified on List B
A4120	Wastes that contain, consist of or are contaminated with peroxides.
A4130	Waste packages and containers containing any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein.
A4140	Waste consisting of or containing off specification or out-dated chemicals containing any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein.
A4150	Waste chemical substances arising from research and development or teaching activities which are not identified and/or are new and whose effects on human health and/or the environment are not known
A4160	Spent activated carbon not included on List B (B2060)

*This List is based on Annex.VIII of the Basel Convention on Transboundary Movement of Hazardous Wastes and comprises of wastes characterized as hazardous under Article 1, paragraph 1(a) of the Convention. Inclusion of wastes on this list does not preclude the use of hazard

characteristics given in Annex.VIII of the Basel Convention (Part C of this Schedule) to demonstrate that the wastes are not hazardous. **Certain waste categories listed in the Schedule - 3 (Part–A) have been prohibited for import. Hazardous wastes in the Schedule – 3 (Part –A) are restricted and cannot be allowed to be imported without permission from Ministry of Environment & Forests and DGFT license.**

PART B

List of Hazardous Wastes applicable for Import and Export not Requiring Prior Informed Consent

[Annex IX of the Basel Convention*]

Basel No.	Description of Wastes
B1	**Metal and metal-bearing wastes**
B1010	Metal and metal-alloy wastes in metallic, non-dispersible form:
	- Precious metals (gold, silver, platinum)**
	- Iron and steel scrap**
	- Nickel scrap**
	- Aluminum scrap**
	- Zinc scrap**
	- Tin scrap**
	- Tungsten scrap**
	- Molybdenum scrap**
	- Tantalum scrap**
	- Cobalt scrap**
	- Bismuth scrap**
	- Titanium scrap**
	- Zirconium scrap**
	- Manganese scrap**
	- Germanium scrap**
	- Vanadium scrap **
	- Hafnium scrap**
	- Indium scrap**
	- Niobium scrap**
	- Rhenium scrap**
	- Gallium scrap**
	- Magnesium scrap**
	- Copper scrap**
	- Thorium scrap
	- Rare earths scrap
	- Chromium scrap**
B1020	Clean, uncontaminated metal scrap, including alloys, in bulk finished form (sheet, plates, beams, rods, etc.) , of:
	- Antimony scrap****
	- Cadmium scrap
	- Lead scrap (excluding lead acid batteries)
	- Tellurium scrap****

B1030	Refractory metals containing residues****
B1031	Molybdenum, tungsten, titanium, tantalum, niobium and rhenium metal and metal alloy wastes in metallic dispersible form (metal powder), excluding such wastes as specified in list A under entry A1050, Galvanic sludges****
B1040	Scrap assemblies from electrical power generation not contaminated with lubricating oil, PCB or PCT to an extent to render them hazardous**
B1050	Mixed non-ferrous metal, heavy fraction scrap, not containing any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein**
B1060	Waste selenium and tellurium in metallic elemental form including powder****
B1070	Waste of copper and copper alloys in dispersible form, unless they contain any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein***
B1080	Zinc ash and residues including zinc alloys residues in dispersible form unless they contain any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein***
B1090	Waste batteries conforming to a standard battery specification, excluding those made with lead, cadmium or mercury.****
B1100	Metal bearing wastes arising from melting, smelting and refining of metals:
	- Hard Zinc Spelter**
	- Zinc-containing drosses: ** ~ Galvanizing slab zinc top dross (>90% Zn) ~ Galvanizing slab zinc bottom dross (>92% Zn) ~ Zinc die casting dross (>85% Zn) ~ Hot dip galvanizers slab zinc dross (batch) (>92% Zn ~ Zinc skimmings (>90%Zn)
	-Slags from copper processing for further processing or refining containing arsenic, lead or cadmium***
	- Slags from precious metals processing for further refining**
	- Wastes of refractory linings, including crucibles, originating from copper smelting
	- Aluminum skimmings (or skims) excluding salt slag**
	-Tantalum-bearing tin slags with less than 0.5% tin****
B1110	Electrical and electronic assemblies
	- Electronic assemblies consisting only of metals or alloys****

	- Waste electrical and electronic assemblies scrap (including printed circuit boards) not containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with constituents such as cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do not possess any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein ****
	- Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse and not for recycling or final disposal.
B1120	Spent catalysts excluding liquids used as catalysts, containing any of: Transition metals, excluding waste catalysts (spent catalysts, liquid used catalysts or other catalysts) on list A: Scandium Titanium Vanadium Chromium Manganese Iron Cobalt Nickel Copper Zinc Yttrium Zirconium Niobium Molybdenum Hafnium Tantalum Tungsten Rhenium Lanthanaides (rare earth metals): Lanthanum Cerium Praseodymium Neody Samarium Europium Gadolinium Terbium Dysprosium Holmium Erbium Thulium Ytterbium Lutetium
B1130	Cleaned spent precious metal bearing catalysts
B1140	Precious metal bearing residues in solid form which contain traces of inorganic cyanides
B1150	Precious metals and alloy wastes (gold , silver, the platinum group) in a dispersible form
B1160	Precious-metal ash from the incineration of printed circuit boards (note the related entry on list A A1150)
B1170	Precious metal ash from the incineration of photographic film

B1180	Waste photographic film containing silver halides and metallic silver
B1190	Waste photographic paper containing silver halides and metallic silver
B1200	Granulated slag arising from the manufacture of iron and steel
B1210	Slag arising from the manufacture of iron and steel including slag as a source of Titanium dioxide and Vanadium
B1220	Slag from zinc production, chemically stabilized, having a high iron content (above 20%) and processed according to industrial specifications mainly for construction
B1230	Mill scaling arising from manufacture of iron and steel**
B1240	Copper Oxide mill-scale***
B2	**Wastes containing principally inorganic constituents, which may contain metals and organic materials**
B2010	Wastes from mining operations in non-dispersible form:
	- Natural graphite waste
	- Slate wastes
	- Mica wastes
	- Leucite, nepheline and nepheline syenite waste
	- Feldspar waste
	- Fluorspar waste
	- Silica wastes in solid from excluding those used in foundry operations
B2020	Glass wastes in non-dispersible from: - Glass Cullets and other wastes and scrap of glass except activated glass cullets from cathode ray tubes and other activated glasses
B2030	Ceramic wastes in non-dispersible form:
	Cermet wastes and scrap (metal ceramic composites) - Ceramic based fibres
B2040	Other wastes containing principally inorganic constituents:
	- Partially refined calcium sulphate produced from flue gas desulphurisation (FGD) - Waste gypsum wallboard or plasterboard arising from the demolition of buildings - Sulphur in solid form

	- Limestone from production of calcium cyanamide (pH<9) - Sodium, potassium, calcium chlorides - Carborundum (silicon carbide) - Broken concrete - Lithium tantalum & Lillium-niobium containing glass scraps
B2060	Spent activated carbon resulting from the treatment of potable water and processes of the food industry and vitamin production (note the related entry on list A A4160)
B2070	Calcium fluoride sludge
B2080	Waste gypsum arising from chemical industry processes unless it contains any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein
B2090	Waste anode butts from steel or aluminium production made of petroleum coke or bitumen and cleaned to normal industry specifications (excluding anode butts from chlor alkali electrolyses and from other metallurgical industry)
B2100	Waste hydrates of aluminum and waste alumina and residues from alumina production, arising from gas cleaning, flocculation or filtration process
B2110	Bauxite residue ("red mud") (pH moderated to less than 11.5)
B2120	Waste acidic or basic solutions with a pH greater than 2 and less than 11.5, which are not corrosive or otherwise hazardous (note the related entry on list A A4090)
B3	**Wastes containing principally organic constituents, which may contain metals and inorganic materials**
B3010	Solid plastic waste The following plastic or mixed plastic waste, provided they are not mixed with other wastes and are prepared to a specification: - Scrap plastic of non-halogenated polymers and copolymers, including but not limited to the following:
	Ethylene
	Styrene
	Polypropylene
	polyethylene terephthalate
	Acrylonitrile
	Butadiene
	Polyacetals
	Polyamides

	polybutylene tere-phthalate
	Polycarbonates
	Polyethers
	polyphenylene sulphides
	acrylic polymers
	alkanes C10-C13 (plasticiser)
	polyurethane (not containing CFC's)
	Polysiloxanes
	polymethyl methacrylate
	polyvinyl alcohol
	polyvinyl butyral
	Polyvinyl acetate
	- Cured waste resins or condensation products including the following:
	urea formaldehyde resins
	phenol formaldehyde resins
	melamine formaldehyde resins
	epoxy resins
	alkyd resins
	polyamides
	- The following fluorinated polymer wastes (excluding post-consumer wastes):
	Perfluoroethylene/ propylene
	Perfluoroalkoxy alkane
	Metafluoroalkoxy alkane
	polyvinylfluoride
	polyvinylidenefluoride
B3020	Paper, paperboard and paper product wastes**** The following materials, provided they are not mixed with hazardous wastes: Waste and scrap of paper or paperboard of: • unbleached paper or paperboard or of corrugated paper or paperboard • other paper or paperboard, made mainly of bleached chemical pulp, not coloured in the mass • paper or paperboard made mainly of mechanical pulp (for example, newspapers, journals and similar printed matter) • other, including but no t limited to 1) laminated paperboard 2) unsorted scrap.
B3130	Waste polymer ethers and waste non-hazardous monomer ethers incapable of forming peroxides
B3140	Waste pneumatic tyres, excluding those which do not lead to resource recovery, recycling, reclamation or direct reuse

B4	**Wastes which may contain either inorganic or organic constituents**
B4010	Wastes consisting mainly of water-based/latex paints, inks and hardened varnishes not containing organic solvents, heavy metals or biocides to an extent to render them hazardous (note the related entry on list A A4070)
B4020	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives, not listed on list A, free of solvents and other contaminants to an extent that they do not exhibit Part C of Schedule 3 characteristics
B4030	Used single-use cameras, with batteries not included on list A

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* This List is based on Annex. IX of the Basel Convention on Transboundary Movement of Hazardous Wastes and comprises of wastes not characterized as hazardous under Article – I of the Basel Convention.

** Import permitted in the country without any license or restriction.

*** Import permitted in the country for recycling/reprocessing by units registered with MoEF/CPCB and having DGFT license .

**** Import permitted in the country by the actual users with MoEF permission and DGFT license.

All other wastes listed in this Schedule -3 (Par – B) having no ' Star/s'(*...) can only be imported in to the country with the permission of MoEF.

Note:

(1) **Copper dross containing copper greater than 65% and lead and cadmium equal to or less than 1.25% and 0.1% respectively; spent cleaned metal catalyst containing copper; and Copper reverts, cake and residues containing lead and cadmium equal to or less than 1.25% and 0.1% respectively are allowed for import without DGFT licence to units (actual users) registered with MoEF upto an annual quantity limit indicated in the Registration letter. Copper reverts, cake and residues containing lead and cadmium greater than 1.25% and 0.1% respectively are under restricted category for which import is permitted only against DGFT licence for the purpose of processing or reuse by units registered with MoEF (actual users).**

(2) **Zinc ash/skimmings in dispersible form containing zinc more than 65% and lead and cadmium equal to or less than 1.25% and 0.1% respectively and spent cleaned metal catalyst containing zinc are allowed for import without DGFT licence to units registered with MoEF (actual users) upto an annual quantity limit indicated in Registration Letter. Zinc ash and skimmings containing less than 65% zinc and lead and cadmium equal to or more than 1.25% and 0.1% respectively and hard zinc spelter and brass dross containing lead greater than 1.25% are under restricted category for which import is permitted against DGFT licence and only for purpose of processing or reuse by units registered with MoEF (actual users).**

PART C
List of Hazardous Characteristics

Code	Characteristic
H 1	**Explosive** An explosive substance or waste is a solid or liquid substance or waste (or mixture of substances or wastes) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such speed as to cause damage to the surroundings (UN Class 1; III)
H 3	**Flammable Liquids** The word "flammable" has the same meaning as "inflammable". Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers, etc. but not including substances or wastes otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 60.5°C, closed-cup test, or not more than 65.5°C, open-cup test. (Since the results of open-cup tests and of closed-cup tests are not strictly comparable and even individual results by the same test are often variable, regulations varying from the above figures to make allowance for such differences would be within the spirit of this definition).
H 4.1	**Flammable Solids** Solids, or waste solids, other than those classed as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire through friction.
H 4.2.	**Substances or wastes liable to spontaneous combustion** Substances or wastes which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up on contact with air, and being then liable to catch fire.
H 4.3	**Substances or wastes which, in contact with water emit flammable gases** Substances or wastes which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

H 5.1	**Oxidizing** Substances or wastes which, while in themselves not necessarily combustible, may, generally by yielding oxygen cause, or contribute to, the combustion of other materials.
H 5.2	**Organic Peroxides** Organic substances or wastes which contain the bivalent-O-O- structure are thermally unstable substances which may undergo exothermic self-accelerating decomposition.
H 6.1	**Poisons (Acute)** Substances or wastes liable either to cause death or serious injury or to harm health if swallowed or inhaled or by skin contact.
H 6.2	**Infectious substances** Substances or wastes containing viable micro organisms or their toxins which are known or suspected to cause disease in animals or humans.
H 8	**Corrosives** Substances or wastes which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards.
H 10	**Liberation of toxic gases in contact with air or water** Substances or wastes which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.
H 11	**Toxic (Delayed or chronic)** Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity).
H 12	**Ecotoxic** Substances or wastes which if released present or may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems.
H 13	**Capable** by any means, after disposal, of yielding another material, e.g., Leachate, which possesses any of the characteristics listed above.

