Semi-Annual Environmental Safeguard Monitoring Report

Loan Number : 3521-IND & 8325-IND

Reporting Period : May'17 to Dec.'17

Solar Transmission Sector Project

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Implementing Agency : POWERGRID

Executing Agency : POWERGRID

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ABBREVIATIONS

ADB	–	Asian Development Bank
CEA	–	Central Electricity Authority
CPTD	–	Compensation Plan for Temporary Damages
CSS	–	Country Safeguard System
CTU	–	Central Transmission Utility
DFO	–	Divisional Forest Officer
EAMP	–	Environmental Assessment Management Plan
ESPP	–	Environment and Social Policy & Procedures
ESMD	–	Environment & Social Management Department
EMP	–	Environmental Management Plan
GHGs	–	Green House Gases
GRM	–	Grievances Redressal Mechanism
GRC	–	Grievance Redressal Committee
HVDC	–	High Voltage Direct Current
IEAR	–	Initial Environmental Assessment Report
ISTS	–	Inter State Transmission Scheme
Km	–	Kilometers
MoEFCC	–	Ministry of Environment, Forest and Climate Change
PAPs	–	Project Affected Persons
POWERGRID	–	Power Grid Corporation of India Ltd.
PMU	–	Project Management Unit
RAP	–	Resettlement Action Plan
RE	–	Renewable Energy
RoW	–	Right of Way
S/s	–	Substation
SAMP	–	Social Assessment Management Plan
SPS	–	Safeguard Policy Statement, 2009 of ADB
TPDP	–	Tribal People Development Plan
UMSPP	–	Ultra Mega Solar Power Parks
USD	–	United States Dollar

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SECTION 1: INTRODUCTION

Power Grid Corporation of India Ltd. (POWERGRID), the Central Transmission Utility (CTU) of the country, is engaged in power transmission with the mandate for planning, co-ordination, supervision and control over complete Inter-State transmission system. It has been contributing significantly towards development of Indian power sector by undertaking coordinated development of power transmission network along with effective and transparent operation of regional grids and through continuous innovations in technical & managerial fields.

Government of India has taken up the initiative for development of Ultra Mega Solar Power Parks (UMSPP) in various parts of the country. Keeping in view short gestation period of solar generation project and time required for development of evacuation system, it is proposed that the transmission scheme may be implemented in different phases commensurate to the power transfer requirement. MoP vide letter dated 08.01.15 & 04.08.15 intimated POWERGRID for taking up of transmission system for evacuation of power from 9 solar generating parks being set up in 7 States along with pooling stations as ISTS Scheme, including subject Tumkur (Pavagada) UMSPP on compressed time schedule basis.

As part of above initiative, an ultra-mega solar power park of 2000 MW capacity is being developed by M/s Karnataka Solar Power Development Corporation Ltd. (KSPDCL) (JVC of SECI & KREDL) at Pavagada in Tumkur district of Karnataka in two phases with 1000MW in each phase. A Ultra-Mega Solar Power Park is also being developed by M/s Saurya Urja Company of Rajasthan Ltd (JVC of Govt. of Rajasthan and IL&FS) for 1000MW capacity and M/s Adani Renewable Energy Park Rajasthan Ltd. (JVC of Govt. of Rajasthan and AREPL) for 500MW capacity as well as by M/s Essel Saurya Company of Rajasthan Ltd (JVC of Govt. of Rajasthan and Essel Infra Projects Ltd) for 750 MW in/near Bhadla, Jodhpur district, Rajasthan. Further, setting up of ultra-mega solar park of 700 MW capacities has been envisaged by M/s Gujarat Power Corporation Limited (GPCL) at Radhanesda district Banaskantha in Gujarat. Ministry of Power (MoP) has assigned POWERGRID to implement transmission system for various solar parks including Banaskantha UMSPP (700 MW) in Gujarat on compressed time schedule basis.

Besides, Rihand-Dadri HVDC system is an important link of Northern Region and is responsible for evacuation of major power out of 3000MW generated at Rihand Generating station. Reliable operation of Rihand-Dadri HVDC is of most importance for smooth operation of Northern Grid as power interruption in the link results in back down of generators in Rihand/Singrauli generating complex and also affects power supply to Delhi/Punjab. Though the system was running satisfactorily till last 3-4 years, problems started arising in different areas of HVDC resulting in outage of HVDC system as well as interruption of power flow. These failures are due to ageing of the equipment as Rihand-Dadri HVDC system has already completed its useful life of 25 years. The project involves up gradation of Rihand & Dadri HVDC systems which will enhance its

life and improve reliability as Rihand-Dadri HVDC system has already completed its useful life of 25 years.

The above inter-state transmission scheme for Bhadla, Tumkur (Pavagada) & Banaskantha UMSPP were discussed and agreed in the Standing committee meeting on Power system Planning held on 20.01.16, 05.03.2016 & 20.01.16 respectively

To meet the funding requirement for the proposed project, Asian Development Bank (ADB) has accepted POWERGRID's proposal to finance a loan of USD 225 million for implementation of transmission system for three UMSPP at Bhadla, Pavagada and Banashkantha and some package for up-gradation of HVDC Rihand-Dadri Project. Moreover, ADB selected this project to be implemented and monitored in line with the POWERGRID's Environmental and Social Policy & Procedures and the Action Plan for Safeguards prepared for the use of CSS so as to ensure that ESPP achieve and maintain full equivalence with ADB's SPS, 2009. The funding for the remaining part will be met from POWERGRID's own Internal Resources (IR). The loan no. 3521-IND & 8325-IND were signed on 5th April, 2017 and became effective from 9th May, 2017. The loan closing date is 31st May, 2022.

1.1 OVERALL PROJECT DESCRICTION

The Solar Transmission Sector Project covered under Loan No. 3521-IND and 8325-IND involves following projects:

(i) Transmission System associated with Solar Park at Bhadla, Rajasthan

- Bhadla (POWERGRID) – Bikaner (POWERGRID) 765kV D/c line;
- Bhadla (POWERGRID)- Bhadla (RVPN) 400kV D/c (Quad);
- Establishment of 765/400/220kV Bhadla (POWERGRID) substation;
- Extension of 765/400kV Bikaner (POWERGRID) substation
- Extension of 400/220kV Bhadla (RVPN) substation.

(ii) Transmission system for Ultra Mega Solar power park (2000 MW) at Tumkur (Pavagada), Karnataka - Phase-II (Part- A & B)

a) Transmission system for Ultra Mega Solar power park (2000 MW) at Tumkur (Pavagada), Karnataka - Phase-II (Part-A)

- Hiriyur – Mysore 400kV D/C line;
- Extension of 400/220kV Tumkur (Pavagada) Pooling station;
- Extension of 400/220kV Mysore (POWERGRID) substation;
- Extension of 400/220kV Tumkur (Vasantnarsapur) substation;

b) Transmission system for Ultra Mega Solar power park (2000 MW) at Tumkur (Pavagada), Karnataka - Phase-II (Part-B);

- Tumkur (Pavagada) PS -Devanahally(KPTCL) 400kV D/c (Quad) Line;
- Extension of 400/220kV Tumkur (Pavagada) Pooling Station;
- Extension of 400/220kV Devanahally (KPTCL) substation

(iii) Transmission system for Ultra Mega Solar Power Park (700 MW) at Banaskantha (Radhanesda), Gujarat
- Banaskantha (Radhanesda) Pooling Station– Banaskantha (PG) 400kV D/c Line;
- 400kV Bay Extension at 765/400kV Banaskantha (PG) substation.

(iv) Upgradation of HVDC Rihand-Dadri Project
- Control & Protection Upgradation (Replacement of existing Control & Protection including SCADA System with latest new Control & Protection including SCADA System);
- Valve Cooling Upgradation (Replacement of existing wet type Valve Cooling System with new Valve Cooling System).

1.2 PROJECT OBJECTIVES

The objective is to improve import capability of Northern, Southern & Western regions through transmitting harnessed solar power, which is another sustainable alternative, renewable and non-polluting form of energy and does not emit any Green House Gases (GHGs) or harmful wastes.

1.3 ENVIRONMENTAL CATEGORY

As per the Asian Development Bank's (ADB) classification of project on the basis of potential environmental impacts, the Solar Transmission Sector Project is classified as Environmental Category 'B'.

1.4 ENVIRONMENTAL PERFORMANCE INDICATORS:

The following parameters which are considered as key indicators for this project need to be monitored to evaluate the environmental performance.

1. Selection of optimum route which has least impact on environment and also avoids protected area/ecological sensitive area/ historical or cultural monuments;
2. Compliance with all applicable statutory requirements;
3. Compliance to CSS Action Plan for Safeguards & Loan Covenants;
4. Compliance with Environment Management Plan.

