		MAHATRANSCO Maharashtra State Electricity Transmission Co. Ltd. CIN No. U40109MH2005SGC153646
Name of office	:	**Office of the Executive Engineer, EHV Projects Division, M.S.E.T.C.L.,**
Office address	:	Bangali Camp Mul Road, Chandrapur.
Contact No.	:	8554993283
Email Id	:	ee4630@mahatransco.in & ehvconstchd@gmail.com
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Ref. No.: EE/EHV/Projects./DN/CHD/Tech/384		Date :18.04.2022

To,
Divisional Forest Officer,
Forest Division Chandrapur.

Sub:- Diversion of 44.0397 ha forest land under the forest (Conservation) Act, 1980 for laying of 132 KV D/C Mul-SICOM Chandrapur transmission line.
..... ***Submission of expert opinion as suggested by APCCF (Nodal), Nagpur.***

Ref:- 1. APCCF Nodal NGP letter No. Desk-17/Nodal/Chandrapur/1. D.12899/2718/21-22, Dt. 16/03/2022.
2. GCE/Nagpur/EED/Consultancy/2022/208 Dt. 13.04.2022.

This office is in receipt of letter under ref. 1 from APCCF (Nodal) Nagpur addressed to CCF Chandrapur vide which it is stated that the proposal for diversion of 44.0397 Ha. forest land under the Forest (Conservation) Act, 1980 for laying of 132kV Mul- SICOM, Chandrapur transmission line has been placed before Regional Empowered Committee's meeting held on 23.02.2022. After detail discussion, it was opined that Chandrapur district inhabits both GIB and Sarus crane, accordingly, the state Govt. is suggested to explore the possibility of laying of underground cable through ecosensative zone to minimize the possible adverse impact on wild life.

As suggested in REC meeting held on 22.03.2022 & conveyed by APCCF (Nodal) Nagpur, MSETCL had requested to The Principal, Govt. College of Engineering Nagpur to suggest their expert opinion regarding laying of overhead / underground transmission line through ecosensative zone to minimize the possible adverse impact on wild life. The Principal, Govt. College of Engineering Nagpur vide reference 2 has given their opinion on the issue. This opinion is attached herewith for onward submission to APCCF (Nodal), Nagpur.

Submitted for information and further needful, please.

Executive Engineer
EHV Projects Division
MSETCL, Chandrapur

Copy s.w.r.s to:
1. The Chief Engineer, EHV PC O&M Zone, MSETCL, Nagpur.
2. The Additional Principal Chief Conservator of Forest & Nodal Officer (FCA), Government of Maharashtra, Nagpur.
3. Chief Conservator of Forests (T), Chandrapur.
4. The Superintending Engineer, EHV Projects Circle, MSETCL, Nagpur.

Government of Maharashtra

Government College of Engineering, Nagpur

Sector 27, Mihan Rehabilitation Colony, Khapri, Wardha Road Nagpur-441108
E-mail : principal.gcoen@gmail.com Website : www.gcoen.ac.in

Telephone No. (07103)295220 (O), (07103)295226(P). (07103)295211(TPO)

No.GCE/Nagpur/EED/Consultancy/2022/ 2088
Date: 13/04/2022

To,

The Superintending Engineer,
EHV Projects Circle, 2nd Floor,
Vidyut Bhawan, Katol Road,
Nagpur-13.

Subject: Submission of report on "Diversion of 44.0397 Ha. Forest land for 132kV D/C Mul - Sicom transmission line. ---Expert opinion for laying 25.995 km 132kV underground cable instead of proposed overhead EHV line through eco-sensitive zone (Forest)".

Ref: **Letter No.** SE/EHV/PC/NGP/T/324, Dated 21/03/22 from the office of The Superintending Engineer, EHV Projects Circle, 2nd Floor, Vidyut Bhawan, Katol Road, Nagpur 440013.

Sir,

With reference to above, expert committee members, Dr. Nitin Ghawghawe, Professor and Dr. Rajesh Surjuse, Associate Professor of Department of Electrical Engineering, Government College of Engineering, Nagpur visited the actual site on 05/04/2022. The committee visited site locations and checked the technical feasibility for laying of the 132 kV EHV underground cable instead of erecting 132 kV EHV overhead line in the forest eco-sensitive zone. The detailed report comprising of the experts opinion is attached herewith for your reference and further action.