Schedule IV

[(See rules), 8 (1)and 9]

List of Hazardous Wastes requiring Registration for Recycling/Reprocessing

Sl. No.	Wastes
1	Brass Dross
2	Copper Dross
3	Copper Oxide mill scale
4	Copper reverts, cake and residue
5	Waste Copper and copper alloys in dispersible form.
6	Slags from copper processing for further processing or refining
7	Insulated Copper Wire Scrap/copper with PVC sheathing including ISRI-code material namely "Druid"
8	Jelly filled copper cables
9	Spent cleared metal catalyst containing copper
10	Spent catalyst containing nickel, cadmium, zinc, copper, arsenic, vanadium and cobalt
11	Zinc Dross-Hot dip Galvanizers SLAB
12	Zinc Dross-Bottom Dross
13	Zinc ash/skimmings arising from galvanizing and die casting operations
14	Zinc ash/skimming/other zinc bearing wastes arising from smelting and refining
15	Zinc ash and residues including zinc alloy residues in dispersible form
16	Spent cleared metal catalyst containing zinc
17	Lead acid battery plates and other lead scrap/ashes/residues not covered under Batteries (Management and Handling)Rules, 2001. [*Battery scrap, namely: Lead battery plates covered by ISRI, Code word "Rails" Battery lugs covered by ISRI, Code word "Rakes". Scrap drained/dry while intact, lead batteries covered by ISRI, Code word "Rains".
18	Components of waste electrical and electronic assembles comprising accumulators and other batteries included on list A, mercury-switches, activated glass cullets from cathode-ray tubes and other activated glass and PCB-capacitors, or any other component contaminated with Schedule 2 constituents (e.g. cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they exhibit hazard characteristics indicated in part C of this Schedule.
19	Paint and ink Sludge/residues
20	Used Oil and Waste Oil - As per specifications prescribed from time to time .

Schedule V

[See rule 3 (ze)and (zf)]

PART A

Specifications of used oil suitable for reprocessing / recycling

S. No.	Parameter	Maximum permissible Limits
(1)	(2)	(3)
1.	Polychlorinated biphenyls (PCBs)	<2 ppm *
2.	Lead	100 ppm
3.	Arsenic	5 ppm
4.	Cadmium+Chromium+Nickel	500 ppm
5	Polyaromatic hydrocarbons (PAH)	6%

PART B

Specifications of fuel derived from Waste Oil

S. No.	Parameter	Maximum permissible Limits
(1)	(2)	(3)
1.	Sediment	0.25 %
2.	Lead	100 ppm
3.	Arsenic	5 ppm
4.	Cadmium+Chromium+Nickel	500 ppm
5.	Polyaromatic hydrocarbons (PAH)	6%
6.	Total halogens	4000 ppm
7.	Polychlorinated biphenyls (PCBs)	<2 ppm *
8.	Sulfur	4.5 %
9.	Water Content	1 %

The detection limit is 2 ppm by Gas Liquid Chromatography (GLC) using Electron Capture detector (ECD)

Schedule VI

[See rule 13(4)]

Hazardous Wastes Prohibited for Import and Export

S.No.	Basel No	Description of Hazardous Wastes
1.	A1010	Mercury bearing wastes
2.	A1030	Waste having Mercury: Mercury Compounds as constituents or contaminants
3.	A1010	Beryllium bearing wastes
4.	A1020	Waste having Beryllium: Beryllium Compounds as constituents or contaminants
5.	A1010	Arsenic bearing wastes
6.	A1030	Waste having Arsenic: Arsenic compounds as constituents or contaminants
7.	A1010	Selenium bearing wastes
8.	A1020	Waste having Selenium; Selenium Compounds as constituents or contaminants
9.	A1010	Thallium bearing wastes
10.	A1030	Waste having Thallium; Thallium Compounds as constituents or contaminants
11.	A1040	Hexavalent Chromium Compounds bearing wastes
12.	A1140	Wastes Cupric Chloride and Copper Cyanide Catalysts bearing wastes
13	A1190	Waste metal cables coated or insulated with plastics containing or contaminated with coal tar, PCB", lead, cadmium, other organohalogen compounds or other constituents as mentioned in schedule 2 to the extent of concentration limits specified therein.
14.	A2020	Waste inorganic fluorine compounds in the form of liquids or sludge but excluding calcium fluoride sludge
15.	A2040	Waste gypsum arising from chemical industry processes if it contains any of the constituents mentioned in Schedule 2 to the extent of concentration limits specified therein
16.	A2050	Waste Asbestos (Dust and Fibres)
17.	A3030	Wastes that consist of or are contaminated with leaded anti-knock compound sludge or leaded petrol (gasoline) sludges.
18.	A3040	Waste Thermal (heat transfer) fluids
19.	A3060	Waste Nitrocellulose
20.	A3090	Waste Leather dust, ash, sludges or flours when containing hexavalent chromium compounds or biocides

21.	A3100	Waste paring and other wastes of leather or of composition leather not suitable for the manufacture of leather articles, containing hexavalent chromium compounds and biocides
22.	A3110	Fellmongery wastes containing hexavalent chromium compounds or biocides or infectious substances
23.	A3150	Halogenated organic solvents
24.	A3180	Waste, Substances and articles containing, consisting of or contaminated with polychlorinated biphenyles (PCB) and/or polychlorinated terphenyls, (PCT) and/or polychlorinated naphthalenes (PCN) and/or polybrominated biphyenyles (PBB) or any other polybrominated analogues of these compounds
25.	A3190	Waste tarry residues (excluding asphalt cements) arising from refining, distillation and pyrolitic treatment of organic materials)
26.	A4020	Clinical and related wastes; that is wastes arising from medical, nursing, dental, veterinary, or similar practices and wastes generated in hospital or other facilities during the investigation or treatment of patients, or research projects.
27.	A4030	Waste from the production, formulation and use of biocides and phyto-pharmaceuticals, including waste pesticides and hebicides which are off-specification, out-dated, and/or unfit for their originally intended use.
28.	A4050	Waste that contain, consist of, or are contaminated with any of the following; Inorganic cyanides, excepting precious metal bearing residues in solid form containing traces of inorganic cyanides. Organic cyanides
29.	A4060	Waste oil/water, hydrocarbons/water mixtures, emulsions
30.	A4110	Wastes that contain, consist of or are contaminated with any of the following : • Any congenor of polychlorinated dibenzofuran • Any congenor of polychlorinated dibenzo-dioxin.

Schedule VII
[See rule 23]

List of Authorities and Corresponding Duties

S.No.	Authority	Corresponding Duties
1.	Ministry of Environment and Forests under the Environment (Protection) Act, 1986	i. Identification of hazardous wastes ii. Permission to exporters of hazardous wastes iii. Permission to importers of hazardous wastes iv. Permission for transit of hazardous wastes through India v. Sponsoring of training and Awareness programme on Hazardous Waste Management related activities.
2.	Central Pollution Control Board constituted under the Water (Prevention and Control of Pollution) Act, 1974	i. Co-ordination of activities of State Pollution control Boards/ Committees ii. Conduct training courses for authorities dealing with management of hazardous wastes iii. Recommend standards and specifications for treatment and disposal of wastes and leachates Recommend procedures for characterization of hazardous wastes. iv. Sector specific documentation to identify waste for inclusion in Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008. v. Prepare guidelines to prevent/reduce/ minimize the generation and handling of hazardous wastes vi. Registration and renewal of registration of Recyclers/Re-processors vii. Any other function under Rules delegated by the Ministry of Environment & Forests.
3.	State Government/Union Territory Government/Administration	i. Identification of site(s) for common Hazardous Waste Treatment Storage and Disposal Facility (TSDF) ii. Assess EIA reports and convey the decision of approval of site or otherwise iii. Acquire the site or inform operator of

		facility or occupier or association of occupiers to acquire the site iv. Notification of sites v. Publish periodically an inventory of all disposal sites in the State/Union Territory
4.	State Pollution Control Boards or Pollution Control Committees constituted under the Water (Prevention and Control of Pollution) Act, 1974	i. Inventorisation of hazardous wastes ii. Grant and renewal of authorization iii. Monitoring of compliance of various provisions and conditions of authorization including conditions of permission for issued by MoEF exports and imports iv. Examining the applications for imports submitted by the importers and forwarding the same to Ministry of Environment and Forests v. Implementation of programmes to prevent/reduce/minimize the generation of hazardous wastes vi. Action against violations of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 vii. Any other function under these Rules assigned by MoEF from time to time.
5.	Directorate General of Foreign Trade constituted under the Foreign Trade (Development and Regulation) Act, 1992	i. Grant of licence for import of hazardous wastes ii. Refusal of licence for hazardous wastes prohibited for imports and export
6.	Port Authority under Indian Ports Act, 1908 (15 of 1908) and Customs Authority under the Customs Act, 1962 (52 of 1962)	i. Verify the documents ii. Inform the Ministry of Environment and Forests of any illegal traffic iii. Analyse wastes permitted for imports and exports iv. Train officials on the provisions of the (Management, Handling and Transboundary Movement) Rules, 2008 and in the analysis of hazardous wastes v. Take action against exporter/importer for violations under the Indian Ports Act, 1908/Customs Act, 1962

FORM 1

[See rules 5(3) and (7)]

APPLICATION FOR OBTAINING AUTHORISTION FOR COLLECTION/RECEPTION/TREATMENT/TRANSPORT/STORAGE /DISPSOAL OF HAZARDOUS WASTE*

From: .....
.....

To

The Member Secretary,
..... Pollution Control Board/.....Pollution Control Committee,
.....

Sir,

I / We hereby apply for authorisation/renewal of authorisation under sub-rule (3) of Rule 5 of the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 for collection/reception/treatment/ transport/storage/disposal of hazardous wastes.

For Office Use Only

5. Code No. :

6. Whether the unit is situated in a critically polluted area as identified by Ministry of Environment and Forests;

To be filled in by Applicant

Part A: General

3. (a) Name and address of the unit and location of activity :

(b) Authorisation required for (Please tick mark appropriate activity / activities :
- (i) collection
- (ii) reception
- (iii) treatment
- (iv) transport
- (v) storage
- (vi) disposal

(c) In case of renewal of authorisation previous authorisation number and date

* delete whichever is not applicable

4. (a) Whether the unit is generating hazardous waste as defined in these Rules:
(b) If so the type and quantity of wastes (in Tonnes/KL) :

5. (a) Total capital invested on the project (in Rupees) :
(b) Year of commencement of production :
(c) Whether the industry works general/ 2 shifts/ round the clock :

6. (a) List and quantum of products and by-products (in Tonnes/KL) :
(b) List and quantum of raw material used (in Tonnes/KL) :

7. Furnish a flow diagram of manufacturing process showing input and output in terms of products, waste generated including for captive power generation and demineralised water.

Part B: Hazardous Waste

8. Hazardous Wastes:
(a) Type of hazardous wastes generated as defined under these Rules :
(b) Quantum of hazardous waste generated :
(c) Sources and waste characteristics : (Also indicate wastes amenable to recycling, re-processing and reuse)
(d) Mode of storage within the plant, method of disposal and capacity: (provide details).

9. Hazardous Wastes generated as per these Rules from storage of hazardous chemicals as defined under the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989

Part C: Treatment, Storage and Disposal Facility

10. Detailed proposal of the facility (to be attached) to include :
(i) Location of site (provide map) :
(ii) Name of waste processing technology :
(iii) Details of processing technology :
(iv) Type and Quantity of waste to be processed per day :
(v) Site clearance (from local authority, if any) :
(vi) Utilization programme for waste processed (Product Utilization) :
(vii) Method of disposal (details in brief be given) :
(viii) Quantity of waste to be disposed per day :
(ix) Nature and composition of waste :
(x) Methodology and operational details of land filling/ incineration :
(xi) Measures to be taken for prevention and control of environmental pollution including treatment of leachate :
(xii) Investment on Project and expected returns :
(xiii) Measures to be taken for safety of workers working in the plant :

Place :
Date :

Signature : .....
Designation : .....

FORM 2

[See rule 5(4)]

FORM FOR GRANT/RENEWAL OF AUTHORISATION BY SPCB/PCC FOR OCCUPIERS, REPROCESSORS, REUSERS AND OPERATORS OF FACILITIES FOR COLLECTION, RECEPTION, TREATMENT, STORAGE, TRANSPORT, AND DISPOSAL OF HAZARDOUS WASTE

1. Number of authorisation and date of issue :

2. .....of.....is hereby granted an authorisation to operate a facility for collection, reception, treatment, storage, transport and disposal of hazardous waste on the premises situated at.....