1.5 OVERALL PROJECT PROGRESS, AGREED MILESTONES & COMPLETION SCHEDULES

Name of project	Project Details	Progress as on Dec.'2017	Completion Schedule
Transmission System associated with Solar Park at Bhadla, Rajasthan	**Transmission Line:** • Bhadla (POWERGRID)–Bikaner (POWERGRID) 765kV D/c line • Bhadla (POWERGRID)- Bhadla (RVPN) 400kV D/c (Quad)	Tower foundation – 49%, Erection- 18 % completed & Stringing is yet to start.	January 2019

	Substation: • Establishment of 765/400/220kV Bhadla (POWERGRID) substation • Extension of 765/400kV Bikaner (POWERGRID) Substation • Extension of 400/220kV Bhadla (RVPN) Substation	Approx. 50% civil works and 20 % equipment erection completed	
Transmission system for Ultra Mega Solar power park (2000 MW) at Tumkur (Pavagada), Karnataka - Phase-II (Part-A & B)	**Transmission Line:** • Hiriyur – Mysore 400kV D/C line; • Tumkur (Pavagada) Pooling station-Devanahally (KPTCL) 400kV D/c (Quad) Line **Substation:** • Extension of 400/220kV Tumkur (Pavagada) Pooling station • Extension of 400/220kV Mysore (POWERGRID) Substation • Extension of 400/220kV Tumkur (Vasantnarsapur) Substation • Extension of 400/220kV Tumkur (Pavagada) Pooling station • Extension of 400/220kV Devanahally (KPTCL) Substation	Approx. 30% of Tower foundation & 13% of Erection completed. Stringing not yet started. Approx. 20% civil works completed	February 2019
Transmission system for Ultra Mega Solar Power Park (700 MW) at Banaskantha (Radhanesda), Gujarat	**Transmission Line:** • Banaskantha (Radhanesda) Pooling Station – Banaskantha (PG) 400kV D/c. **Substation:** • 400kV Bay Extension at 765/400kV Banaskantha (PG) Substation	Only 15% of Tower foundation completed. Engineering works under Progress.	September 2018
Upgradation of HVDC Rihand-Dadri Project	• Control & Protection Upgradation (Replacement of existing Control & Protection including SCADA System with latest new Control & Protection including SCADA System); • Valve Cooling Upgradation (Replacement of existing wet type Valve Cooling System with new Valve Cooling System).	Yet to be awarded	---

SECTION 2 : COMPLIANCE STATUS WITH APLLICABLE STATUTORY REQUIREMENTS

The applicable statutory requirements vis-s-vis POWERGRID**'s** compliance status is presented below.

S. No.	Legal Requirements	Applicable Attributes	POWERGRID's Compliance Status
1.	Forest (Conservation) Act, 1980	This Act is applicable whenever a transmission line traverses forest area. Prior approval from Ministry of Environment Forests and Climate Change (MoEFCC), Govt. of India has to be obtained before construction of line in forest areas	Only 0.414ha. of social forestry (strip plantation along State Highway crossings) involved in one line i.e. Banaskantha (Radhanesda) Pooling Station – Banaskantha (PG) 400 kV D/c Line. POWERGRID has submitted diversion proposal for obtaining clearance from Ministry of Environment, Forests and Climate Change. Details of clearance status are presented in **Table-1**.
2.	Batteries (Management and Handling) Rules, 2001	To avoid/minimize lead pollution, Bulk consumers shall have the responsibility to dispose all used batteries to dealers, manufacturer, registered recycler, reconditioners or at the designated collection centres only. Half-yearly return (Form-8) for the same is to be submitted to the concerned State Pollution Control Board.	Since the instant project is under implementation phase, no used batteries have been replaced so far.
3.	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.	As per the notification, used mineral oil is categorized as hazardous waste and requires proper handling, storage and disposed only to authorised disposal facility (registered recyclers/ reprosessors). Annual return (Form -13) for the same is to be submitted to the concerned State Pollution Control Board.	Transformer oil (Used mineral oil) is changed only after 10-15 years of operation Since the instant project is under implementation phase, oil change/ replacement is not envisaged at present.
4.	Ozone Depleting Substances (Regulation and Control) Rules, 2000	Controls and regulations specified on manufacturing, import, export, and use of CFC compounds.	Necessary provisions have been made in contract document for restricting the use/supply of CFC compounds.

Table-1: Details of Forest/ Wildlife Clearance Status

Sl. No.	Name of the Line	Forest Area (Ha.)	State	Present Status
1.Transmission System for UMSPP at Tumkur (Pavagada), Phase II (Part A & B)				
i)	Hiriyur – Mysore 400 kV D/c	Nil		No forest area involved
ii)	Tumkur (Pavagada)– Devanhally (KPTCL) 400 kV D/c (Quad)	Nil		No forest area involvement as per preliminary assessment. Detailed survey yet to be completed.
2.Transmission System for UMSPP at Banaskantha (Radhanesda), Gujarat				
i)	Banaskantha (Radhanesda) Pooling Station – Banaskantha (PG) 400 kV D/c	0.414	Gujarat	Forest area involved only strip plantation along road crossings (State Highway) Forest proposal submitted on 12.12.2017.
3. Transmission System associated with Solar Park at Bhadla, Rajasthan				
i)	Bhadla –Bikaner 765kV D/c	Nil		No forest area involved
ii)	Bhadla – Bhadla 400kV D/c (Quad)	Nil		No forest area involved.
4. Upgradation of HVDC Rihand-Dadri Project (No New Line involved)				

SECTION 3 : COMPLIANCE STATUS WITH MAJOR LOAN COVENANTS

POWERGRID has complied with various environmental safeguards as agreed in the loan covenants. The point wise compliance status is presented in the table below;

Project Specific Covenants	Reference	Status of Compliance
The Borrower shall ensure, to ADB's satisfaction, prior to any disbursement of Loan proceeds for the relevant Subproject, the following requirements, as outlined in the PAM: (a) each Subproject meets the Subprojects selection criteria for ADB appraisal; (b) project relevant information of each of the Subprojects is disclosed to affected persons during consultation and prior to ADB appraisal; (c) draft and final IEAR, EAMP and SAMP (CPTD, RAP and/or TPDP, as applicable) are submitted to ADB for its review; (d) satisfactory draft, final, and any updated IEAR, EAMP, and SAMP (CPTD, RAP and/or TPDP, as applicable) are disclosed on the Borrower's website; and (e) submit the same to ADB for disclosure on ADB website.	LA, Sch. 5, para. 10	Complied
The Borrower shall use agency-level CSS to assess, categorize and address any environmental or social impacts under the Project in accordance with the ESPP, the agreed Action Plan for Safeguards, and the provisions set out in paragraphs 12 through 17 of this Schedule.	LA, Sch. 5, para. 11	Complied/Being complied. The detailed compliance status under CSS is placed as **Annexure-I.**
The Borrower shall adopt and implement the Action Plan for Safeguards in a timely manner so as to ensure that its ESPP achieve and maintain full equivalence with the objectives, policy scope, principles and triggers of SPS throughout Project implementation.	LA, Sch. 5, para. 12	

The Borrower shall promptly notify ADB of any proposed changes to its ESPP or its safeguards implementation practices pursuant thereto. If, in the reasonable opinion of ADB, the change(s) could have the effect that environmental or social impacts under the Project are no longer assessed, categorized or addressed in a manner consistent with the objectives, policy scope, principles and triggers of SPS, ADB may (i) require such additional changes to the Action Plan for Safeguards or other remedial actions as it considers necessary to maintain such consistency or (ii) withdraw its approval for the use of CSS and financing of related Subprojects.	LA, Sch. 5, para. 13	Will be notified in case of any changes in ESPP.
The Borrower shall ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities, including their associated facilities, comply with (a) all applicable laws and regulations of the Guarantor and the relevant States relating to environment, health and safety; (b) the ESPP; (c) the Action Plan for Safeguards; and (d) all measures and requirements set forth in the respective IEAR, EAMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	LA, Sch. 5, para. 14	Complied/To be complied.
The Borrower shall make available necessary budgetary and human resources to fully implement the ESPP; the Action Plan for Safeguards; and each EAMP and SAMP (CPTD, RAP and/or TPDP, as applicable); and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	LA, Sch. 5, para. 18	Complied/Being complied.
The Borrower shall ensure that all bidding documents and contracts for works contain provisions that require contractors to: (a) comply with the measures relevant to the contractor set forth in the relevant IEAR, EAMP, and SAMP (CPTD, RAP and/or TPDP as applicable), (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set forth in the Action Plan for Safeguards and Safeguards Monitoring Report; (b) make available a budget for all such environmental and social measures and monitoring activities; (c) provide the Borrower with a written notice of (i) any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the relevant IEAR, EAMP, and SAMP (CPTD, RAP and/or TPDP, as applicable), and (ii) any corrective or preventative actions set forth in the Action Plan for Safeguards and Safeguards Monitoring Report;		Complied/Being complied.