Thanking You,

Encl: 1. Detailed report.
(Total 7 pages)

(Dr. Rewatkumar P. Borkar)
Principal
Government College of Engineering,
Nagpur.

Govt. College of Engineering

O/C

Government of Maharashtra

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No.GCE/Nagpur/EED/Consultancy/2022/2088
Date: 13/04/2022

Report on "Diversion of 44.0397 Ha. Forest land for 132kV D/C Mul-Sicom transmission line. ---Expert opinion for laying 25.995 km 132kV underground cable instead of proposed overhead EHV line through eco-sensitive zone (Forest)".

Ref: **1.** SE/EHV/PC/NGP/T/324, Dated 21/03/22 from the office of The Superintending Engineer, EHV Projects Circle, 2nd Floor, Vidyut Bhawan, Katol Road, Nagpur 440013.
2. APCCF Nodal NGP letter No.: Desk-17/Nodal/Chandrapur/1. D.12899/2718/21-22, Dated 16/03/2022.

With reference to above, experts committee of Department of Electrical Engineering, Govt. C.O.E. Nagpur visited the actual site as mentioned above. The detailed report comprising of the experts opinion is as follows-

Date of Field Visit: 05/04/2022

Visiting Expert Members:

1. Dr. Nitin Ghawghawe, Professor, Electrical Engineering, Government College of Engineering, Nagpur
2. Dr. Rajesh Surjuse, Associate Professor, Electrical Engineering, Government College of Engineering

Officers of MSETCL, accompanied during the visit:

1. Er. Avinash Nimbalkar, Superintending Engineer EHV, PC, MSETCL, Nagpur
2. Er. K. N. Bhoyar, Executive Engineer, EHV Projects Division, MSETCL, Chandrapur

1.0 Preamble : It was proposed by Maharashtra Transmission Co. Ltd, to lay down 132 kV D/C transmission line in Chandrapur District with following details and description-

1.1 Project Name/Title:

"Laying of 132 KV D/C Mul-SICOM Chandrapur Transmission Line"

1.2 Project Description: To extend the uninterrupted power supply to rural area of Chandrapur/Gadchiroli district, MSETCL has proposed to establish 132 KV power line from 220 kV SICOM Sub-Station (Chandrapur) to 132 kV Mul Sub-Station. The proposed project will help to strengthen the transmission system in Eastern Maharashtra and boost the power position in domestic, agriculture and industrial field.

Following are the some of the key features of the project:

i. The route length of line is 48.615 km, out of which 26 km is passing through the eco-sensitive area which includes 16.311 km of line passing through forest area.
ii. Total towers proposed in the project are 168, out of which 53 are proposed in forest area.
iii. The above line route involving forest land admeasuring approximately 44.0397 Ha. The proposal for diversion of 44.0397 Ha of forest land for construction of above transmission line was submitted to forest department under provision of forest conservation Act- 1980.
iv. The construction activity of this 132 kV transmission line is in progress in non forest area and line work in forest area is held up for want of permission from forest department.

2.0 Major Project Benefits: By putting this link of 132 kV Mul SICOM EHV transmission line has following benefits to Tribal & Naxal affected part of Chandrapur & Gadchiroli district:

i. Formation of 132 kV grid, leading to increase in redundancy.
ii. Voltage improvement.
iii. Outage management, leading to improved reliability.
iv. Industrial and agricultural growth, thereby increase in employment in the region.
v. Help in alleviating development in agriculture, commerce, education, health, social welfare and public safety.

3.0 Scope of the Expert Report: As per the reference No. 2, the said proposal was discussed and examined in Regional Empowered Committee (REC) meeting held at Integrated Regional Office, Govt. of India, Ministry of Environment, Forest and Climate Change (MoEFCC), Nagpur on Date 23.02.2022. After detailed discussion and examination of the proposal, the committee opined that Chandrapur District inhibits both GIB and Saras crane in TATR (Tadoba Andhari Tiger Reserve). Accordingly, REC suggested State Govt. to explore the possibility of laying of 132 kV underground line through eco-sensitive Zone to minimize possible impact on wildlife.

The scope of this expert report is limited to the study of possible advantages and disadvantages of underground line through eco-sensitive Zone of the forest and the study of the technical feasibility of 132 kV EHV underground cable and 132 kV EHV overhead line and to check its feasibility.