3. The authorisation granted to operate a facility for generation, collection, reception, treatment, storage, transport and disposal of hazardous wastes.

4. The authorisation shall be in force for a period of .....

5 The authorisation is subject to the conditions stated below and the such conditions as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986.

Date :

Signature of Issuing Authority
Designation and Seal

Terms and conditions of authorisation

1. The authorisation shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.

2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the SPCB/PCC.

3. The person authorised shall not rent, lend, sell, transfer or otherwise transport the hazardous wastes without obtaining prior permission of the SPCB/PCC.

4. Any unauthorized change in personnel, equipment as working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorisation.

5. It is the duty of the authorised person to take prior permission of the SPCB/PCC to close down the facility.

6. An application for the renewal of an authorisation shall be made as laid down under these Rules.

7. Any other conditions for compliance as per the Guidelines issued by the MoEF or CPCB.

FORM 3

[See rule 5 (6), and 22 (1)]

FORMAT FOR MAINTAINING RECORDS OF HAZARDOUS WASTES BY THE OCCUPIER OR OPERATOR OF A FACILITY

1. Name and address of the occupier or operator of a facility :

2. Date of issuance of authorisation and its reference number :

3. Description of hazardous waste :

Physical form with description	Chemical form	Total volume (m^3) and weight (in kg.)

4. Description of storage and treatment of hazardous waste :

Date	Method of storage of hazardous wastes	Date	Method of treatment of hazardous wastes

5. Details of transportation of hazardous waste

Name and address of the consignee of package	Mode of packing of the waste for transportation	Mode of transportation to site of disposal	Date of transportation

6. Details of disposal of hazardous waste :

Date of disposal	Concentration of hazardous constituents in the final waste form	Site Of disposal (identify the location on the relevant layout drawing for reference)	Method of disposal	Persons involved in disposal

7. Data on environmental surveillance :

Date of measu-rement	Analysis of ground water			Analysis of soil samples			Analysis of air samples		Analysis of any other samples (give details)
	Locatin of sampling	Depth of sampling	Data	Location of sampling	Depth of sampling	Data	Location of sampling	Data	

8. Details of hazardous waste sold/auctioned to the recyclers or reprocessors or re-users:

9. Details of hazardous waste reused or recycled :

Date	Total Quantity of Hazardous Wastes generated	Details of hazardous waste minimization activity	Materials received	Final Quantity of waste generated	Net reduction in waste generation quantity and percentage

Date: Name and signature of the Head of facility

Place:

FORM 4

[See rules 5(6) and 22 (2)]

FORM FOR FILING ANNUAL RETURNS BY THE OCCUPIER OR OPERATOR OF FACILITY

[To be submitted by occupier/operator of disposal facility to State Pollution Control Board/ Pollution Control Committee by 30th June of every year for the preceding period April to March]

1.	Name and address of the generator/ operator of facility	:				
2.	Name of the authorised person and full address with telephone and fax number	:				
3.	Description of hazardous waste	:	Physical form with description		Chemical form	
4.	Quantity of hazardous wastes (in MTA)	:	**Type of hazardous waste**		**Quantity (in Tonnes /KL)**	
			(a)			
			(b)			
			(c)			
			.....		.....	
5.	Description of Storage	:				
6.	Description of Treatment	:				
7.	Details of transportation	:	Name & address of consignee	Mode of packing	Mode of transportation	Date of transportation
8.	Details of disposal of hazardous waste	:	Name & address of consignee	Mode of packing	Mode of transportation	Date of transportation
9.	Quantity of useful materials sent back to the manufacturers* and others#	:	**Name and type of material sent back to**		**Quantity in Tonnes/KL**	
			Manufacturers*			
			Others#			

* *delete whichever is not applicable*

\# *enclose list of other agencies.*

Signature :

Designation :

Date : .....

Place : .....

FORM 5

[See rule 8(1)]

FORM OF APPLICATION FOR GRANT/RENEWAL OF REGISTRATION OF INDUSTRIAL UNITS POSSESSING ENVIRONMENTALLY SOUND MANAGEMENT FACILITIES FOR REPROCESSING/RECYCLING

{To be submitted to the Central Pollution Control Board in triplicate by the Reprocessor/Recycler}

<table>
<tr><td>1</td><td>Name and Address of the unit :</td><td></td></tr>
<tr><td>2</td><td>Name of the occupier or owner of the unit with designation, Tel / Fax:</td><td></td></tr>
<tr><td>3</td><td>Date of commissioning of the unit :</td><td></td></tr>
<tr><td>4.</td><td>No. of workers (including contract labourers) :</td><td></td></tr>
<tr><td>5</td><td>Consent Validity</td><td>a) Water (Prevention & Control of Pollution) Act, 1974 valid up to.....

b) Air (Prevention & Control of Pollution) Act, 1981 valid up to.....</td></tr>
<tr><td>6.</td><td>Product Manufactured during the last three years (Tonnes / Year)</td><td><table><tr><th>Year</th><th>Name of the Product</th><th>Quantity in Metric Tonnes or KL</th></tr><tr><td rowspan="3"></td><td>a)</td><td></td></tr><tr><td>b)</td><td></td></tr><tr><td>c)</td><td></td></tr></table></td></tr>
<tr><td>7.</td><td>Raw material consumption during last three years (Tonnes/ year)</td><td><table><tr><th>Year</th><th>Name of the Raw Material consumed</th><th>Quantity in Metric Tonnes or KL</th></tr><tr><td rowspan="3"></td><td>a)</td><td></td></tr><tr><td>b)</td><td></td></tr><tr><td>c)</td><td></td></tr></table></td></tr>
<tr><td>8.</td><td>Manufacturing Process</td><td>Please attach manufacturing process flow diagram for each product (s)</td></tr>
<tr><td>9.</td><td>Water Consumption</td><td>Industrial .....m^3/ day
Domestic.....m^3/day</td></tr>
<tr><td>10</td><td>Water Cess paid up to (date)</td><td>.....</td></tr>
<tr><td>11</td><td>Waste water generation as per consent.....m^3/day</td><td>Industrial/Domestic
Actual.....m^3/day (avg. of last 3 months)</td></tr>
<tr><td>12</td><td>Waste water treatment (provide flow diagram of the treatment scheme)</td><td>Industrial
Domestic</td></tr>
</table>

13	Waste water discharge	Quantity..... m^3/day Location..... Analysis of treated waste water for parameters such as pH, BOD, COD, SS, O&G and any other as stipulated by the SPCB/PCC (attach details)
14.	Air Pollution Control	
	a. Flow diagram for emission control system (s) installed for each process unit, utilities etc.	
	b. Details of facilities provided control of fugitive emission due to material handling, process, utilities etc.	
	c. Fuel consumption	**Name of fuel** / **Quantity per Day/Month :** a) b)
	d. Stack emission monitoring results	**Stack attached to:** / **Emissions (for SPM, SO_2, NO_x and Metals (like Pb etc.) in particulates in mg/Nm^3**
	e. Ambient air quality	**Ambient air quality location:** / **Parameters (SPM, SO_2, NO_x, Pb, any other) in $\mu g/ m^3$**
15.	Hazardous waste management :	
	a. Waste generation :	**S. No.** / **Name** / **Category** / **Quantity (last 3 years)**
	b. Details on collection , treatment and transport :	
	c. Disposal	
	(i) Please attach Details of the disposal facilities	
	(ii) Please attach analysis report of characterisation of hazardous waste generated (including leachate test if applicable)	
16.	Details of hazardous wastes proposed to be acquired through sale/negotiation/ contract or import as the case may be for use as raw material.	1. Name 2. Quantity required per year 3. Waste listing & No. in Annex VIII (List A)/ Annex IX (List B) of Basel Convention (BC) 4. Hazard Characteristic as per Annex III of BC

17	Occupational safety and Health aspects	Please provide details of facilities provided
18	Remarks	
	(i) whether industry has provided adequate pollution control system/ equipment to meet the standards of emission/effluent.	Yes / No
	(ii) whether HW collection and Treatment , Storage and Disposal Facility (TSDF) are operating satisfactorily.	Yes / No
	(iii)Whether conditions exists or likely to exists of the hazardous waste being handled /processed of posing immediate or delayed adverse impacts on the Environment.	Yes / No
	(iv) Whether conditions exists or is likely to exists of the wastes being handled / processed by any means capable of yielding another material eg , leachate which may possess eco-toxicity.	Yes / No
19	Any other Information i) ii) iii)	
20	List of enclosures as per rule	

Signature :
Designation :

Date:.....
Place:.....

FORM 6

[see rules 8 (7)]

FORM FOR FILING ANNUAL RETURNS AND RECORDS ON RECYCLABLE HAZARDOUS WASTES BY THE RECYCLERS

[To be submitted by recyclers to State Pollution Control Board/Pollution Control Committee by 30th June of every year for the preceding period April to March]

1.	Name and address of the recycler :			
2.	Name of the authorized person and full address with telephone and fax number :			
3.	Installed annual capacity to recycle or dispose the hazardous waste (in MTA) :			
4.	Quantity hazardous waste (in MTA) purchased/sold	Type of wastes	Source of purchase/sold	Quantity (in MTA)
5.	Quantity of hazardous wastes processed :	Type of wastes processed		Quantity (in MTA)
6.	Quantity and type of material recovered (in MTA)	Type of material recovered		Quantity (in MTA)
7.	Quantity of useful materials sent back to the generators/ manufacturers* and others#	Name and type of material sent back to		Quantity in Tonnes/KL
		Manufacturers*		
		Others#		
8.	Quantity of hazardous waste generated (in MTA) and its disposal methods.	Type of wastes	Quantity (in MTA)	Method of Dispsoal

* delete whichever is not applicable

\# enclose list of other agencies

Signature :

Designation :

Place : .....

Date : .....

FORM 7

[See rule 15 (1) and 16 (1)]

APPLICATION FOR IMPORT OR EXPORT OF HAZARDOUS WASTE FOR REPROCESSING/RECYCLING/REUSE

From

.....

.....

TO BE MAILED BY IMPORTER

To

The Member Secretary,
.....State Pollution Control Board/.....Pollution Control Committee
.....

Sir,

I/we apply for permission for import of recyclable hazardous wastes.

FOR OFFICE USE ONLY

1. Code No. :

2. Whether the unit is situated in a critically polluted area as identified by the Ministry of Environment and Forests : If yes provide details.

TO BE FILLED IN BY APPLICANT

1. Name and Address of the Exporter with telephone number :
2. Details of hazardous waste to be exported/imported for recycling/reprocessing/reuse:

S.No.	Particulars of hazardous wastes	Six digit Code No.*	Constituent (s) expected	Quantity MT/KL	Any special handling requirement?

* *(Here enter as reference nomenclature, the equivalent six digit code no. from European Waste Catalogue EWC, issued pursuant to the Article 1 (a) of Council Directive 75/442/EEC on waste or its equivalent as the case may be).*

3. The hazardous waste permitted shall be fully insured for transit as well as for any accidental occurrence and its cleanup operation.

4. The exported wastes shall be taken back, if it creates a genuine environmental hazard or shall take all such measures to treat and dispose in an environmentally benign manner upto the satisfaction of concerned SPCB/PCC. All such costs involved in such operation shall be borne by Exporter and/or Importer

5. Name and Address of the importer with telephone number :

6. Whether authorization obtained : (Enclose the copy).

7. Whether you have received such imported hazardous waste in the past and if yes give details.

S.No	Description of hazardous wastes	Country of Export	Year	Quantity in tones

8. Whether the importer has :

(a) Adequate facility to handle imported hazardous waste :(If yes furnish details).

(b) Adequate facility to handle the hazardous wastes generated by the use of such imported hazardous wastes :(Provide details)

9. Break-up of the imported wastes :

a. The total quantity applied for :..... **Tonnes**

b. Out of (a) above, how much quantity after initial in-situ purification, will be available as raw material :..... **Tonnes**

c. Out of (b) above, how much quantity will be converted into the useful product or co-product :..... **Tonnes**

10. Means of Transport (Road, Rail, inland waterway, sea, air) including country of export, transit and import, also point of entry and exit where these have been designated.

11. Information on special handling requirements including emergency provision in case of accident : **(Attach details)**

12. Undertaking :

I hereby solemnly undertake that

(i) The full consignment shall be cleared in one lot by arranging authorised transporter under my supervision with due prior intimation to the SPCB/PCC, District Collector and Police Station and the imported waste shall be admitted in an enclosure especially provided in the premises.

(ii) The waste permitted shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.

(iii) The record of consumption and fate of the imported waste shall be monitored and report sent to the SPCB/PCC every fortnight.

(iv) At every step of consumption of 25, 50, 75 and 100% of the imported waste, the situation in the store shall be shown to the SPCB/PCC at our cost.