(d) The Borrower shall ensure that all bidding documents (adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (e) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.	LA, Sch. 5, para. 19	
The Borrower shall do the following, consistent with Action Plan for Safeguards: (a) disclose Safeguards Monitoring Reports on the Borrowers website, and submit the same for disclosure on ADB website, on a semiannual basis; (b) disclose satisfactory revisions and updates of IEAR, EAMP, and SAMP (CPTD, RAP and/or TPDP, as applicable), prepared during Subproject implementation, if any, on the Borrower's website, and submit these to ADB for disclosure on ADB website, and provide relevant information to affected people and other stakeholders in a timely manner and in a form and language understandable to them; (c) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the relevant IEAR, EAMP, and SAMP (CPTD, RAP and/or TPDP as applicable), promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; (d) report any actual or potential breach of compliance with the measures and requirements set forth in the relevant EAMP, and SAMP (CPTD, RAP and/or TPDP, as applicable) promptly after becoming aware of the breach; and (e) in the event unexpected significant safeguard impacts are identified, promptly engage qualified and experienced external expert or agency under terms of reference intimated to ADB, to verify information produced through the Project monitoring process, and facilitate the carrying out of any verification activities by such external experts.	LA, Sch. 5, para. 20	Being complied. To be complied when became due. Will be complied if situation warrants. Will be complied in case of any breach. But till date no such breach reported. Will be complied if situation warrants

SECTION: 4 COMPLIANCE STATUS WITH ENVIRONMENT MANAGEMENT AND MONITORING PLAN STIPULATED IN IEAR AND AS AGREED WITH ADB

The instant project is being implemented and monitored in line with the POWERGRID's Environmental and Social Policy & Procedures and the Action Plan for Safeguards prepared for the use of CSS so as to ensure that ESPP achieve and maintain full compliance with ADB's SPS, 2009. Accordingly, POWERGRID has prepared Initial Environmental Assessment Report (IEAR) reports including Environmental Management Plan (EMP) to ensure that all the anticipated environment impacts due to

the project activities are minimized wherever possible. The EMP describes detailed site-specific mitigation measures and monitoring plans for impacts anticipated during different stages of the proposed project i.e. pre-construction, construction, and operation & maintenance phase. A summary of monitoring requirements has also been included which identifies when and where the parameter will be monitored, how often and against what aspect. For proper implementation of EMP and other mitigation measures separate fund has been allocated in the project cost.

Monitoring the implementation of environmental mitigation measures is required to ensure that these are undertaken in accordance with the EMP, and to enable mitigation to be adapted and refined as required. Further, in order to achieve full compliance with ADB's SPS, 2009 under CSS, agreed action plan for safeguards are being implemented by POWERGRID. The detailed compliance status of the same is place as **Annexure-I**.

A summary of the environmental mitigation measures and monitoring requirements vis-a-vis to compliance status by POWRGRID's is given in **Table 2**.

TABLE – 2 : ENVIRONMENT MANAGEMENT PLAN

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
Pre-construction								
1	Location of line towers and line alignment and design	Exposure to safety related risks	Setback of dwellings to line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites	Tower location and alignment selection with respect to nearest dwellings	Setback distances to nearest houses – once	POWERGRID	Part of tower siting survey and detailed alignment survey &design	Complied during survey. Route alignment criterion is part of survey contract. .
		Impact on water bodies	Avoidance of such water bodies to the extent possible. Avoidance of placement of tower inside water bodies to the extent of possible	Tower location and line alignment selection (distance to water bodies)	Consultation with local authorities– once			
		Social inequities	Careful route selection to avoid existing settlements and sensitive locations	Tower location and line alignment selection (distance to nearest dwellings or social institutions)	Consultation with local authorities and land owners – once			
			Minimise impact on agricultural land	Tower location and line alignment selection (distance to agricultural land)	Consultation with local authorities and land owners – once			
			Careful selection of site and route alignment to avoid encroachment of socially, culturally & archaeological sensitive	Tower location and line alignment selection (distance to	Consultation with local authorities -once			

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
			areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.)	sensitive area)				
2	Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	PCBs not used in substation transformers or other project facilities or equipment.	Transformer design	Exclusion of PCBs in transformers stated in tender specification – once	POWERGRID	Part of tender specifications for the equipment	Complied. As per technical specification PCB is not used or it not detectable (i.e. less than 2mg/kg) as per IEC 61619 or ASTM D4059
			Processes, equipment and systems not to use chlorofluorocarbons (CFCs), including halon, and their use, if any, in existing processes and systems should be phased out and to be disposed of in a manner consistent with the requirements of the Govt.	Process, equipment and system design	Exclusion of CFCs stated in tender specification – once	POWERGRID	Part of tender specifications for the equipment	Complied
					Phase out schedule to be prepared in case still in use – once		Part of equipment and process design	Not Applicable.
3	Transmission line design	Exposure to electromagnetic interference	Line design to comply with the limits of electromagnetic interference from power lines	Electromagnetic field strength for proposed line design	Line design compliance with relevant standards – once	POWERGRID	Part of design parameters	Complied. Designed as per guidelines of ICNIRP and ACGIH and checked by CPRI &M/s PTI, USA
4	Substation location and design	Exposure to noise	Design of plant enclosures to comply with noise regulations.	Expected noise emissions based on substation design	Compliance with regulations - once	POWERGRID	Part of detailed siting survey and design	Complied
		Social inequities	Careful selection of site to avoid encroachment of socially, culturally and	Selection of substation location (distance	Consultation with local authorities -once	POWERGRID	Part of detailed siting survey and design	Complied during survey. Route alignment criterion is part of

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
			archaeological sensitive areas (i.e. sacred groves, graveyard, religious worship place, monuments etc.)	to sensitive area).				survey contract.
5	Securing lands for substations.	Loss of land/ income change in social status etc.	In the case of Involuntary Acquisitions, Compensation and R&R measures are extended as per provision of RFCTLARRA, 2013[1]	Compensation and monetary R&R amounts/ facilities extended before possession of land.	As per provisions laid out in the act	POWERGRID	Prior to award/start of substation construction.	Fresh land required only for Bhadla substation which was Govt Land secured from State Govt though transfer For details of lands & compensation thereof refer Social Monitoring Report
6	Line through protected area/ precious ecological area	Loss of precious ecological values/ damage to precious species	Avoid siting of lines through such areas by careful site and alignment selection (National Parks, Wildlife Sanctuary, Biosphere Reserves/ Biodiversity Hotspots)	Tower location and line alignment selection (distance to nearest designated ecological protected/ sensitive areas)	Consultation with local forest authorities - once	POWERGRID	Part of tower siting survey and detailed alignment survey and design	In spite of best efforts, a small area of 0.414 ha (PF) along Banaskantha-Banaskantha line could not be avoided. However, clearance under FC Act, 1980 is under progress
			Minimize the need by using RoW wherever possible	Tower location and line alignment selection	Consultation with local authorities and design engineers- once	POWERGRID	Part of tower siting survey &detailed alignment survey and design	Complied

[1] No Involuntary acquisition of land (permanent) is involved; hence this clause shall not be applicable.

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
7	Line through identified Elephant corridor / Migratory bird	Damage to the Wildlife/ Birds and also to line	Study of earmarked elephant corridors to avoid such corridors, Adequate ground clearance, Fault clearing by Circuit Breaker, Barbed wire wrapping on towers, reduced spans etc., if applicable	Tower location and line alignment selection. Minimum /maximum ground clearance	Consultation with local forest authorities – once. Monitoring – quarterly basis	POWERGRID	Part of tower sitting and detailed alignment survey & design and Operation	Complied. The routes of proposed lines don't form part of any such areas.
			Avoidance of established/ identified migration path (Birds & Bats). Provision of flight diverter/ reflectors, bird guard, elevated perches, insulating jumper loops, obstructive perch deterrents, raptor hoods etc[2]., if applicable	Tower location and line alignment selection	Consultation with local forest authorities - once	POWERGRID	Part of tower siting survey and detailed alignment survey and design	
8	Line through forestland	Deforestation and loss of biodiversity edge effect	Avoid locating lines in forest land by careful site and alignment selection	Tower location and line alignment selection (distance to nearest protected or reserved forest)	Consultation with local authorities-once	POWERGRID	Part of tower siting survey and detailed alignment survey and design	Complied/Being complied. Route alignment finalised by taking consideration of minimum impact on forest area after consultation with concerned authorities. However, in spite of best efforts, an area of
			Minimise the need by using existing towers, tall towers and RoW, wherever possible		Consultation with local authorities and design engineers- once			

[2] As per International/National best practices and in consultation with concerned forest/wildlife Authority.