4.0 Advantages and disadvantages of underground line (132 KV): Following are some major advantages and disadvantages of the Underground Cable of 132 kV

Advantages:

1. They have reduced visual impact due to being below the ground.
2. It is less affected by extreme weather conditions and hence increased reliability of supply of power.
3. These lines have reduced EMFs (Electric and Magnetic Fields).
4. It has lesser transmission losses.

Disadvantages:

1. The installation process of underground cables through various geographic areas has high difficulties, because of ground excavation.
2. The installation cost of Underground transmission is high, as it requires a continuous trench or concrete ducts for cable installation. Also, it has a high material cost due to the requirement of thick and insulated conductors.
3. Cost of underground cables (e.g. 132 kV) are near to 10 times higher comparing to overhead lines (e.g. 132 kV).
4. Underground transmission systems have a high cost of maintenance. Because the line needs to dig up before any repair activities and required to reinstall again.
5. High complications in fault detection and maintenance.
6. High voltage transmission is difficult in underground transmission.
7. Unlike overhead lines which can easily be upgraded to carry more power, underground lines cannot be upgraded to increase the capacity.
8. Limited by thermal capacity.
9. Underground cables are subjected to damage due to ground movement due to earthquake and due to fire incidences.

5.0 Advantages and disadvantages of overhead line (132 kV): Following are some major advantages and disadvantages of the overhead line of 132 kV

Advantages:

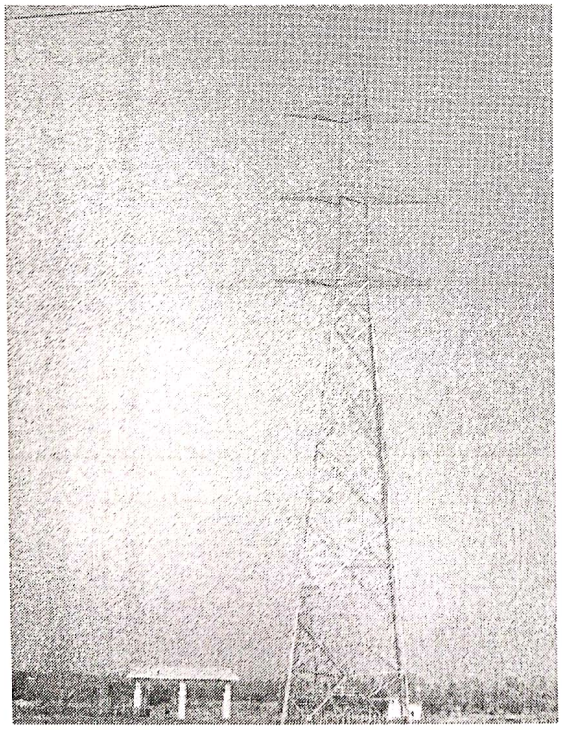
1. Use for high power transmission.
2. Low installation and material cost.
3. The fault or damage in overhead lines can be easily located.
4. Extension or joining on overhead lines can be performed easily and also it facilitates easy replacing.

5. They are not restricted by landscape i.e. they can be easily installed over river or motorway or hilly regions.
6. Chances of electrocution are less as they run high above the ground.
7. Cheaper to setup compare to underground transmission.

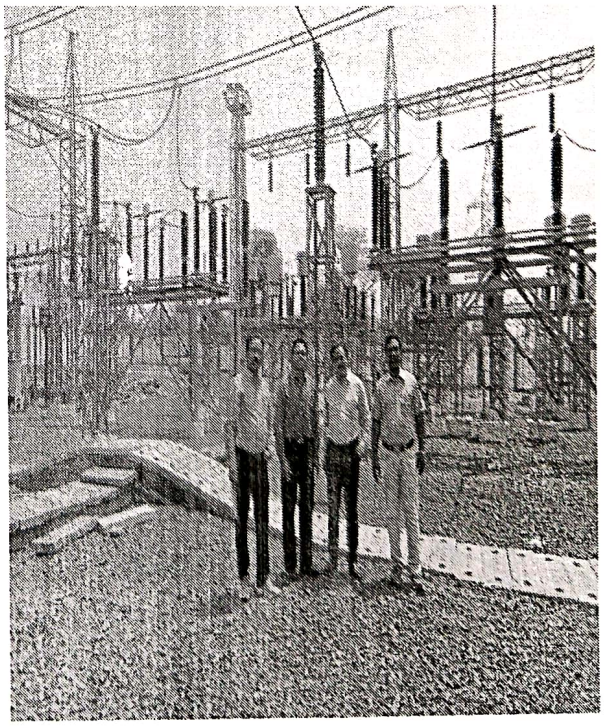
Disadvantages:

1. These lines visually pollute the areas where they are installed.
2. These lines suffer from problems such as terrorism, vandalism and lightning etc.
3. Sometimes these lines come in the way of birds and low flying aircrafts or drones which can be dangerous. But can be mitigated by providing bird flappers and appropriate markers.