(v) The hazardous waste which gets generated in our premises by the use of imported hazardous wastes in the form of raw material shall be treated and disposed of and only as per conditions of authorisation.

(vi) I agree to bear the cost of export and mitigation of damages if any.

(vii) I am aware that there are significant penalties for submitting a false certificate/ undertaking/ disobedience of the rules and lawful orders including the possibility of fine and imprisonment.

Signature of the Applicant

Date.....

Designation

Place.....

Form 8

[See rules 15 (1) and 16 (1)]

APPLICATION FOR TRANSBOUNDARY MOVEMENT OF HAZARDOUS WASTE

S. No.	Description	Details to be furnished by the Exporter/Importer
1.	Exporter (Name & Address) :	
	Contact person :	
	Tel/fax :	
	Reason for export :	
2.	Importer/Recycler (Name & Address) :	
	Contact person :	
	Tel/fax :	
3.	Application concerning [1] :	
	Applicants reference number :	
	A. Single / Multiple movement : B. Recovery/Reprocessing Operation : C. Pre-authorized recovery/reprocessing facility [1] :	
4.	Total intended number of shipments :	
5.	Estimated quantity [3] in Kg/Liters :	
6.	Intended date(s) or period of time for shipment(s) :	
7.	Intended carrier(s) (name, address) [2] :	
	Contact person: Tel/fax. :	
8.	Waste generator (s) (Name, address) [2] :	
	Contact Person Tel/fax :	
	Site of generation & Process :	
9.	Method(s) of recycling [4] :	
	R Code :	
	Technology employed :	
10.	Means of transport [4] :	
11.	Packaging type(s) [4] :	
12.	(i) Designation and complete chemical composition of waste *(attach details)* :	

	(ii) Special handling requirements :	
13.	Physical characteristics [4] :	
14.	Waste identification code :	
	Basel No :	
	OECD No. :	
	UN No. :	
	ITC (HS) :	
	Customs Code (H.S.) :	
	Other (specify) :	
15	OECD classification [1] *(attach details)*	
	(a) amber/red/other :	
	(b) Number :	
16.	Y- Number [4] :	
17.	H-Number [4] :	
18.	(a) UN identification Number :	
	(b) UN shipping name :	
	(c) UN class [4] :	
	(d) Other :	
19.	Concerned states, code number of competent authoritics, and specific points of entry and exit :	
	State of export :	
	States of transit :	
	State of import :	
20.	Customs offices of entry and/or departure **Entry:** / **Departure :**	
21.	Exporter's / Generator's declaration: I certify that the information is complete and correct to my best knowledge. I also certify that Legally-enforceable written contractual obligations have been entered into and that any applicable insurance or other financial guarantees are or shall be in force covering the transboundary movement. **Name:** **Signature:** **Date:**	
22.	Number of annexes attached	

	FOR USE BY COMPETENT AUTHORITIES	
23.	To be completed by competent authority of Import :	
	Notification Received on :	
	Transit (Basel) :	
	a) Acknowledgement sent on :	
	b) Name of Competent authority, Stamp and/or signature	
24	Consent to the movement provided by the competent authority of (Country) :	
	a) Consent given on :	
	b) Consent expires on :	
	c) Specific condition :	(Yes/No) (Please attach)
	d)Name of Competent authority, Stamp and/or signature :	
	FOR USE BY CUSTOMS OFFICES	
25	COUNTRY OF EXPORT/DISPATCH OR CUSTOMS OFFICE OF EIXIT	
	The waste described overleaf has left the country on :	
	Stamp :	
	Signature :	
26.	COUNTRY OF IMPORT/DESTINATION :	
	The waste described overleaf has entered the country on :	
	Stamp :	
	Signature :	
27.	STAMPS OF CUSTOMS OFFICES OF TRANSIT COUNTRIES	

Name of Country	Entry	Departure

Notes: (1) Enter X in appropriate box ; (2) Attach list if more than one ; (3) Attach detailed list of multiple shipment ; (4) See following codes

List of abbreviations used in the Movement Document

RECOVERY OPERATIONS (S.No. 9)	
R 1	Use as a fuel (other than in direct incineration) or other means to generate energy
R 2	Solvent reclamation/regeneration
R 3	Recycling/reclamation of organic substances which are not used as solvents
R 4	Recycling/reclamation of metals and metal compounds
R 5	Recycling/reclamation *of* other inorganic materials
R 6	Regeneration *of* acids or bases
R 7	Recovery of components used for pollution abatement
R 8	Recovery *of* components from catalyst
R 9	Used oil re-refining or other reuses of previously used oil
R 10	Land treatment resulting in benefit to agriculture or ecological improvement
R 11	Uses of residual materials obtained from any of the operations numbered R 1 to 10
R 12	Exchange of wastes for submission to any of the operations numbered R 1 to R 11
R 13	Accumulation of material intended for any operation numbered R 1 to R 12

MEANS OF TRANSPORT (S.No.10)	PACKAGING TYPES (S.No.11)	H NUMBER (S.No.17) AND UN CLASS (S.No. 18)		
		UN Class	H Number	Designation
R= Road	1. Drum	1	H 1	Explosive
T= Train/Rail	2.Wooden barrel	3	H 3	Inflammable liquids
S=Sea	3. Jerrican	4.1	H 4.1	Inflammable solids
A= Air	4. Box	4.2	H 4.2	Constituents or wastes liable to spontaneous combustion
W=Inland Waterways	5. Bag	4.3	H 4.3	Constituents or wastes which, in contact with Water emit inflammable gases
	6.Composite packaging	5.1	H 5.1	Oxidizing
	7.Pressure receptacle	5.2	H 5.2	Organic peroxides
	8. Bulk	6.1	H 6.1	Poisonous (acute)
	9.Other (specify)	6.2	H 6.2	Infectious wastes
		8	H 8	Corrosives
		9	H 10	Liberation of toxic gases in contact with air or water
		9	H 11	Toxic (delayed or chronic)
		9	H 12	Ecotoxic
		9	H 13	Capable, by any means, after disposal *of* yielding another material e.g. leachate, which Possesses any *of* the characteristics listed above

PHYSICAL CHARACTERISTICS (Sl. No. 13)	1. Powdery/powder
	2. Solid
	3. Viscous/paste
	4. Sludge
	5. Liquid
	6. Gaseous
	7.Other (specify)

FORM 9

[See rules 15 (5) and 16 (5)]

TRANSBOUNDARY MOVEMENT - MOVEMENT DOCUMENT

S. No	Description	Details to be furnished by the Exporter/Importer
1.	(i) Exporter (Name & Address) :	
	Contact person :	
	Tel./Fax :	
	(ii) Waste Generator (name and address) [1] :	
	Contact person with Tel./Fax :	
	Site of generation :	
2	Importer/recycler (name & address) :	
	Contact person with Tel./Fax :	
3.	Corresponding to applicant Ref. No. :	
	Movement subject to single/multiple.	
4.	Serial number of shipment :	
5.	(a) 1st Carrier (Name, address) : Registration number : Tel/fax Identity of Means of Transport [3] : Date of Transfer : Signature of Carrier's representative :	
	(b) 2nd Carrier (name, address) : Registration number : Tel/fax : Identity of Means of Transport [3] : Date of Transfer : Signature of Carrier's representative :	
	(c) Last Carrier (name, address) [4] : Registration number : Tel/fax : Identity of Means of Transport [3] : Date of Transfer : Signature of Carrier's representative :	
6.	Disposer (name, address) :	

	Contact person :	
	Actual site of disposal	
	Tel/fax :	
7.	Method(s) of recovery :	
	R code :	
	Technology employed* *(Attach details if necessary).	
8.	Designation and chemical composition of the waste :	
9.	Physical characteristics [3],	
10.	Actual quantity Kg/litre	
11.	Waste identification code :	
	Basel No :	
	OECD No. :	
	UN No. :	
	ITC (HS) :	
	Customs Code (H.S.) :	
	Other (specify) :	
12.	OECD Classification [2] (a)amber/red/other[attach details] (b) number	
13.	Packaging Type[3] :	
	Number :	
14.	UN Classification :	
	UN shipping name :	
	UN identification No. :	
	UN Class [3] :	
	H Number [3] :	
	Y Number :	
15.	Special handling requirements :	
16.	Actual date of shipment :	
17.	Exporter's declaration: I certify that the information in Sl No.1 of 16 above is complete and correct to my best knowledge. I also certify that legally-enforceable written contractual obligations have been entered into, that any applicable insurance or other financial guarantees are in force covering the transboundary movement and that all necessary authorizations have been received from the competent authorities of the States concerned. Date: Signature: Name:	

TO BE COMPLETED BY IMPORTER/RECYCLER		
18.	Shipment received by Importer/Recycler	
	Quantity received .... Kg/litres Date: Name: Signature	
19.	Shipment received at recycler :	
	Quantity received at recycler: Kg/litres	
	Quantity received and accepted: Kg/litres Date: Name: Signature	
20.	Approximate date of recycling :	
21	Method of recycling :	
22.	I certify that the Recycling of the wastes described above will be completed as per HW (M, H and TM) Rules **Signature:** **Date:**	
23.	SPECIFIC CONDITIONS ON CONSENTING TO THE MOVEMENT :	*(attach details)*

Notes:- (1) Attach list, if more than one; (2) Enter X in appropriate box; (3) See codes on the reverse (x) Immediately contact Competent Authority; (4) if more than three carriers, attach information as required in Sl.No. 5.

List of abbreviations used in the Movement Document

RECOVERY OPERATIONS (S.No. 7)	
R 1	Use as a fuel (other than in direct incineration) or other means to generate energy
R 2	Solvent reclamation/regeneration
R 3	Recycling/reclamation of organic substances which are not used as solvents
R 4	Recycling/reclamation of metals and metal compounds
R 5	Recycling/reclamation *of* other inorganic materials
R 6	Regeneration *of* acids or bases
R 7	Recovery of components used for pollution abatement
R 8	Recovery *of* components from catalysts
R 9	Used oil re-refining or other reuses of previously used oil
R 10	Land treatment resulting in benefit to agriculture or ecological improvement
R 11	Uses of residual materials obtained from any of the operations numbered R 1 to 10
R 12	Exchange of wastes for submission to any of the operations numbered R 1 to R 11
R 13	Accumulation of material intended for any operation numbered R 1 to R 12

MEANS OF TRANSPORT (S.No.5)	PACKAGING TYPES (S.No.13)
R= Road	1. Drum
T= Train/Rail	2. Wooden barrel
S=Sea	3. Jerrican
A= Air	4. Box
W=Inland Waterways	5. Bag
	6.Composite packaging
	7.Pressure receptacle
	8. Bulk
	9. Other (specify)

H NUMBER (S.No.14) AND UN CLASS (S.No. 14)

UN Class	H Number	Designation
1	H 1	Explosive
3	H 3	Inflammable liquids
4.1	H 4.1	Inflammable solids
4.2	H 4.2	Constituents or wastes liable to spontaneous combustion
4.3	H 4.3	Constituents or wastes which, in contact with Water emit inflammable gases
5.1	H 5.1	Oxidizing
5.2	H 5.2	Organic peroxides
6.1	H 6.1	Poisonous (acute)
6.2	H 6.2	Infectious wastes
8	H 8	Corrosives
9	H 10	Liberation of toxic gases in contact with air or water
9	H 11	Toxic (delayed or chronic)
9	H 12	Ecotoxic
9	H 13	Capable, by any means, after disposal *of* yielding another material e.g. leachate, which Possesses any *of* the characteristics listed above

PHYSICAL CHARACTERISTICS (Sl. No. 09)	1. Powdery/powder
	2. Solid
	3. Viscous/paste
	4. Sludge
	5. Liquid
	6. Gaseous
	7.Other (specify)

Y Number (S.No.13) refer to categories of waste listed in Annexure I and II of the Basel Convention as well as more detailed information can be found in an instruction manual available from the Secretariat of the Basel Convention

FORM 10

[See rule 15 (7) and 16 (7)]

FORMAT FOR MAINTAINING RECORDS OF HAZARDOUS WASTE IMPORTED AND EXPORTED

1. Name and address of the importer/exporter :

2. Date and reference number of issuance of permission to import/export hazardous wastes :

3. Description of hazardous waste :

S.No	Dates of import/export and relevant consignment numbers	Origin /destination of waste	Total volume and weight (in kilograms)	Physical form	Chemical form	Test report

4. Description of storage, treatment and reuse of hazardous waste :

S.No	Dates of import/export and relevant consignment numbers	Total volume and weight (in kilograms)	Test report	Method of Storage	Method of treatment and reuse (give details)

FORM 11

[See rule 20 (2)]

TRANSPORT EMERGENCY (TREM) CARD

[To be carried by the transporter during transportation of hazardous wastes, provided by the Occupier or Operator of a Facility]

1. Characteristics of hazardous wastes :

S. No.	Type of Waste	Physical Properties/	Chemical Constituents	Exposure Hazards	First Aid Requirements

2. Procedure to be followed in case of fire :

3. Procedure to be followed in case of spillage/accident/explosion :

4. For expert services, please contact :

   i) Name & Address :

   ii) Telephone No. :