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
			Measures to avoid invasion of alien species	Intrusion of invasive species	Consultation with local forest authorities-once			0.414 ha forest land[3] could not be avoided.
			Obtain statutory clearances from the Government	Statutory approvals from Government	Compliance with regulations – once for each subproject			
9	Lines through farmland	Loss of agricultural production/ change in cropping pattern	Use existing tower or footings wherever possible.	Tower location and line alignment selection.	Consultation with local authorities and design engineers – once	POWERGRID	Part of detailed alignment survey and design	Complied during survey which is part of survey contract.
			Avoid sitting new towers on farmland wherever feasible	Tower location and line alignment selection	Consultation with local authorities and design engineers- once		Part of detailed sitting & alignment survey /design	
10	Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance	Noise levels	Noise levels to be specified in tender documents-once	POWERGRID	Part of detailed equipment design	Complied. Maximum noise limit of 80 (dB)A stated in the technical specification for transformer.
11	Interference with drainage patterns/ irrigation channels	Flooding hazards/ loss of agricultural production	Appropriate sitting of towers to avoid channel interference	Tower location and line alignment selection (distance to nearest flood	Consultation with local authorities and design engineers- once	POWERGRID	Part of detailed alignment survey and design	Complied/Being complied. Appropriate siting of towers ensured during alignment survey and Tower spotting to avoid channel

[3] As per provision of Forest (Conservation) Act, 1980, Compensatory Afforestation (CA) on degraded forest land double the extent of diverted forest area to be undertaken. However, if the diverted forest area is ≤ 1 ha. , then plantation of 10 times the number of trees likely to be felled will have to be carried out. It may be noted that the role of User Agency (POWERGRID) is limited to depositing the cost of afforestation activities as demanded by forest authorities who in turn undertake the actual afforestation work. Since in the instant case forest proposal is being formulated at this moment such afforestation scheme has not yet prepared.

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
				zone)				interference.
12	Escape of polluting materials	Environmental pollution	Transformers designed with oil spill containment systems, and purpose-built oil, lubricant and fuel storage system, complete with spill clean-up equipment.	Equipment specifications with respect to potential pollutants	Tender document to mention specifications – once	POWERGRID	Part of detailed equipment design /drawings	Complied. Underlying pit with a storage capacity of at least 20% of the total oil of the transformer & a common Secondary Containment of capacity of 220% of largest transformer oil volume is part of detailed design
			Substations to include drainage and sewage disposal systems to avoid offsite land and water pollution.	Substation sewage design	Tender document to mention detailed specifications – once	POWERGRID	Part of detailed substation layout and design /drawings	Complied. Provision of soak pit is part of design where sewage line is not present.
13	Equipments submerged under flood	Contamination of receptors	Substations constructed above the high flood level(HFL) by raising the foundation pad	Substation design to account for HFL (elevation with respect to HFL elevation)	Base height as per flood design-once	POWERGRID	Part of detailed substation layout and design/drawings	Complied. Substations are designed above HFL.
14	Explosions /Fire	Hazards to life	Design of substations to include modern fire fighting equipment	Substation design compliance with fire prevention and control codes	Tender document to mention detailed specifications – once	POWERGRID	Part of detailed substation layout and design /drawings	Complied. Fire fighting equipments are integral part of Substation design
			Provision of fire fighting equipment to be located close to transformers					
Construction								
15	Equipment layout and installation	Noise and vibrations	Construction techniques and machinery selection seeking to minimize ground disturbance.	Construction techniques and machinery	Construction techniques and machinery creating minimal ground	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied. Low noise producing machineries/

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
					disturbance- once at the start of each construction phase			equipments are being used.
16	Physical construction	Disturbed farming activity	Construction activities on cropping land timed to avoid disturbance of field crops (within one month of harvest wherever possible).	Timing of start of construction	Crop disturbance – Post harvest as soon as possible but before next crop – once per site	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being complied. Construction on farm land undertaken mostly during post-harvest period.
17	Mechanized construction	Noise, vibration and operator safety, efficient operation	Construction equipment to be well maintained.	Construction equipment – estimated noise emissions	Complaints to be received by local authorities – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being complied. No complaints received so far
		Noise, vibration, equipment wear and tear	Turning off plant not in use.	Construction equipment – estimated noise emissions and operating schedules	Complaints to be received by local authorities – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	
18	Construction of roads for accessibility	Increase in airborne dust particles	Existing roads and tracks used for construction and maintenance access to the line wherever possible.	Access roads, routes (length and width of new access roads to be constructed)	Use of established roads wherever possible – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Most sites are easily accessible and existing road are used for construction activity.

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
		Increased land requirement for temporary accessibility	New access ways restricted to a single carriageway width within the RoW.	Access width (meters)	Access restricted to single carriage – way width within RoW – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied
19	Construction activities	Safety of local villagers	Coordination with local communities for construction schedules, Barricading the construction area and spreading awareness among locals	Periodic and regular reporting /supervision of safety arrangement	No. of incidents- once every week	POWERGRID (Contractor through contract provisions)	Construction period	All required safety precautions have been taken. Most of the tower locations are in farm/barren land. Hence, the cases of traffic obstruction are not envisaged. No accidents reported during the reporting period.
		Local traffic obstruction	Coordination with local authority/requisite permission for smooth flow of traffic	Traffic flow (Interruption of traffic)	Frequency (time span)- on daily basis	POWERGRID (Contractor through contract provisions)	Construction period	
20	Temporary blockage of utilities	Overflows, reduced discharge	Measure in place to avoid dumping of fill materials in sensitive drainage area	Temporary fill placement (m^3)	Absence of fill in sensitive drainage areas – every 4 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied
21	Site clearance	Vegetation	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance.	Vegetation marking and clearance control (area in m^2)	Clearance strictly limited to target vegetation – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied
			No use of herbicides and pesticides					

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
22	Trimming /cutting of trees within RoW	Fire hazards	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations.	Species-specific tree retention as approved by statutory authorities (average and max. tree height at maturity, in meters)	Presence of target species in RoW following vegetation clearance – once per site	POWERGRID (Contractor through contract provisions)	Construction period	Regulated felling of tree in RoW is carried out with permission of owner & revenue authority keeping required electrical clearance as per design.
		Loss of vegetation and deforestation	Trees that can survive pruning to comply should be pruned instead of cleared.	Species-specific tree retention as approved by statutory authorities	Presence of target species in RoW following vegetation clearance-once per site	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied
			Felled trees and other cleared or pruned vegetation to be disposed of as authorized by the statutory bodies.	Disposal of cleared vegetation as approved by the statutory authorities (area cleared in m^2)	Use or intended use of vegetation as approved by the statutory authorities – once per site	POWERGRID (Contractor through contract provisions)	Construction period	All felled trees are handed over to owner for disposal. POWERGRID has no role in storage and disposal of felled tree/wood.
23	Wood/ vegetation harvesting	Loss of vegetation and deforestation	Construction workers prohibited from harvesting wood in the project area during their employment, (apart from locally employed staff continuing current legal activities)	Illegal wood /vegetation harvesting (area in m^2, number of incidents reported)	Complaints by local people or other evidence of illegal harvesting – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied No complaints received on illegal harvesting.
24	Surplus earthwork/soil	Runoff to cause water pollution, solid waste disposal	Soil excavated from tower footings/ substation foundation disposed of by placement along	Soil disposal locations and volume (m^3)	Acceptable soil disposal sites – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/Being complied. 90-95% of the excavated soil is used for refilling/ resurfacing and rest is