(Name and Signature of Occupier/authorized representative)

FORM 12

[See rule 20(2)]

MARKING OF HAZARDOUS WASTE CONTAINER

HAZARDOUS WASTE *

Handle with Care

Waste Category No	Compatible Group .....
Total Quantity	Date of Storage
Contents and State of the Waste :	
Sender's Name & Address	Receiver's Name & Address
Phone	Phone .....
E-mail.....	E-mail .....
Tel. & Fax No	Tel.& Fax No .....
Contact Person	Contact Person .....
In case of emergency please contact	

Note :

1. *Background colour of lab I fluorescent yellow.*
2. *The words 'HAZARDOUS WASTES' & 'HANDLE WITH CARE' to be prominent and written in red in Hindi, English and in Vernacular Language*
3. *Label should be of non-washable material.*

* *delete which ever is not applicable*

FORM 13

[See rule 21 (1)]

HAZARDOUS WASTE MANIFEST

1.	Occupier's Name & Mailing Address (including Phone No.) :	
2.	Occupier's Registration No. :	
3.	Manifest Document No. :	
4.	Transporter's Name & Address :(including Phone No.)	
5.	Type of Vehicle :	(Truck/Tanker/Special Vehicle)
6.	Transporter's Registration No. :	
7.	Vehicle Registration No. :	
8.	Designated Facility Name &Site Address :	
9.	Facility's Registration No. :	
10.	Facility's Phone :	
11.	Waste Description :	
12.	Total Quantity :	.....m^3 or MT
13.	Consistency :	(Solid/Semi-Solid/Sludge /Oily /Tarry /Slurry)
14.	Transport Description of Wastes :	
15.	Containers :	Number | Type
16.	Total Quantity :	.....m^3 or MT
17.	Unit Wt/Vol. :	..... m^3 or MT
18.	Waste Category Number :	
19.	Special Handling Instructions & Additional Information :	
20.	OCCUPIER'S CERTIFICATE :	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and are in all respects in proper condition for transport by road according to applicable national government regulations.
	Typed Name & Stamp : Signature :	Month Day Year
21.	Transporter Acknowledgement of Receipt of Wastes	
	Typed Name & Stamp : Signature :	Month Day Year
22.	Discrepancy Note Space	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp : Signature :	Month Day Year

FORM 14

(See rule 24)

FORMAT OF ACCIDENT REPORT

[To be submitted by the occupier or operator of a facility and the transporter to the SPCB/PCC]

1.	The date and time of the accident	:
2.	Sequence of events leading to accident	:
3.	The hazardous waste involvement in accident	:
4.	The date for assessing the effects of the accident on health or the environment	:
5.	The emergency measures taken	:
6.	The steps taken to alleviate the effects of accidents	:
7.	The steps taken to prevent the recurrence of such an accident	:

[Place: **Signature:**

Date: **Designation]**

FORM 15

[see rule 26 (1) and (2)]

APPLICATION FOR FILING APPEAL AGAINST THE ORDER PASSED BY CPCB/SPCB/PCC OF THE UNION TERRITORY

1.	Name and address of the person making the appeal	:
2.	Number, date of order and address of the authority to which passed the order, against which appeal is being made	: (certified copy of the order be attached).
3.	Ground on which the appeal is being made	:
4.	Relief sought for	:
5.	List of enclosures other than the order referred in para 2 against which the appeal is being filed.	:

Signature.....

Date: **Name and address .....**

[F. No. 23-17/2006-HSMD]

R. K. VAISH, Jt. Secy.

Printed by the Manager, Govt. of India Press, Ring Road, Mayapuri, New Delhi-110064
and Published by the Controller of Publications, Delhi-110054.

Annexure-13

FORM – 2
[See rule 4(8), 5(5) and 9 (5)]

Form for Maintaining Records of E-Waste Handled / Generated Quantity in Metric Tonnes (MT) or Kilograms (Kg) per year

1.	Name & Address: Producer /Collection Centre/Dismantler? Recycler/ Bulk consumer *		
2.	Date of Issue of Authorization* Registration *		
3.	Validity of Authorization* /Registration*		
4.	Types & Quantity of e-waste handled/ generated	Category	Quantity
		Item Description	
5.	Types & Quantity of e-waste stored	Category	Quantity
		Item Description	
6.	Types & Quantity of e-waste sent to authorized collection centre/ registered dismantler or recycler	Category	Quantity
		Item Description	
7.	Types & Quantity of e-waste transported*	Category	Quantity
		Quantity	
	Name, address and contact details of the destination		
8.	Types & Quantity of e-waste refurbished*	Category	Quantity
		Item Description	
	Name, address and contact details of the destination of refurbished materials		
9.	Types & Quantity of e-waste dismantled*	Category	Quantity
		Item Description	
	Name, address and contact details of the destination		
10.	Types & Quantity of e-waste recycled*	Category	Quantity
	Types & Quantity of materials recovered	Item Description	
		Quantity	
	Name, address and contact details of the destination		
11.	Types & Quantity of waste treated & disposed	Category	Quantity
		Item Description	

* Strike off whichever is not applicable

Annexure-14

Pro-forma for Environment and Social details for Transmission Line and Sub-Stations

Environmental and Social details for Transmission Lines				
SN	**DESCRIPTION**	**ALIGNMENT-I**	**ALIGNMENT-II**	**ALIGNMENT-III**
1.	Route particulars			
i)	Length			
ii)	Terrain			
2.	Environmental Details			
i)	Town in) Alignment (Near By)			
ii)	House within ROW			
iii)	Forest In Km / Ha			
a)	Type of forest			
b)	Density of forest			
c)	Type of Fauna & Flora			
d)	Endangered species if any			
e)	Historical/Cultural monument			
f)	Any other relevant information			
3. i) ii)	Compensation cost Crop Forest			
4. i) ii) iii)	No. of Crossing Railway Transmission line River Xing etc			
5.	Construction Problem			
6.	O & M Problem			
7.	Overall Remarks			
8.	Reasons for selection of final route:			

Environment and Social details for Sub-station					
Sl.No.	**Study Point**	**Alt.I**	**Alt.II**	**Alt.III**	**Remarks**
01.	Location				
02.	Village Name				
03.	Size of Land				
04.	Type of Land (Govt./Pvt./others)				
05.	General Geography of Area				
06.	Agricultural/Cropping Pattern				
	Main types of crops Irrigation Facility				
07. i)	Socio-economic condition of area : Profession of existing population Agricultural (Self employment, Merchants, manufacturer, Transporters & Handicrafts etc.)				
ii)	Wage Earner (Skilled/Unskilled Labour)				
iii)	Others if any				
iv)	Natural Resource base				
v)	Political Influence				
08.	No./Name of villages effected I. Partly II. Fully				
09.	Total No. of families likely to be effected				
10.	No. of families whose part holding likely to be acquired				
11.	No. of families whose total holding likely to be acquired Land + Home Land Only Home only				
12.	Caste of PAPs/PAFs a) GC b) OBC c) SC/ST				
13.	General Pattern of Cultivation i.e. By owner On lease (Registered/ Un-registered)				
14.	Loss of Structure House/Shop along with the status of occupants (Owner/Tenant/ Lease holder/squatter)				
15.	Others a) Common property resources like School, Ponds Grazing Ground, Religious Places b) Drainage facility				
16.	Tree/Plantation/Orchards (Approx.)				
17.	Cost of Land				
18.	Reasons for selection/rejection				

Annexure-15

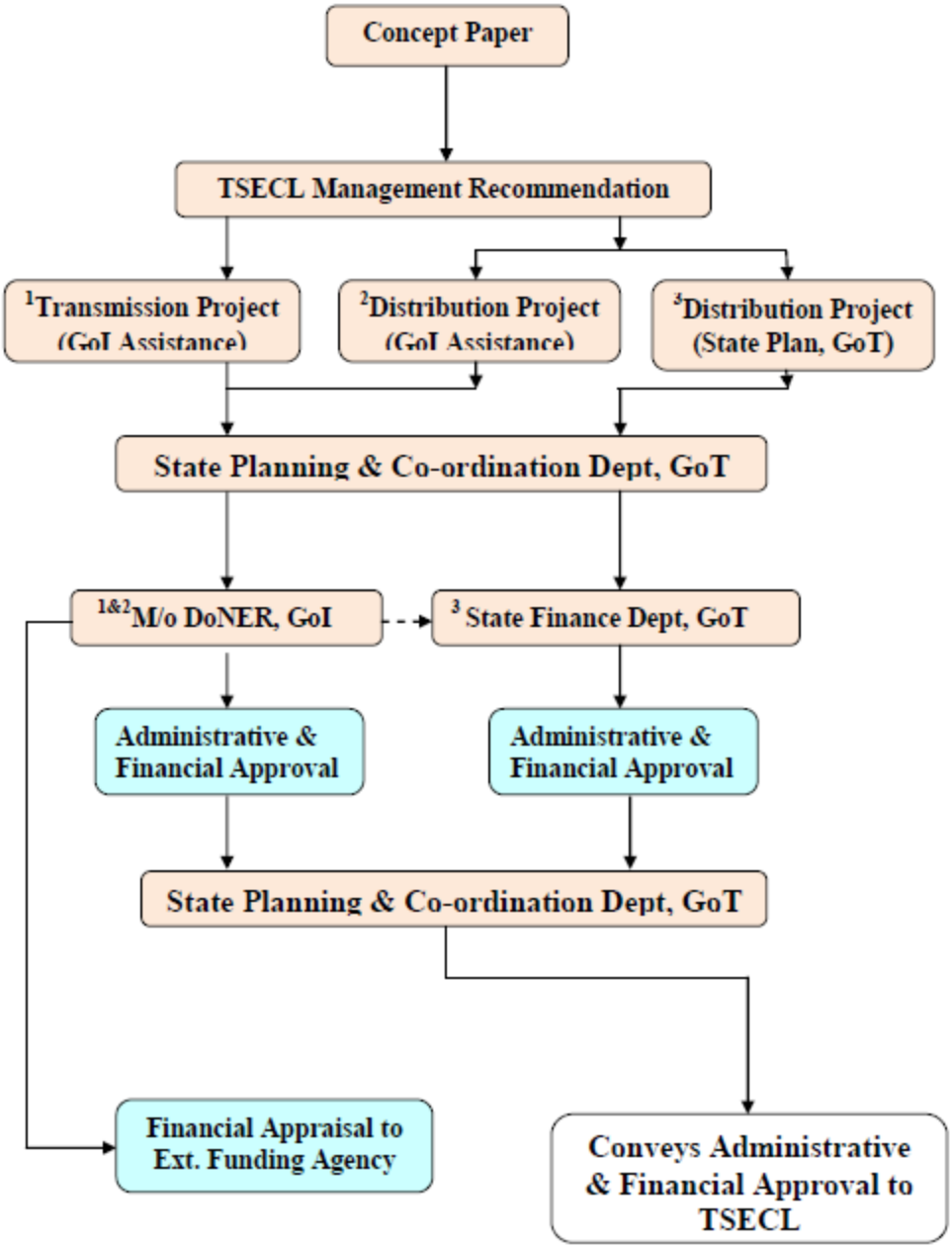
Format: Statement for details of Sites identified for Substations

Sl. No.	Criteria	Site-I	Site-II	Site-III
1.0	**Land**			
1.1	Size (Acre) (Mtr. x Mtr.)			
1.2	Govt. Private/Forest land			
1.3	Agriculture/Wasteland			
1.4	Development			
1.5	Approximate cost			
1.6	Type of soil			
1.7	No. of owners			
1.8	Environment/Pollution in the vicinity			
1.9	Location with reference to nearest town			
1.10	H.F.L. Data			
1.11	Diversion of Nallah/Canal required			
1.12	Slope			
1.13	Extent of levelling required			
1.14	Land acquisition feasibility			
1.15	Rate of Govt. land			
1.16	No. of owners			
1.17	Extn. of approach			
1.18	Planned/unplanned development			
1.19	Size of sites			
1.20	No. of families displaced			
1.21	Required Government value			
1.22	Level of site with ref. to road level			
1.23	Distance from sea shore			
2.0	**Approach**			
2.1	What are the Obstacles in reaching site?			
2.2	Approach road			
2.3	Length of approach road			
2.4	Distance from main road			

2.5	Unloading facility at Railway Station
2.6	No. of Culverts required
3.0	**Community Facilities**
3.1	Drinking Water
3.2	Drainage
3.3	a) Post Office
	b) Telephone
	c) Telex
3.4	Market
3.5	Security
3.6	Amenities
3.7	Availability of construction water
3.8	Availability of water
3.9	Nearest EHC line
3.10	Length of line between this site & nearest substation
3.11	Length of line estimate
3.12	Additional crossings
3.13	Frontage for line take off
3.14	Telephone/Telegraph line
4.0	**Others**

Annexure-16

Investment Approval Process (TL/DL Project)



13. FORM OF SAFETY PLAN TO BE SUBMITTED BY THE CONTRACTOR WITHIN SIXTY DAYS OF AWARD OF CONTRACT

[TO BE EXECUTED ON A NON JUDICIAL STAMP PAPER WORTH RS. TWENTY ONLY]

SAFETY PLAN

THIS SAFETY PLAN is made this ……..... day of ……..... 20..... by ……..…… a Company registered under the Companies Act, 1956/Partnership firm/proprietary concern having its Registered Office at …….....[*to be modified suitably for JV Contractor*] (hereinafter called as 'Contractor' which expression shall include its successors and permitted assigns) for approval of .....*(insert name of the Employer)*....., a company incorporated under the Companies Act, 1956 having its Registered Office at .....*(insert registered address of the Employer)*..... for its Contract for …….…..... .....*(insert package name, project name alongwith Specification number of the Contract)*.....