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
			roadsides, or at nearby house blocks if requested by landowners					being disposed off along with other debris at selected location
25	Substation construction	Loss of soil	Loss of soil is not a major issue as excavated soil will be mostly reused for leveling and re-filling. However, in case of requirement of excess soil the same will be met from existing quarry or through deep excavation of existing pond or other nearby barren land with agreement of local communities	Borrow area sitting (area of site in m^2 and estimated volume in m^3)	Acceptable soil borrow areas that provide a benefit - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied
		Water pollution	Construction activities involving significant ground disturbance (i.e. substation land forming) not undertaken during the monsoon season	Seasonal start and finish of major earthworks(P^H, BOD /COD, Suspended solids, others)	Timing of major disturbance activities –prior to start of construction activities	POWERGRID (Contractor through contract provisions))	Construction period	Complied/ Being Complied
26	Site clearance	Vegetation	Tree clearances for easement establishment to only involve cutting trees off at ground level or pruning as	Ground disturbance during vegetation clearance(area, m^2)	Amount of ground disturbance – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Regulated felling of tree in RoW is carried out with permission of owner & revenue authority keeping

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
			appropriate, with tree stumps and roots left in place and ground cover left undisturbed	Statutory approvals	Statutory approvals for tree clearances – once for each site			required electrical clearance as per design.
27	Tower erection Substation foundation-disposal of surplus earthwork/fill	Waste disposal	Excess fill from substation/tower foundation excavation disposed of next to roads or around houses, in agreement with the local community or landowner.	Location and amount (m^3)of fill disposal	Appropriate fill disposal locations – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied
28	Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Location of hazardous material storage; spill reports (type of material spilled, amount (kg or m^3) and action taken to control and clean up spill)	Fuel storage in appropriate locations and receptacles – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Stored at designated place only.
29	Construction schedules	Noise nuisance to neighbouring properties	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Timing of construction (noise emissions, [dB(A)]	Daytime construction only – every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Construction activity restricted to day time only
30	Provision of facilities for construction workers	Contamination of receptors (land, water, air)	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.	Amenities for Workforce facilities	Presence of proper sanitation, water supply and waste disposal facilities – once	POWERGRID (Contractor through contract provisions)	Construction period	No complaints received

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
					each new facility			
31	Influx of migratory workers	Conflict with local population to share local resources	Using local workers for appropriate asks	Avoidance/ reduction of conflict through enhancement/ augmentation of resource requirements	Observation & supervision–on weekly basis	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied. Local workforce being used based on skill and no incidents of conflict reported so far
32	Lines through farmland	Loss of agricultural productivity	Use existing access roads wherever possible	Usage of existing utilities	Complaints received by local people /authorities - every 4 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Being complied. No complaints received from local peoples/authorities
			Ensure existing irrigation facilities are maintained in working	Status of existing facilities				
			Protect /preserve topsoil and reinstate after construction completed	Status of facilities (earthwork in m^3)				
			Repair /reinstate damaged bunds etc after construction completed	Status of facilities (earthwork in m^3)				
		Loss of income.	Land owners/ farmers compensated for any temporary loss of productive land as per existing regulation.	Process of Crop/tree compensation in consultation with forest dept. (for timber yielding tree) and Horticulture dept. (for fruit bearing tree)	Consultation with affected land owner prior to implementation and during execution.	POWERGRID	During construction	Tried to minimise the loss. Details of tree, crop compensation paid is provided separately in Social Monitoring Report
33	Uncontrolled erosion/silt runoff	Soil loss, downstream siltation	Need for access tracks minimised, use of existing roads.	Design basis and construction procedures	Incorporating good design and construction	POWERGRID (Contractor through	Construction period	Complied/ Being Complied

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
			Limit site clearing to work areas	(suspended solids in receiving waters; area re-vegetated in m^2; amount of bunds constructed [length in meter, area in m^2, or volume in m^3])	management practices – once for each site	contract provisions)		
			Regeneration of vegetation to stabilise works areas on completion (where applicable)					
			Avoidance of excavation in wet season					
			Water courses protected from siltation through use of bunds and sediment ponds					
34	Nuisance to nearby properties	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices.	Contract clauses	Incorporating good construction management practices – once for each site	POWERGRID (Contractor through contract provisions)	Construction period	Complied/ Being Complied
			As much as possible existing access ways will be used	Design basis and layout	Incorporating good design engineering practices– once for each site			
			Productive land will be reinstated following completion of construction	Reinstatement of land status (area affected, m^2)	Consultation with affected parties – twice – immediately after completion of construction			

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
		Social inequities	Compensation will be paid for loss of production, if any.	Implementation of Tree/Crop compensation (amount paid)	Consultation with affected parties – once in a quarter	POWERGRID	Prior to construction	Compensation provided as per POWERGRID's procedure for tree/crop compensation (for details of tree, crop compensation paid please refer Social Monitoring Report)
35	Flooding hazards due to construction impediments of natural drainage	Flooding & loss of soils, contamination of receptors (land, water)	Avoid natural drainage pattern/ facilities being disturbed/blocked/ diverted by on-going construction activities	Contract clauses (e.g. suspended solids and BOD/COD in receiving water)	Incorporating good construction management practices-once for each site	POWERGRID (Contractor through contract provisions)	Construction period	Complied/Being complied. Good construction management practices are employed at sites to avoid blockage of natural drainage and resultant flooding.
36	Equipment submerged under flood	Contamination of receptors (land, water)	Equipment stored at secure place above the high flood level(HFL)	Store room level to be above HFL (elevation difference in meters)	Store room level as per flood design-once	POWERGRID	Construction period	All equipment foundations are designed above HFL.
37	Inadequate siting of borrow areas (quarry areas)	Loss of land values	Existing borrow sites will be used to source aggregates, therefore, no need to develop new sources of aggregates	Contract clauses	Incorporating good construction management practices – once for each site	POWERGRID (Contractor through contract provisions))	Construction period	Extra aggregates not required till date. However, If needed it will be sourced through approved/registered borrow/quarry area.
38	Health and safety	Injury and sickness of workers and	Safety equipment's (PPEs) for construction workers	Contract clauses (number of incidents and	Contract clauses compliance –	POWERGRID (Contractor through	Construction period	Complied with project specific safety plan and general conditions of

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
		members of the public	Contract provisions specifying minimum requirements for construction workers camps	total lost-work days caused by injuries and sickness)	once every quarter	contract provisions)		contract, which covers all applicable regulations. Compliance to safety measures like safety training /awareness along with safety checklists is placed as Annexure-II
			Contractor to prepare and implement a health and safety plan.					
			Contractor to arrange for health and safety training sessions					
39	Inadequate construction stage monitoring	Likely to maximise damages	Training of environmental monitoring personnel	Training schedules	No. of programs attended by each person – once a year	POWERGRID	Routinely throughout construction period	Provides proper training and have very good environmental monitoring process. A Training for trainer programme on Livelihood Restoration & Indigenous People in association with domain expert from ADB and World Bank organised in Jan.'18. (Photographs enclosed as **Plate-1**) Appropriate clause incorporated in contact provision for EMP implementation. Site managers review the implementation on daily basis.
			Implementation of effective environmental monitoring and reporting system using checklist of all contractual environmental requirements	Respective contract checklists and remedial actions taken thereof.	Submission of duly completed checklists of all contracts for each site - once			
			Appropriate contact clauses to ensure satisfactory implementation of contractual environmental mitigation measures.	Compliance report related to environmental aspects for the contract	Submission of duly completed compliance report for each contract – once			

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
Operation and Maintenance								
40	Location of line towers and line alignment & design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Compliance with setback distances ("as-built" diagrams)	Setback distances to nearest houses – once in quarter	POWERGRID	During operations	Will be complied during O & M stage
41	Line through identified bird flyways, migratory path	Injury/ mortality to birds, bats etc. due to collision and electrocution	Avoidance of established/ identified migration path (Birds & Bats). Provision of flight diverter/reflectors, elevated perches, insulating jumper loops, obstructive perch deterrents, raptor hoods etc., if applicable	Regular monitoring for any incident of injury/mortality	No. of incidents-once every month	POWERGRID	Part of detailed siting and alignment survey /design and Operation	-do-
42	Equipment submerged under flood	Contamination of receptors (land, water)	Equipment installed above the high flood level (HFL) by raising the foundation pad.	Substation design to account for HFL ("as-built" diagrams)	Base height as per flood design – once	POWERGRID	During operations	-do-
43	Oil spillage	Contamination of land/nearby water bodies	Each transformer has a secure and impervious underlying pit with a storage capacity of at least 20% of the total oil volume of the transformer and the individual pits are connected to a main collection sump of capacity of 220% of largest transformer oil	Substation bunding (Oil sump) ("as-built" diagrams)	Bunding (Oil sump) capacity and permeability - once	POWERGRID	During operations	-do-

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
			volume, which acts as a Secondary Containment, in case of a leakage.					
44	SF_6 management	Emission of most potent GHG causing climate change	Reduction of SF6 emission through awareness, replacement of old seals, proper handling & storage by controlled inventory and use, enhance recovery and applying new technologies to reduce leakage	Leakage and gas density/level	Continuous monitoring	POWERGRID	During Operations	-do-
45	Inadequate provision of staff/workers health and safety during operations	Injury and sickness of staff /workers	Careful design using appropriate technologies to minimise hazards	Usage of appropriate technologies (lost work days due to illness and injuries)	Preparedness level for using these technologies in crisis – once each year	POWERGRID	Design and operation	-do-
			Safety awareness raising for staff.	Training/awareness programs and mock drills	Number of programs and percent of staff /workers covered – once each year			
			Preparation of fire emergency action plan and training given to staff on implementing emergency action plan					
			Provide adequate sanitation and water supply facilities	Provision of facilities	Complaints received from staff /workers every 2 weeks			

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
46	Electric Shock Hazards	Injury/ mortality to staff and public	Careful design using appropriate technologies to minimise hazards	Usage of appropriate technologies (no. of injury incidents, lost work days)	Preparedness level for using these technology in crisis- once a month	POWERGRID	Design and Operation	-do-
			Security fences around substations	Maintenance of fences	Report on maintenance – every 2 weeks			
			Barriers to prevent climbing on/ dismantling of towers	Maintenance of barriers				
			Appropriate warning signs on facilities	Maintenance of warning signs				
			Electricity safety awareness raising in project areas	Training/awareness programs and mock drills for all concerned parties	Number of programs and percent of total persons covered –once each year			
47	Operations and maintenance staff skills less than acceptable	Unnecessary environmental losses of various types	Adequate training in O&M to all relevant staff of substations & line maintenance crews.	Training/awareness programs and mock drills for all relevant staff	Number of programs and percent of staff covered – once each year	POWERGRID	Operation	-do-
			Preparation and training in the use of O&M manuals and standard operating practices					
48	Inadequate periodic environmental monitoring.	Diminished ecological and social values.	Staff to receive training in environmental monitoring of project O & M activities	Training/awareness programs and mock drills for all relevant staff	Number of programs and percent of staff covered – once each year	POWERGRID	Operation	-do-

Cl. No.	Project activity / stage	Potential Impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule	Compliance Status
49	Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	Processes, equipment and systems using chlorofluorocarbons (CFCs) including halon, should be phased out and to be disposed of in a manner consistent with the requirements of the Govt.	Process, equipment and system design	Phase out schedule to be prepared in case still in use – once in a quarter	POWERGRID	Operation	-do-
50	Transmission line maintenance	Exposure to electromagnetic interference	Transmission line design to comply with the limits of electromagnetic interference from overhead power lines	Required ground clearance (meters)	Ground clearance -once	POWERGRID	Operation	-do-
51	Uncontrolled growth of vegetation	Fire hazard due to growth of tree/shrub /bamboo along RoW	Periodic pruning of vegetation to maintain requisite electrical clearance No use of herbicides/ pesticides	Requisite clearance (meters)	Assessment in consultation with forest authorities- once a year (pre/post monsoon	POWERGRID	Operation	-do-
52	Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance	Noise levels {dB(A)}	Noise levels at boundary nearest to properties & consultation with affected parties if any - once	POWERGRID	Operation	-do-

SECTION: 5 APPROACH AND METHODOLOGY ENGAGED FOR ENVIRONMENT MONITORING OF THE PROJECT

Environmental monitoring is a continuous process throughout the Project life cycle starting from site selection to construction and maintenance state. POWERGRID has instituted a three tier support structure at corporate, regional and site level with specific functions for effective implementation of environment and social safeguard measures. Flow chart showing institutional arrangement for ESPP implementation & monitoring is placed as **Plate-2.**

A Project Management Unit (PMU) has been set up headed by Executive Director (Corporate Planning) at headquarters to coordinate and implement all environment and social issues with the assistance of functional department like Environment & Social Management Deptt., Engineering etc. Apart from site managers review the progress on daily basis and regular project review meetings held at least on monthly basis, chaired by the Executive Director of the region wherein the environmental aspects of the projects are discussed and remedial measures taken wherever required. The exceptions of these meetings will be submitted to the Directors and Chairman & Managing Director (CMD).

POWERGRID has a separate monitoring department which carry out real time monitoring of all parameters of project implementation including the environment and social issues. Such issues are discussed in detail during every quarter in the Project Review Meeting (PRM) Chaired by Director (Project). CMD also takes periodic review of project implementation

A summarized environmental monitoring plan with implementation schedule at different stage of subprojects implementation is presented in the table below

Environmental Monitoring Tasks	**Implementation Responsibility**	**Implementation Schedule**
Pre-Construction Phase		
Monitor contractor's detailed alignment survey to ensure relevant environmental mitigation measures in EMP have been included.	POWERGRID with assistance of project implementation unit	Prior to POWERGRID approval of contractor's detailed alignment survey.
Construction Phase		
Regular monitoring and reporting of contractor's compliance with contractual environmental mitigation measures.	POWERGRID with assistance of project implementation unit	Continuous as per IEER and EMP throughout construction period.
Operation and Maintenance Phase		
Observations during routine maintenance inspections of substations and transmission lines RoWs. Inspections will include monitoring implementation status of mitigation measures specified in EMP.	POWERGRID	As per POWERGRID inspection schedules and EMP provisions.

SECTION: 6 MONITORING OF ENVIRONMENTAL RECEPTORS/ ATTRIBUTES

It is evident that environmental impacts associated with power transmission project are not far reaching as these developmental activities are non- polluting in nature and do not involve any disposal of solid waste, effluents and hazardous substances on land, air and

water. Although, there are some localized impacts on natural resources like forest whenever transmission line passes through forest area, however, it can be avoided or minimized through careful route selection by using modern technique like GPS, GIS, remote sensing etc. In this case also, forest involvement in all proposed lines have been completely avoided except for line route of 400KV Banaskantha-Radhanesda where 0.414 ha. of strip plantation along State Highway crossings couldn't be avoided .

The proposed projects don't have much anticipated impact on environmental attributes like air, water, soil etc. and are mostly concentrated to construction stage. Air quality impact is restricted to the construction phase only as no emissions to air takes place during ordinary operations of transmission lines. Impacts on air quality due to airborne dust in the vicinity of the work sites (at points along the route of the transmission line where towers are located) mainly result from excavation and construction activities and tail gases from construction equipments and vehicles. Since all the proposed alignments are accessible, no construction of access roads is envisaged thereby avoiding any airborne dust pollution in the vicinity. The construction activities are small scale and of a temporary nature. Moreover, the activities are not concentrated to one place (localized) rather it is widely dispersed that provide adequate buffering to air environment. Therefore, impacts on air quality from construction activities are considered insignificant. Further, no liquid effluent is generated due to project activity. However, small quantities of domestic sewage from staff quarters and construction camp is generated which is discharged in local soak pits. Construction of transmission tower foundation, stringing and other activities are mostly manual in nature and use heavy equipment or blasting is not envisaged. The main noise sources during the construction phase are from equipments and transportation vehicles. However, no significant noise level variation from construction related activities is anticipated.

SECTION: 7 ANY OTHER MONITORING OF ENVIRONMENTAL ASPECTS, IMPACTS OBSERVED DURING IMPLEMENTATION

Except the predicted impacts as mentioned in EMP, no other unanticipated impacts were observed during the implementation of projects. As regard Safety, all required measures are in place including due precautions/awareness programs as well as ensuring use of PPEs, which is evident from the fact that no accidents (fatal or non-fatal) including major/minor injuries were reported during the reporting period from any of the construction sites.

SECTION: 8 DETAILS OF GRIEVENCE REDRESS COMMITTEE , COMPLAINT RECEIVED AND ACTION TAKEN

Grievance Redress Mechanism (GRM) is an integral and important mechanism for addressing/resolving the concerns and grievances in a transparent and swift manner. Many minor concerns of peoples are addressed during public consultation process initiated at the beginning of the project. For handling grievance, Grievance Redress Committee (GRC) has been established both at the project/scheme level and at Corporate/HQ level. The site/project level GRCs constituted also include members from POWERGRID, Local Administration, Panchayat Members, Affected Persons representative and reputed persons from the society on nomination basis under the chairmanship of project head. The corporate level GRC functions under the chairmanship of Director (Projects) and includes one representative from corporate ESMD who is conversant with the environment & social issues.