WHEREAS .....*(abbreviated name of the Employer)*..... has awarded to the Contractor the aforesaid Contract vide its Notification of Award/Contract No. ……..……..... dated .....……..and Amendment No. ..... (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which the Contractor is required to submit 'Safety Plan' alongwith certain documents to the Engineer In-Charge/Project Manager of the Employer within Sixty (60) days of Notification of Award for its approval.

NOW THEREFORE, the Contractor undertakes to execute the Contract as per the safety plan as follows:

1. THAT the Contractor shall execute the works as per provisions of Bidding Documents including those in regard to Safety Precautions / provisions as per statutory requirements.

2. THAT the Contractor shall execute the works in a well planned manner from the commencement of Contract as per agreed mile stones of work completion schedule so that planning and execution of construction works goes smoothly and consistently through out the contract duration without handling pressure in last quarter of the financial year/last months of the Contract and the shall be finalized in association with EMPLOYER Engineer In-charge/Project Manager from time to time as required.

3. THAT the Contractor has prepared the safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site, which is enclosed at **Annexure – 1A (SP)** for acceptance and approval of Engineer In-charge/Project Manager. The Contractor shall ensure that on approval of the same from Engineer In-charge/Project Manager , the approved copies will be circulated to Employer's

personnel at site [Supervisor(s)/Executive(s)] and Contractor's personnel at site [Gang leader, supervisor(s) etc.] in their local language / language understood by gang.

THAT the Contractor has prepared minimum manpower deployment plan, activity wise as stated above, which is enclosed at **Annexure – 1B (SP)** for approval of Engineer In-charge/Project Manager.

4. THAT the Contractor shall ensure while executing works that they will deploy minimum 25% of their own experienced work force who are on the permanent roll of the company and balance 75% can be a suitable mixed with the hired gangs / local workers / casual workers if required. The above balance 75% work force should be provided with at least 10 days training by the construction agencies at sites and shall be issued with a certificate. No worker shall be engaged without a valid certificate. Hired gang workers shall also follow safe working procedures and safety norms as is being followed by company's workmen. It should also be ensured by the contractor that certified fitters who are climbing towers / doing stringing operations can be easily identifiable with a system like issue of Badge / Identification cards (ID cards) etc. Colour identification batches should be worn by the workers. Contractor has to ensure that inexperience workers / unskilled workers should not be deployed for skilled job.

5. THAT the Contractor's Gang leader / Supervisor / Senior most member available at every construction site shall brief to each worker daily before start of work about safety requirement and warn about imminent dangers and precautions to be taken against the imminent dangers (Daily Safety Drill). This is to be ensured without fail by Contractor and maintain record of each gang about daily safety instructions issued to workers and put up to EMPLOYER site In-charge for his review and record.

6. THAT the Contractor shall ensure that working Gangs at site should not be left at the discretion of their Gang Leaders who are generally hired and having little knowledge about safety. Gang leader should be experienced and well versed with the safe working procedures applicable for transmission line/ Sub Station works. In case gang is having Gang leader not on permanent roll of the company then additional Supervisor from company's own roll having thorough knowledge about the works would be deployed so as to percolate safety instructions upto the grass root level in healthy spirits. Contractor has to ensure close supervision while executing critical locations of transmission lines / sub stations and ensures that all safety instructions are in place and are being followed.

7. THAT the Contractor shall maintain in healthy and working condition all kind of Equipments / Machineries / Lifting tools / Lifting tackles / Lifting gears / All kind of Ropes including wire ropes / Polypropylene ropes etc. used for Lifting purpose during execution of the project and get them periodically examined and load tested for safe working load in accordance with relevant provisions and requirement of Building & other construction workers Regulation of Employment and Conditions of Services Act and Central Rule 1998, Factories Act 1948, Indian Electricity Act 2003 before start of the project. 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 In-charge/Project Manager or by

the person authorised by him. The Contractor has to ensure to give special attention on the formation / condition of eye splices of wire rope slings as per requirement of IS 2762 Specification for wire rope slings and sling legs.

THAT the Contractor has prepared a list of all Lifting machines, lifting Tools / Lifting Tackles / Lifting Gears etc. / All types of ropes and Slings which are subject to safe working load is enclosed at **Annexure – 2 (SP)** for review and approval of Engineer In-charge/Project Manager.

8. THAT the Contractor has to procure sufficient quantity of Personal Protective Equipment (PPE)conforming to Indian / International standards and provide these equipment to every workman at site as per need and to the satisfaction of Engineer-in-charge/Project Manager of EMPLOYER. The Contractor's Site Supervisor/ Project Manager has to ensure that all workmen must use Personal Protective Equipment at site. The Contractor shall also ensure that Industrial Safety helmets are being used by all workmen at site irrespective of their working (at height or on ground). The Contractor shall further ensure use of safety shoes by all ground level workers and canvas shoes for all workers working at height, Rubber Gum Boots for workers working in rainy season and concreting job, Use of Twin Lanyard Full body Safety Harness with attachment of light weight such as aluminium alloy etc. and having features of automatic locking arrangement of snap hook, by all workers working at height for more than three meters and also for horizontal movement on tower shall be ensured by contractor. The Contractor shall not use ordinary half body safety harness at site. The Contractor has to ensure use of Retractable type fall arrestors by workers for ascending / descending on suspension insulator string and other similar works etc., Use of Mobile fall arrestor for ascending / descending from tower by all workers. The contractor has to provide cotton / leather hand gloves as per requirement, Electrical Resistance Hand gloves for operating electrical installations / switches, Face shield for protecting eyes while doing welding works and Dust masks to workers as per requirement. The Contractor will have to take action against the workers not using Personal Protective Equipment at site and those workers shall be asked to rest for that day and also their Salary be deducted for that day. EMPLOYER may issue warning letter to Project Manager of contractor in violation of above norms.

THAT the Contractor shall prepare a detailed list of PPEs, activity wise, to commensurate with manpower deployed, which is enclosed at **Annexure – 3 (SP)** for review and approval of Engineer In-charge/Project Manager. It shall also be ensured that the sample of these equipment shall be got approved from EMPLOYER supervisory staff before being distributed to workers. The contractor shall submit relevant test certificates as per IS / International Standard as applicable to PPEs used during execution of work. All the PPE's to be distributed to the workers shall be checked by EMPLOYER supervisory staff before its usage.

The Contractor also agrees for addition / modification to the list of PPE, if any, as advised by Engineer In-Charge/Project Manager.

9. THAT the Contractor shall procure, if required sufficient quantity of Earthing Equipment / Earthing Devices complying with requirements of relevant IEC standards (Generally IECs standards for Earthing Equipments / Earthing Devices are – 855, 1230, 1235 etc.) and to the satisfaction of Engineer In-Charge/ Project Manager and contractor to ensures to maintained them in healthy condition.

THAT the Contractor has prepared / worked out minimum number of healthy Earthing Equipments with Earthing lead confirming to relevant IS / European standards per gang wise during stringing activity/as per requirement, which is enclosed herewith at **Annexure – 4 (SP)** for review and acceptance of Engineer In-Charge/ Project Manager prior to execution of work.

10. THAT the Contractor shall provide communication facilities i.e. Walky – Talkie / Mobile Phone, Display of Flags / whistles for easy communication among workers during Tower erection / stringing activity, as per requirement.

11. THAT the Contractor undertakes to deploy qualified safety personnel responsible for safety as per requirements of Employer/Statutory Authorities.

THAT 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 qualified safety officer having diploma in safety to supervise safety aspects of the equipment and workmen who will coordinate with Engineer In-charge /Project Manager/Safety Co-ordinator of the Employer. 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. If the number of workers are less than 250 then one qualified safety officer is to be deployed for each contract. He will report directly to his head of organization and not the Project Manager of contractor He shall also not be assigned any other work except assigning the work of safety. The curriculum vitae of such person shall be got cleared from EMPLOYER Project Manager / Construction staff.

The name and address of such safety officers of contractor will be promptly informed in writing to Engineer In-charge with a copy to safety officer - In-charge before start of work or immediately after any change of the incumbent is made during the currency of the contract. The list is enclosed at **Annexure – 5A (SP)**.

THAT the Contractor has also prepared a list including details of Explosive Operator (if required), Safety officer / Safety supervisor / nominated person for safety for each erection / stringing gang, list of personnel trained in First Aid Techniques as well as copy of organisation structure of the Contractor in regard to safety. The list is enclosed at **Annexure – 5B (SP)**.

12. The Project Manager 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 Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.

13. THAT, if, any Employer's Engineer/ supervisor at site observes that the Contractor is failing to provide safe working environment at site as per agreed Safety Plan / EMPLOYER Safety Rule/ Safety Instructions / Statutory safety requirement and creates hazardous conditions at site and there is possibility of an accident to workmen or workmen of the other contractor or public or the work is being carried out in an un safe manner or he continues to work even after being instructed to stop the work by Engineer / Supervisor at site / RHQ / Corp. Centre, the Contractor shall be bound to pay a penalty of Rs. 10,000/ - per incident per day till the instructions are complied and as certified by Engineer / Supervisor of Employer at site. The work will remain suspended and no activity will take place without compliance and obtaining clearance / certification of the Site Engineer / Supervisor of the Employer to start the work.

14. THAT, if the investigation committee of Employer observes any accident or the Engineer In-charge/Project Manager of the Employer based on the report of the Engineer/Supervisor of the Employer at site observes any failure on the Contractor's part to comply with safety requirement / safety rules/ safety standards/ safety instruction as prescribed by the Employer or as prescribed under the applicable law for the safety of the equipment, plant and personnel and the Contractor does not take adequate steps to prevent hazardous conditions which may cause injury to its own Contractor's employees or employee of any other Contractors or Employer or any other person at site or adjacent thereto, or public involvement because of the Contractor's negligence of safety norms, the Contractor shall be liable to pay a compensation of Rs. 10,00,000/- (Rupees Ten Lakh only) per person affected causing death and Rs. 1,00,000/- (Rupees One Lakh only) per person for serious injuries / 25% or more permanent disability to the Employer for further disbursement to the deceased family/ Injured persons. The permanent disability has the same meaning as indicated in Workmen's Compensation Act 1923. The above stipulations is in addition to all other compensation payable to sufferer as per workmen compensation Act / Rules

    THAT as per the Employer's instructions, the Contractor agrees that this amount shall be deducted from their running bill(s) immediately after the accident, That the Contractor understands that this amount shall be over and above the compensation amount liable to be paid as per the Workmen's Compensation Act /other statutory requirement/ provisions of the Bidding Documents.

15. THAT the Contractor shall submit Near-Miss-Accident report alongwith action plan for avoidance such incidence /accidents to Engineer – In-charge/ Project Manager. Contractor shall also submit Monthly Safety Activities report to Engineer – In-charge/

Project Manager and copy of the Monthly Safety Activities report also to be sent to Safety In-charge at RHQ of the Employer for his review record and instructions.

16. THAT the Contractor is submitting a copy of Safety Policy/ Safety Documents of its Company which is enclosed at **Annexure – 6 (SP)** and ensure that the safety Policy and safety documents are implemented in healthy spirit.

17. THAT the Contractor shall make available of First Aid Box [Contents of which shall be as per Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Rule 1998 / EMPLOYER Guidelines)] to the satisfaction of Engineer In-Charge/ Project Manager with each gang at site and not at camp and ensures that trained persons in First Aid Techniques with each gang before execution of work.

18. THAT the Contractor shall submit an 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. which is enclosed at **Annexure – 7 (SP)** for approval of the Engineer In-Charge/ Project Manager before start of work.

19. THAT the Contractor shall organise Safety Training Programs on Safety, Health and Environment and for safe execution of different activities of works i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. for their own employees including sub contractor workers on regular basis.

    The Contractor, therefore, submits copy of the module of training program, enclosed at **Annexure – 9 (SP)**, to Engineer In-charge/Project Manager for its acceptance and approval and records maintained.