As per information collected from different sites, only one written complaints was registered by M/s Green World for re-routing of Hiriyur - Mysore 400 kV line. Besides, many minor issues brought to the notice were resolved instantly through discussion & deliberation by local project officials. Details of written & verbal complaints including court cases are presented below in **Table-3**

Table 3: Details of Court Cases and Complaints:

S. N.	Name of the line	Loca-tion No.	Name of complainants	Date of complaints/ Court case	Main Issue of complaints	Status of complain
A. Written Complaints/ Court Cases						
1.	Mysore-Hiriyur 400kV	137/0 - 137/1	Written M/s Green World Development and Creations Pvt. Ltd., Mysore	11.11.17/ 01.02.18	Route diversion	The matter is under the consideration of the court. However, efforts are on for out of court settlement amicably through discussions.
B. Verbal Complaints						
1	Bhadla – Bikaner 765 kV D/C	14/10	Verbal Mr. Saitan Singh	02.07.17	Crop compensation	Issue resolved through discussion with affected persons.
2		3/4	Verbal Mr. Mograj	01.09.17	-do-	Matter resolved through discussion.
3		32/1	Verbal Mr. Ram Singh	09.09.17		Issue resolved through meeting/discussion.
4		34/4	Verbal Mr. Mitha Ram	09.10.17	-do-	Matter resolved through discussion. Compensation framework explained to complainant.
5		12/4	Verbal Mr. Madan Lal	15.10.17	Safety	All aspect related safety explained to complainant to his satisfaction
6		27/1	Verbal Mr. Bhomo Ram	06.11.17	- do-	Matter resolved through discussion.
7		35/4	Verbal Mr. Hada Ram	11.11.17	- do-	Matter resolved through discussion in consultation with Revenue Authorities.
8	Ajmer – Bikaner 765 kV D/C	80/1	Verbal Mr. Tola Ram	15.11.17	Basis of assessment of Crop Compensation	Matter Resolved through discussion. Compensation framework explained to Complainant.
9	Bhadla-Bhadla 765 kV D/C		Verbal Mr. Sahabuddin	11.07.17	Crop compensation	Matter resolved through discussion.
10			Verbal Mr. Kayagddin	01.10.17	-do-	Matter resolved through discussion

SECTION: 9 CONCLUSION

It may be noted from above discussion that the subprojects activities are non-polluting in nature and don't have significant adverse impacts on environment except the involvement of 0.414 ha. protected forest. However, with the condition of raising the compensatory afforestation on double the area will mitigate the likely loss of vegetation. Moreover, some environmental impacts are anticipated, mostly during construction period which have

been mitigated successfully by implementing the EMP. POWERGRID approach of project implementation involving selection of optimum route before design stage, proper implementation of EMP and monitoring mechanism throughout project life cycle supported by strong institutional arrangement has considerably nullified the adverse impacts arising out of project activities. Besides this, direct or indirect benefits of the subprojects like the employment opportunity, improved & uninterrupted power supply, improvement in infrastructure facilities, improved business opportunity will outweigh the negative impacts of the project. Since the instant project is planned to evacuate clean and green solar energy, which is another sustainable alternative, renewable and non-polluting form of energy, the benefits associated with such projects like reduction in emission of Green House Gases (GHGs) and resultant warming & climate change shall offset possible adverse impact if any

R.K.SRIVASTAVA
General Manager (ESMD)

Annexure- 1 : Status of Action Plan for Safeguards under CSS

In order to achieve full compliance with ADB's SPS, 2009 under CSS, following agreed action plan is implemented by POWERGRID. The detailed compliance status of the same is as follows;

(i) Environment

Action Plan	Status
a) Assign environmental specialist(s) (staff or consultants) to each project for project implementation and monitoring during construction.	Dedicated environmental specialists have been assigned with the responsibility to coordinate, supervise & monitor the safeguard measures on project basis. To strengthen the manpower, two more environment specialists were recruited in 2017 (one posted at WR-II Regional Head Quarters for Green Energy Corridor projects and other at Corporate Center).
b) Undertake stakeholder consultations with representation of women.	Completed as such information was already made part of IEARs/CPTDs.
c) Document disclosure and availability of project information in a timely manner and in a form and languages understandable to affected people.	All safeguard documents (IEAR/CPTD) including its update, if any are regularly uploaded on POWERGRID's website. The Executive Summary of such reports are also translated in the local languages and disclosed at Panchayat Office/Site office as well as on website.
d) Document where EAMP requirements were not met and status of associated corrective actions in site visit reports by environmental specialists.	Regular inspection visit by assigned environmental specialists carried out and till date no major deviations worth reporting observed. Minor issues were rectified during visit itself in consultation with site in-charge.

(ii) Involuntary Resettlement

Action Plan	Status
a) Develop procedures on monitoring livelihood impacts of land acquisition.	As agreed no land has been secured involuntarily and all lands are secured on willing buyer willing seller basis on negotiated and agreed rate. The process of such negotiation included confirmation by seller that he is fully satisfied with the agreed rate and the process As per agreed action, POWERGRID organized training for trainer programme on Livelihood Restoration in association with domain expert from ADB and World Bank in Jan.'18 wherein senior officials associated with safeguard implementation at various sites participated. Such topics shall be incorporated in the regular E & S training module to facilitate wider reach and acceptability.
b) Use recording and tracking systems in the Grievance Redress	Being complied.

Action Plan	Status
Mechanism.	Two tiers GRC constituted and notified. Moreover, a centralized online portal for complaint has become operational which also include proper tracking and time bound action procedure.
c) Conduct meaningful consultation with affected people.	Being complied. Public consultation is an integral part of project cycle. However, more emphasis on dissemination of information through various modes have also been practiced.
d) Disclose monitoring reports, in a timely manner and in Hindi and English to the affected people.	Semi-annual monitoring report shared with ADB on 7th March 2018 and also disclosed on website. It is to inform that EAMP translated in Hindi is already available on website.

(iii) Indigenous Peoples

Action Plan	Status
Provisions for acceptability actions with respect to safeguards of Indigenous Peoples are not applicable at this stage. While ESPP requires that a project affecting Indigenous Peoples prepare and implement a TPDP, there are currently no POWERGRID projects triggering Indigenous Peoples safeguards under implementation that are mature enough to assess.	No impacts on IPs and hence actions with regard to IPs are not applicable in the instant case. However, to prepare POWERGRID for such issues two days training programme on Indigenous People for senior officials was organized in association with domain expert from ADB and World Bank in Jan.'18. We intend to organise 1 or 2 more such programme in different part of country for greater awareness.

- ***In addition to above, as suggested by ADB during discussion website of POWERGRID has also been redesigned/ reoriented to ensure better accessibility/visibility of safeguard issues and can be accessed at following link:***
  http://www.powergridindia.com/disclosure

- ***As regard revision of ESPP it is to inform that as discussed during appraisal process "The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Bill, 2015" is still with Select Committee of Parliament of India and once cleared and notified the revision of ESPP shall be planned/undertaken.***

Annexure-II : Health & Safety Compliances

Hiriyur - Mysore Line, Location- AP 51/0 ,
Date: 09.12.17

Hiriyur – Mysore Line, Location AP- 24/0 ,
Date: 14.12.17

Tower Location- AP-97/0 Hiriyur –Mysore Line,
Tower no. Date: 27.12.17

Tower Location-AP-97/0 Hiriyur –Mysore Line,
Tower No. Date: 27.12.14

POWER GRID CORPORATION OF INDIA LTD

Foundation Safety Checklist

Name of TL: 400 KV D/C Hiriyur - Mysore
Date of Inspection 23-01-18
Contract No.:- CC-CS/702/SR-2/TW-3431/7/G7/NOA-II/7046 (Erection) Dated - 23-11-2016
LOC No 0410
Classification of Foundation and Type of Tower DFR (DB+00)
Contractor:- Simplex Infrastructure Ltd.