20. THAT the Contractor shall conduct safety audit, as per Safety Audit Check Lists enclosed at **Annexure – 8 (SP)**, by his Safety Officer(s) every month during construction of Transmission Lines / Sub Stations / any other work and copy of the safety audit report will be forwarded to the Employer's Engineer In-charge / Site In-charge/Project Manager for his comments and feedback. During safety audit, healthiness of all Personal Protective Equipments (PPEs) shall be checked individually by safety officer of contractor and issue a certificate of its healthiness or rejection of faulty PPEs and contractor has to ensure that all faulty PPEs and all faulty lifting tools and tackles should be destroyed in the presence of EMPLOYER construction staff. Contractor has to ensure that each gang be safety audited at least once in two months. During safety audit by the contractor, Safety officer's feedback from EMPLOYER concerned shall be taken and recorded. The Employer's site officials shall also conduct safety audit at their own from time to time when construction activities are under progress. Apart from above, the Employer may also conduct surveillance safety audits. The Employer may take action against the person / persons as

deemed fit under various statutory acts/provisions under the Contract for any violation of safety norms / safety standards.

21. THAT the Contractor shall develop and display Safety Posters of construction activity at site and also at camp where workers are generally residing.

22. THAT the Contractor shall ensure to provide potable and safe drinking water for workers at site / at camp.

23. THAT the Contractor shall do health check up of all workers from competent agencies and reports will be submitted to Engineer In-Charge within fifteen (15) days of health check up of workers as per statutory requirement.

24. THAT the Contractor shall submit information alongwith documentary evidences in regard to compliance to various statutory requirements as applicable which are enclosed at **Annexure – 10A (SP)**.

    The Contractor shall also submit details of Insurance Policies taken by the Contractor for insurance coverage against accident for all employees are enclosed at **Annexure – 10B (SP)**.

25. THAT a check-list in respect of aforesaid enclosures alongwith the Contractor's remarks, wherever required, is attached as **Annexure – Check List** herewith.

THE CONTRACTOR shall incorporate modifications/changes in this 'Safety Plan' necessitated on the basis of review/comments of the Engineer In-Charge/Project Manager within fourteen (14) days of receipt of review/comments and on final approval of the Engineer In-Charge/Project Manager of this 'Safety Plan', the Contractor shall execute the works under the Contract as per approved 'Safety Plan'. Further, the Contractor has also noted that the first progressive payment towards Services Contract shall be made on submission of 'Safety Plan' alongwith all requisite documents and approval of the same by the Engineer In-Charge/Project Manager.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

For and on behalf of

M/s.....…….....

WITNESS

1. Signature..... Signature.....

   Name..... Name.....

   Address..... Address.....

2. Signature..... Authorised representative

   Name..... (Common Seal)

   Address..... (In case of Company)

Note:

All the annexure referred to in this “Safety Plan“are required to be enclosed by the contractor as per the attached “Check List “

1. Safety Plan is to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute such contract documents etc., (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to this Safety Plan.

2. For all safety monitoring/ documentation, Engineer In-charge / Regional In-charge of safety at RHQ will be the nodal Officers for communication.

CHECK LIST FOR SEFETY PLAN

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
1.	**Annexure – 1A (SP)** Safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site.	Yes/No	
2.	**Annexure – 1B (SP)** Manpower deployment plan, activity wise foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc.	Yes/No	
3.	**Annexure – 2 (SP)** List of Lifting Machines i.e. Crane, Hoist, Triffor, Chain Pulley Blocks etc. and Lifting Tools and Tackles i.e. D shackle, Pulleys, come along clamps, wire rope slings etc. and all types of ropes i.e. Wire ropes, Poly propylene Rope etc. used for lifting purposes along with test certificates.	Yes/No	
4.	**Annexure – 3 (SP)** List of Personal Protective Equipment (PPE), activity wise including the following along with test certificate of each as applicable: 1. Industrial Safety Helmet to all workmen at site. (EN 397 / IS 2925) with chin strap and back stay arrangement. 2. Safety shoes without steel toe to all ground level workers and canvas shoes for workers working on tower. 3. Rubber Gum Boot to workers working in rainy season / concreting job. 4. Twin lanyard Full Body Safety harness with shock absorber and leg strap arrangement for all workers working at height for more than three meters. Safety Harness should be	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	with attachments of light weight such as of aluminium alloy etc. and having a feature of automatic locking arrangement of snap hook and comply with EN 361 / IS 3521 standards. 5. Mobile fall arrestors for safety of workers during their ascending / descending from tower / on tower. EN 353 -2 (Guided type fall arresters on a flexible anchorage line.) 6. Retractable type fall arrestor (EN360: 2002) for ascending / descending on suspension insulator string etc. 7. Providing of good quality cotton hand gloves / leather hand gloves for workers engaged in handling of tower parts or as per requirement at site. 8. Electrical Resistance hand gloves to workers for handling electrical equipment / Electrical connections. IS : 4770 9. Dust masks to workers handling cement as per requirement. 10. Face shield for welder and Grinders. IS : 1179 / IS : 2553 11. Other PPEs, if any, as per requirement etc.		
5.	**Annexure – 4 (SP)** List of Earthing Equipment / Earthing devices with Earthing lead conforming to IECs for earthing equipments are – (855, 1230, 1235 etc.) gang wise for stringing activity/as per requirement	Yes/No	
6.	**Annexure – 5A (SP)** List of Qualified Safety Officer(s) alongwith their contact details	Yes/No	
7.	**Annexure – 5B (SP)** Details of Explosive Operator (if required), Safety officer / Safety supervisor for every erection / stinging gang, any other person nominated for safety, list of personnel trained in First Aid as well as brief information about safety set up by the Contractor alongwith copy of organisation of the Contractor in regard to safety	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
8.	**Annexure – 6 (SP)** Copy of Safety Policy/ Safety Document of the Contractor's company	Yes/No	
9.	**Annexure – 7 (SP)** 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc.	Yes/No	
10.	**Annexure – 8 (SP)** Safety Audit Check Lists (Formats to be enclosed)	Yes/No	
11.	**Annexure – 9 (SP)** Copy of the module of Safety Training Programs on Safety, Health and Environment, safe execution of different activities of works for Contractor's own employees on regular basis and sub contractor employees.	Yes/No	
12.	**Annexure – 10A (SP)** Information alongwith documentary evidences in regard to the Contractor's compliance to various statutory requirements including the following:		
(i)	Electricity Act 2003 _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(ii)	Factories Act 1948 _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
(iii)	Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Act 1996) and Welfare Cess Act 1996 with Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(iv)	Workmen Compensation Act 1923 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(v)	Public Insurance Liabilities Act 1991 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(vi)	Indian Explosive Act 1948 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(vii)	Indian Petroleum Act 1934 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(viii)	License under the contract Labour (Regulation & Abolition) Act 1970 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(ix)	Indian Electricity Rule 1956 and amendments if any, from time to time. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
(x)	The Environment (Protection) Act 1986 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(xi)	Child Labour (Prohibition & Regulation) Act 1986. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(xii)	National Building Code of India 2005 (NBC 2005). _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(xiii)	Indian standards for construction of Low/ Medium/ High/ Extra High Voltage Transmission Line _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
(iv)	Any other statutory requirement(s) [*please specify*] _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	
13.	**Annexure – 10B (SP)** Details of Insurance Policies alongwith documentary evidences taken by the Contractor for the insurance coverage against accident for all employees as below:		
(i)	Under Workmen Compensation Act 1923 and Rules. _____ [*Name of Documentary evidence in support of*	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	insurance taken]		
(ii)	Public Insurance Liabilities Act 1991 _____ [*Name of Documentary evidence in support of insurance taken*]	Yes/No	
(iii)	Any Other Insurance Policies _____ [*Name of Documentary evidence in support of insurance taken*]	Yes/No	

____

EMPLOYER

Annexure-18

CHECKLIST FOR INSPECTION OF TRANSMISSION LINES AND SUB-STATION

TRANSMISSION LINES			
NON-SHUT DOWN	**SHUT DOWN**	**DEFECT**	**MONTH DATE**
		A. FOUNDATION	
A 1		Soil erosion/uneven settlement	
A 2		Any crack/damage to foundation	
A 3		Any crack/damage to retaining wall/revetment	
A 4		Missing/Damage/Earthwire/Strip	
A 5		Earth Cutting from vicinity of foundation	
		B. TOWER	
B 1		Damaged/Missing Member BWL	
	B 2	Damaged/Missing Member AWL	
B 3		Damaged/Missing nuts &bolts BWL	
	B 4	Damaged/Missing nuts &bolts AWL	
B 5		Danger plate missing	
B 6		Number plate missing	
B 7		Phase plate missing	
B 8		Protective coating disappeared	
B 9		Step bolts missing	
B 10		Foreign material on Tower *viz* birds nest	
		C. HARDWARE FITTINGS & INSULATORS	
	C 1	Surface pollution	
	C 2	Unusual deflection of string	
	C 3	Flash over/Burning mark	
	C 4	No. of fitting damage	
	C 5	No. of disc damage	
		D. CONDUCTOR AND EARTHWIRE	
	D 1	Strands cut and open	
	D 2	Loose jumpers of conductor	
	D 3	Hanging earthwire	
	D 4	Dislocated/Loose VD of conductor	
	D 5	Missing VD of Conductor	
	D 6	Dislocated/Loose VD of earthwire	
	D 7	Missing VD of earthwire	
	D 8	Spacers Missing	
	D 9	Spacers Dislocated/Loose	
	D 10	Jumper/Hard Spacer missing	

TRANSMISSION LINES			
NON-SHUT DOWN	**SHUT DOWN**	**DEFECT**	**MONTH DATE**
	D 11	Jumper/Hard spacer loose/dislocated	
	D 12	Copper bonds missing	
	D 13	Copper bonds dislocated	
		E. ELECTRICAL CLEARANCE	
E 1		Details of trees causing/may cause problems	
	E 2	Infringement in clearance of bottom conductors to ground	
	E 3	Infringement in clearance of earthwire to conductor	
E 4		Any new construction seen within the line	
E 5		Well blasting below the line	
		Patrolling done by	
		Signature	
		Counter Signature by Line Section I/C	
1) Comments with signature of Line Section In-charge Date			

SUB-STATION			
SL. NO	**ACTIVITY**	**TEST RESULTS TO BE APPROVED BY**	**S/D PERIOD**
1	**AC PLANT**		
1.1	AHU		
1.2	Compressors		
1.3	Condenser Unit		
1.4	Cooling Towers		
1.5	Electrical Motor		
1.6	LT Panels		
1.7	Water Treatment		
2	**BATTERY SYSTEMS**		
3	**BUSBARS**		
4	**CAPACITANCE VOLTAGE TRANSFORMER**		
5	**CIRCUIT BREAKERS**		
5.1	Air Blast CB		
5.2	CB Operation		
5.3	Control Cabinet		
5.4	Measurement		

SUB-STATION			
SL. NO	**ACTIVITY**	**TEST RESULTS TO BE APPROVED BY**	**S/D PERIOD**
5.5	SF_6 CB		
6	**CURRENT TRANSFORMER**		
7	**DG SET**		
8	**FIRE PROTECTION**		
8.1	Compressor		
8.2	Deluge System		
8.3	Diesel Engine		
8.4	Electrical Panel		
8.5	Fire Alarm System		
8.6	Fire Extinguish		
8.7	General		
8.8	Hydrant System		
8.9	Jockey Pump		
8.10	Motors		
8.11	Pumps		
8.12	Strainers		
9	**ISOLATORS & E/S**		
9.1	Earth Switch		
9.2	Main Contacts		
9.3	Marshalling Box		
9.4	Operating mech.		
10	**LIGHTNING ARRESTORS**		
11	**CT SW. GEARS (ACDB)**		
12	**PLCC SYSTEM**		
13	**PROTECTION SYSTEMS**		
14	**SHUNT REACTORS**		
15	**TELEPHONE EXCHANGE**		
16	**WAVE TRAPS**		

ANNEXURE- 19

SAMPLE TERMS OF REFERENCE (TOR) FOR BIODIVERSITY ASSESSMENT STUDY

1.0 Background :

Power transmission is a less intrusive activity. Its operational activities are totally different from other linear transportation corridors. However, it may have some negative impacts on area it traverses and affect any sensitive receptors in its vicinity. In order to ensure that there is minimum impact on any important biodiversity area encountered along the routes, if any, a specific Biodiversity Assessment Study for this stretch shall be undertaken by independent agency to provide necessary mitigation measures that can be incorporated into overall Environment Management Plan (EMP) of the project.

2.0 Objectives & Scope of the Study:

The above study aims in identifying potential impacts on flora and fauna and to suggest relevant compensatory and mitigatory measures to protect/conserve biodiversity in the likely impacted area along RoW of transmission line due to the project activity. To achieve this agency/consultant shall carry out a comprehensive study on biological, socio-economic aspects along the proposed routes (RoW) limited to affected biodiversity area and assess the potential impacts and risks (direct as well as indirect/ induced) due to the project activities and shall suggest appropriate measures for compensating & mitigating measures for managing the same. This study will describe the biodiversity values present on the development site and the impact of the project activity on these values and also identify reasonable measures and strategies that can be taken to avoid and minimise impacts on biodiversity.