S. No	Description	Observations	Remarks
1	Check weather Supervisor / Gang leader had issued instructions to workers before start of work on that day.	Yes / No (Yes ticked)	
2	a) All workers are using PPEs at site i.e. Safety Helmets, Rubber Gum Boots, Hand Gloves, Nose masks	Safety Helmate-No in use/total worker= 10 Rubber Gum Boot-No in use/total worker= 06 Hand Gloves-No in use/total worker= 08 Nose Mask- No in use/total worker- 04	
3	Distance of Dumped excavated soil of all four sides from the edge of the pit	Yes / No (Yes ticked)	2 mtr away from the edge of the Pit
4	Slope of cutting edge of all four sides	Yes / No (Yes ticked)	
5	a) De watering arrangement if required b) If yes Distance of disposal of water	Yes / No (No ticked) Yes / No (No ticked)	
6	Installation of Shorting & Shuttering, if required	N/A	
7	Adequate warning & Barricading of the pit for protection have been made.	Yes / No (Yes ticked)	
8	The Blaster is valid licence holder Yes/No Adequate arrangement made to inform public by making (Red Flag/Public Notice) and signal man posted.	Yes / No (Yes ticked)	
9	Strong ladder provided in the pit.	Yes / No (Yes ticked)	
10	Jacks for supporting the template is placed at safe distance	Yes / No (Yes ticked)	
11	Distance of construction materials, Concrete Mixer & Compressor placed from edge of pit.	Yes / No (Yes ticked)	06 mtr away from the edge of the Pit
12	Whether arrangements for electrical loose joints and barricating of electrical panels have been made.	N/A	
13	Whether all Safety aspects taken care of for concreting.	Yes / No (Yes ticked)	
14	First Aid box with required items are available at site and (Name & No) of First Aid trained persons.	Yes / No (Yes ticked)	
15	Action taken for voilation for safety norms if any.	Yes / No (No ticked)	
16	Any other points specified to locaton.	Yes / No (No ticked)	

Site Incharge/ Engineer			Safety Incharge/ officer		
Name	Designation	Signature	Name	Designation	Signature
Susanta Ghosh	Surveyor	[signature and stamp: Simplex Infrastructures Ltd.]	Avijit Paul	Safety Steward	[signature]

Copy : 1) Project Manager
2) Project HSE Head

Safety Check list for Pile/Well Foundation will be issued separatly.

[signature] (Tamphal G.S)

POWERGRID CORPORATION OF INDIA LTD.

CORPORATE OPERATION SERVICES

Safety Check list during Foundation Work

Region : RTS-II **TLConst. Office:** Pavagada **Date Of Inspection:** 09/12/17.

Name of The TL:

400kV D/C(Quad) from Tumkur Pool(Pavagada) to Devanahalli Transmission Line Project

Loc No : 22/2

Classification of Foundation and Type Of Tower: DER / DRY (PIT D)

Executing Agency: M/s KEC International Ltd. **Subcontractor:** Balakrishna

Si.No	Description	Observations	Remarks
1.	Check Whether Supervisor / Gang leader has been issued instructions to workers before starting the work of that day	Yes	
2.	a) All workers are using PPEs at site i.e. safety Helmets, Rubber Gum Boots, Hand Gloves b) POWERGRID / POWER GRID Officials are using PPEs at site	Yes	
3.	Distance of Dumped excavated Soil of all four sides from the edge of the pit.	Yes	
4.	Slope of cutting edge of all four sides	Yes	
5.	a) De watering arrangement, if required b) If yes, Distance of disposal of water	N.A	
6.	Installation of Shoring & Shuttering, if required	N.A	
7.	Adequate warning & Barrication of the pit for protection have been made	Yes	
8.	The Blaster is valid license holder. Yes / No. Adequate arrangement made to inform public by caution marking (Red flag) / Public Notice and signal man posted	N.A	
9.	Storage ladder provided in the pit	Yes	
10.	Jacks for supporting the template is placed at safe distance	Yes	
11.	Distance of construction materials, Concrete Mixer / Compressor placed safe distance from edge of pit	Yes	
12.	Whether arrangements for electrical loose joints and Barrication of electrical panels have been made	N.A	
13.	Whether all Safety aspects taken care of for concreting	Yes	
14.	First Aid with required items are available at site and (Name & No) of First Aid trained persons	Yes	
15.	Action taken for violation for safety norms, if any	Yes	
16.	Any other points specific to location	—	

CONSTRUCTION AGENCY OFFICIALS			POWERGRID OFFCIALS		
Name	Designation	Signature	Name	Designation	Signature
Bibhuti Bhusan Das	Jr. Engineer		JAIBEND KUMAR	J.E	

Copy 1. PM Construction Agency

2. GM Construction Agency

3. Site In-charge POWERGRID

4. ED(Region)/GM(Projects) POWER GRID

For KEC INTERNATIONAL LTD

Authorized Signatory

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Plate 1 : Training Programme On "Livelihood Restoration & Indigenous Peoples" on 29 & 30 Jan.'18 at Udaipur

MODULE FOR WORKSHOP ON LIVELIHOOD RESTORATION AND INDIGINOUS PEOPLE IN ASSOCIATION WITH ASIAN DEVELOPMENT BANK (ADB)

Venue: Hotel Golden Tulip, UDAIPUR

Date	9.30-10.00	10.15 – 11.30	11.45 -13.00	13.00-14.00	14.00 - 15.30		16.00 – 17.30
29th Jan'18	**Inauguration**	Social and R&R (Livelihood Restoration) Identification and Assessment of Issues. Global Best Practices/Benefit Sharing **Mr. S. Satish, Sr. Social Specialist, World Bank**	Preparation and Implementation of action plan and special measures for IP (Tribal). **Mr. S. Satish, Sr. Social Specialist, World Bank**	Lunch	Engaging with Indigenous People (Tribal-Society & Culture) **Ms. Arati Nandi, ADB Consultant**		Global Best Practices on IP issues & their participation in Development **Ms. Arati Nandi, ADB Consultant**
30th Jan'18	10.00 – 11.30		11.45 -13.00	13.15-14.00	14.00 - 15.00	15.00 – 15.30	
	Gender Issues- Mitigating adverse impact on Women & Marginalised section of society. **Ms. Soma Dutta, ADB Consultant**		Monitoring and Evaluation of action plan and Organizational Requirement & Preparedness **Ms. Soma Dutta, ADB Consultant**	Lunch	**Panel Discussion**	**Valedictory and Feedback**	

11.30-12.00 AND 15.45-16.00 Tea Break

Workshop on livelihood restoration and indigenous people in association with "Asian Development Bank"

पावरग्रिड

ATTENDANCE

S/N	NAME ONLY IN BLOCK CAPITAL LETTERS	Designation / Empno.	Location	SIGNATURE 29.01.2018	SIGNATURE 30.01.2018
1	VIKRANT SHARMA	60016878	RHQ JAMMU		
2	KUNAL PAUL	60065009	RHQ KOLKATA		
3.	RITESH RANJAN	60002380	CC ESMD		
4.	SANJU KISHAN	60060192	RHQ-SRTS-II BANGALORE		
5	BATHALA SUBHASH	11592	RHQ-SRTS-I SECUNDERABAD		
6.	SANJAY VERMA	60010148	RHQ; WR-1 NAGPUR; MS.		
7	DINESH KUMAR SHARMA	60020136 Chief Manager	BANASKANTHA WR-II		

Program Coordinator: - Mr Koushik Goswami, Manager (HRD), 09599683573

Workshop on livelihood restoration and indigenous people in association with "Asian Development Bank"

पावरग्रिड

ATTENDANCE

S/N	NAME ONLY IN BLOCK CAPITAL LETTERS	~~Designation~~ Emp no.	Location	SIGNATURE 29.01.2018	SIGNATURE 30.01.2018
8	AVGERMA BHINAV	60000523	RHQ VADODARA		
9	MK GANGRADE	60020124	HVDC RR17 ADGA	29/1/18	30/1/18
10	MS THAKUR	60020063	BANASKANTHA WR Z	29/01/18	30/01/18
11	KK GUPTA	60000543	LUCKNOW		30/01/18
12	RV RAMANA	60030192	HVDC PUGALUR		
13	A RADHAKRISHNA REDDY	60030832	HYDERABAD		
14	MADHUREN DU SINGH	60001094	RHQ PATNA BIHAR ER-I		

Workshop on livelihood restoration and indigenous people in association with "Asian Development Bank"

ATTENDANCE

S/N	NAME ONLY IN BLOCK CAPITAL LETTERS	Designation Emp no.	Location	SIGNATURE 29.01.2018	SIGNATURE 30.01.2018
15	SUVENDU KUMAR	02580	CC GURGAON		
16	KUMMARA VINAY	03143	CC GURGAON	K. Vinay	K. Vinay
17	M SIDDHARDHA	02977	CC GURGAON	M.	M.
18	S S TOMAR	10791	NR1 DELHI		
19	A J XAVIER	00117	SRO 2 RE BANGALORE		
20	J BARDHAN	40072	NERPSIP GUWAHATI		
21	VIKRAM CHAND	16376	NERPSIP SHILLONG		

Workshop on livelihood restoration and indigenous people in association with "Asian Development Bank"

पावरग्रिड

ATTENDANCE

S/N	NAME ONLY IN BLOCK CAPITAL LETTERS	Designation / Emp No.	Location	SIGNATURE 29.01.2018	SIGNATURE 30.01.2018
22	PRAKASH JYOTI SHARMA	60050073	NERTS SHILLONG		
23	DR. SHANKAR SINGH	11013	CC, ESMD DELHI		