3.0 Approach and Methodology of the Study:

The study will essentially carried out in two parts:

i) Baseline study in order to determine what flora & fauna species of concern might be found along the route in such sensitive areas through review of data from secondary sources like important data base (IBAT Business), using Satellite imaginary like GIS and GPS technique, IUCN Red data lists, other literatures/publications, various notifications/ gazette, forest/wildlife management plans and other studies, if available

ii) Field study and collection of primary data along the route in protected/sensitive areas on key parameters like

a) Details of flora & fauna with special reference to endemic/threatened species population reported from the study area.
b) Description of habitat for such endemic/threatened species, , ecology and like threat including the breeding, foraging pattern and its conservation plan/biodiversity action plan undertaken, if any
c) Socio-economic values of the affected area vis-à-vis biodiversity values.
d) Consultations with forest/wildlife officials, local communities, technical & managerial staff of Utility and survey team.

4.0 Output:

The agency will submit biodiversity assessment report including management plan broadly covering following aspects:

1) ***Baseline status of diversity values project affected area***: Biodiversity assessment shall include details on forest/ tree cover with species and girth distribution, density/crown, description of understory and middle storey flora & fauna, if any, survey of fauna including species abundance, major habitats, current distribution etc. The study also cover distribution of species in terms of seasonal issues related to breeding and feeding ecology and geographical issues related with the movement of wild species including species from cryptic habitats. This study also identify any rare, endangered, threatened, and endemic species of flora and fauna present along the route. If such species are present, the assessment shall also include geographical features and other associations important for survival of these species and their role in community ecology.

2) ***Study of ecological, environmental and socio-economic impacts***: The study should concentrate on the likely impacts on flora & fauna including their role in community ecology due to project activities. The study shall include impact on socio-economic aspect and also impact on ancillary activities such as provision of access roads to site, on other resources on biodiversity value in the affected area.

3) ***Management Plan for bio-diversity conservation***: Based on the assessment, suitable management plan shall be prepared describing adequate compensation, mitigation and management measures with respect to identified impacts, if any. It should focus on measures for conserving important resources, recommending avoidance of impacts by modifying design of specific activities/components if practical, minimum compensatory measures required by GoI/State government for mitigation and/or management measures for indirect or induced impacts, institutional arrangements including co-ordination mechanisms that need strengthening, description of roles and responsibilities, and budgetary resources required.

5.0 Resource Requirements:

It is anticipated that the assignment will require a Biodiversity Expert assisted by a field team of support professionals including Ecologist, Wildlife Biologist, and Zoologist & Environmental Management/Planning Specialist etc.

6.0 Completion Schedule & Final Deliverables:

It is expected that the above study will be completed within 8-14 weeks from the date of issuance of Work Order. The agency will submit final report in both hard & soft copy with within 2 weeks of acceptance of report.

Annexure-20

Table of Content for Initial Environment Assessment Report (IEAR) For Sub Project

Section - I: Project Description: Brief description of the background, objective of the project, resultant benefit and scope of the work

Section – II: Base line data: Description of the relevant physical, physiographical, and socio-economic condition of the project area including description of natural resources base like forest resources or any other environment sensitive areas like National Park sanctuary etc. along with description of climatic condition, population and other demographic features of the project area.

Section -III: Policy, Legal and Regulatory framework: Description of the policy, Legal and Regulatory framework applicable to transmission project and the environmental requirement under which environment assessment has been carried out.

Section – IV: TSECL Approach for Route Selection: Brief description of the environmental criteria for selection of route and sub-station(if applicable) description of alternative studies made for proposed route of transmission line including systematic analysis of different alternative studied with reference to particular environmental & social parameters like involvement of forest, protected areas, significant economic benefit associated with the project and without the project etc. and reason for selection of proposed route.

Section – V: Screening of potential Environmental impact, evaluation and mitigation measures: Description of the criteria for identification of potential impact due to project location, construction and operation on the environment (clearing of forest/vegetation) public health, landscape etc. its extent magnitude, duration and significance. The section will also list different measures like design modification, variation in alignment compensation etc. to either completely avoid or to mitigate such impact to the extent possible. Section also details out process of public consultation for the given project and peoples reaction/suggestion if any and a conclusion regarding further studies required for selected impacts if any.

Section – VI: Monitoring and organization support structure: Describing of the monitoring plan reporting pattern/frequency, cost estimate, external monitoring requirement/timing for potential environment & social issues with detailed Environment Management Plan (EMP) and proposed organization support structure for the same including training needs if so felt.

Enclosures:

1) Original Topo map (SOI) with alternative route marked
2) Public Consultation details like list of participants, photos etc.
3) Any other supporting documents.

Annexure- 21

TABLE OF CONTENT FOR COMPENSATION PLAN FOR TEMPORARY DAMAGES (CPTD) FOR SUB PROJECT

Section - I: Project Description: Brief description of the background, benefits of the project, objective of compensation plan.

Section – II: Project Impacts : Minimization of impacts**,** description of alternative studies made for proposed route of transmission line including systematic analysis of different alternative studied with reference to particular environmental & social parameters like involvement of forest, protected areas, significant economic benefit associated with the project and without the project etc. and reason for selection of proposed route, analysis of impacts

.

Section – III: Socio-economic and Environmental Analysis for CPTD: Description of the physical, physiographical, socio-economic condition of the project area including other demographic features of the project area, Preliminary Social assessment, Impact due to project location and design and Critical social review criteria

Section -IV: Compensation Framework: Description of compensation plan, Procedure for tree/crops/land compensation.

Section – V: Stakeholders Participation & Compensation: Public Consultation during Preliminary Survey and peoples reaction/suggestion if any, Plan for further consultation during implementation

Section – VI: Institutional Arrangements for Implementation and Monitoring: Describing the implementation schedule, Grievances Redressal Mechanism, Disclosure, Evaluation and monitoring plan. Budget provision for compensation

Annexure-22

Table of Content for Final Environment Assessment Report (FEAR) for Transmission and Distribution Project

Section - I: Project Description: Brief description of the background, objective of the project, resultant benefit and scope of the work

Section – II: Base line data: Description of the relevant physical, physiographical, and socio-economic condition of the project area including description of natural resources base like forest resources or any other environment sensitive areas like National Park sanctuary etc. along with description of climatic condition, population and other demographic features of the project area.

Section -III: Policy, Legal and Regulatory framework: Description of the policy, Legal and Regulatory framework applicable to transmission project and the environmental requirement under which environment assessment has been carried out.

Section – IV: Major Features of Final Route & Environment Impact: Brief description of the environmental criteria for selection of route and major features of final route alignment , details of forest involvement including number of trees and species of the trees likely to be effected. The details of forest clearance and environmental impact matrix describing in brief the extent of impact of transmission line.

Section – V: Potential Environmental Impact, Evaluation and its Management: Description of the measures adopted and under implementation for identified impact due to project location, design, construction, O&M details of public consultation and its documentation, details of contractual conditions regarding safeguard issues under scope of contract for compliance and conclusion listing the category of the project based on the impact and analysis.

Section – VI: Monitoring and Organization Support Structure: Description of the monitoring plan, reporting pattern/frequency, external monitoring requirement/timing for potential environment & social issues with compliance status of Environment Management Plan (EMP) and organization support structure.

Enclosures:

1) Original Topo / GIS map with Final route marked
2) Public Consultation details like list of participants, photos etc.
3) Copy of Forest proposal and Compensatory Afforstation plan.
4) Forest approval letters

5) Tree, crop compensation details
6) Contract conditions regarding safeguard issues.
7) Budget/Expenditure
8) Compliance details of safety checklist/measures

Annexure-23

TSECL's Public Consultation Process

Public consultation forms an integral part of TSECL's project cycle, and will be carried out in local language (Bengali & Tipura) for wider/better understanding. The process of consultation and its documentation shall be as follows:

TRANSMISSION LINES

1. When planning a transmission line, public consultation is used as an integral tool for screening, assessment and finalisation of route alignment. During initial screening and walkover survey, TSECL's staffs meet the public in the route of proposed transmission line. Observations and problems arising from these discussions are given due consideration while finalising the route.

2. During the survey for tower spotting, TSECL's site officials meet the public i.e. people coming in the route of the line. This enables TSECL to gauge public opinion. At the time of construction, every individual on whose land a tower is to be erected is met with. People coming in the way of the ROW are consulted and their views and suggestions are incorporated thus allowing for public participation.

3. During construction TSECL pays the compensation for any damages to each land owner and obtains their final acknowledgement.

4. During maintenance, TSECL consults the individual landowners, obtains their approval and pays compensation for any damage to property.

Substations:

1. TSECL identifies locations of the substation/DTs. If it is private/panchayat land TSECL shall request GoT for acquisition for their purpose after selecting suitable one as per LARRA, 2014. Preliminary Social Assessment shall be done by TSECL as per funding agency requirement and public views shall be recorded too, till this point.

2. Further processing shall be done by concerned dept. of GoT as per LARRA and after acquisition GoT will give possession to TSECL.

In order to further streamline the consultation process for transmission/distribution line and to facilitate documentation of the same, the followings aspects may be shared during public discussion:

- complete project plan (i.e. its route and terminating point and substations, if any, in between
- 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 TSECL's approach to minimising and solving them;

TSECL shall practise to use one or more of the following consultation techniques at various stages. These include:

(1) ***Public meetings:*** TSECL will hold public meetings during its EAMP process at appropriate locations along the length of the transmission line. Public meetings will include one to one meetings with land owners during transmission tower spotting. Larger group meetings will be organised at strategic distances along the length of the transmission line. These will consist of all or at least most of the people to be directly affected by the concerned project and their local Gram Panchayat leaders.

(2) ***Informal small group meetings:*** Informal small group meetings will be conducted during walkover survey to find out local environmental and social issues along the proposed transmission line route. These meetings will be conducted by Site staff at appropriate intervals.

(3) ***Information brochures and Pamphlets: TSECL*** will make available information and project specific details to the public through Information brochures and Pamphlets. These brochures and pamphlets will contain information on: the overall project plan; design and construction standards; prudent deviations from design standards from transmission towers near schools, hospitals, human habitation; potential impacts and generic mitigation measures; resettlement and rehabilitation; and, compensation.

(4) ***Operating field offices:*** Information regarding the proposed transmission line can be accessed by the public from operating field offices. Information will be provided through brochures and pamphlets and any further queries will be responded by TSECL's staff.

(5) ***Local planning visits and site visits: TSECL*** staff will visit field sites. During this time informal contacts will be established with the local people. Reactions of the public to the project will be informally gauged.

(6) ***Response to public Enquires:*** Circle office will respond to public enquiries by post or through notices in local news papers.

(7) ***Press release inviting comments:*** TSECL will publish details of proposed transmission routes in two local newspapers. Public will be invited to comment in writing or by meeting concerned TSECL officials within a specified period. TSECL will then incorporate relevant objections and suggestions.

(8) ***Project coordination committees:*** TSECL will set up grievance redressal committees to address the complaints and objections that PAP's may have regarding the project, its impacts or mitigation measures.

(9) ***Ombudsman or representative:*** For building a consensus on the project its impacts and mitigation measures, the PAPs will be encouraged to elect or appoint a trusted ombudsman or representative.

(10) ***Public Displays:*** TSECL will show their model projects to public/small representative groups.

DOCUMENTATION

The proceedings of the above consultation shall be documented. Details recorded will include date of the meeting, venue, number and possibly the names of the people attended, issues discussed and the outcome of the meeting.

The manager at Circle office/site will apply combinations of the appropriate techniques at various activities of a project depending upon the field conditions as shown below:

Milestones	Process	Techniques
1. Environmental & social screening & scoping for TL/DL	▪ Screen &scope TL/DLs from an environmental and social perspective - spot verification	Informal small group meetings, local planning visits and site visits
2. Environmental & social screening & scoping for SS	▪ Screen &scope SS from an environmental and social perspective - spot verification	Informal small group meetings, Local planning visits and site visits
3. EAMP	▪ TL/DLs & SS - undertake environmental review and formulate appropriate management measures	Public meetings, Press release inviting comments
4. SAMP	▪ TL/DLs - negotiate compensation packages with revenue authorities and Affected person (APs) - finalise and document compensation and other management measures	Informal small group meetings, local planning visits and site visits, Response to public enquiries

Milestones	Process	Techniques
	▪ SS - finalise SS site	
5. Execution of Environmental management works	▪ Execute environmental management works - Appropriate clearance for Transmission line ROW, etc. - compensatory afforestation	Information brochures and pamphlets, Operating field offices, Response to public enquiries
6. Execution of Social management works	▪ Tls - pay compensation as agreed and documented in SAMP and execute other measures ▪ SS - deposit compensation and take possession of land -	Information brochures and pamphlets, Operating field offices, Response to public enquiries Information brochures and pamphlets, Operating field offices, Response to public enquiries
7. Environmental and Social monitoring	▪ Monitor EAMP measures - maintenance of ROW - progress on compensatory afforestation ▪ Monitor SAMP measures - appropriate compensation and other measures during maintenance of towers and lines	Information brochures and pamphlets, Operating field offices, Response to public enquiries Informal small group meetings