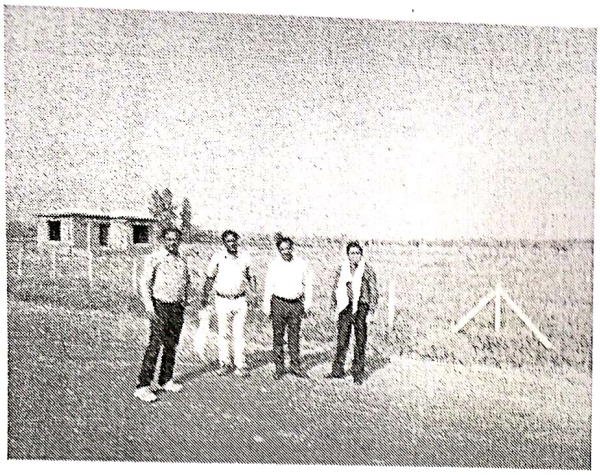
6.0 Observations: The committee visited the actual site and checked the technical feasibility for laying of the 132 kV EHV underground cable instead of erecting 132 kV EHV overhead line in the forest eco-sensitive zone, which came as one of the suggestions. The committee visited along the track of proposed transmission line and checked the spots at crossings between transmission tower numbers 62-63, 58-57, 52-53 and 43-44. The expert committee members visited and minutely observed the SICOM Chandrapur sub-station, location 62 (9/2) – 63 (9/3) Ajaypur to Kelzar road crossing, location 57 (7/14) – 58 (AP8) Chichpalli – Jambharla road crossing, location 52 (7/9) – 53 (7/10) Chichpalli – Junona road crossing, location 15 (AP5) – 16 (5/1) Lohara – Junona road crossing etc.



Tower Erection at one location



SICOM Chandrapur sub-station



Location: 62 (9/2) – 63 (9/3)
Ajaypur to Kelzar road crossing

Location: 15 (AP5) – 16 (5/1)
Lohara – Junona road crossing

As per the actual evidences and the documents available, following observations have been made-

i. The total Forest area proposed for diversion is 44.0397 ha and the proposal also involves 87.0858 ha of non-forest land thereby total land required for the project is 131.1255 ha. Legal status of forest land proposed for diversion is Reserved Forest, Protected Forest and Zudpi Jungle.

ii. The CCF. Chandapur apprised the Committee that alignment cannot be proposed through the existing road since it is passing through the buffer of Tadoba Andhari Tiger Reserve.

iii. MSETCL has ensured every possible effort to avoid the forest area involvement completely or to keep it to the barest minimum. And whenever it becomes unavoidable due to the geography of terrain, residential development or other reasons, minimum possible involvement of forest stretch is taken in alignment of route of proposed EHV line.

iv. The Chief Conservator of Forest (T), Chandrapur has suggested following mitigation measures which have also been recommended by the PCCF (Wildlife), Government of Maharashtra:

   a. A 5.8 m vertical clearance and 1.2 m horizontal clearance from the vegetation will be maintained as per Indian Electricity Rule 1956.
   b. Any felling/pollarding/ of trees will be done as permitted for electrical clearance.
   c. Vegetation clearance along forest stretches will be avoided or minimized by increasing height of towers structure to shall maintain safe vertical clearance.

d. Adhere to guidelines issued by National Green Tribunal if applicable
e. Guidelines issued by forest clearance diversion pertaining to transmission line passing through forest will be strictly followed.
f. No construction activity 6.00 pm to 7.00 am.
g. Labour at least 1.00 Km away.
h. Installation of 'Bird Reflectors' at proper places

v. The construction activity of this 132 kV transmission line is in progress in non forest area and line work in forest area is held up for want of permission from forest department

7.0 Important Findings of the Experts Committee: After the thorough study made from the observations, following are the findings

i. Overhead line involves minimum clearance from ground of 6 meters approximately. Being the Extra High Voltage line high speed protection is provided which clears the faults instantaneously by tripping the line. **Thus there would not be any hazards to wild animals passing through the eco-sensitive zone**

ii. Power theft by putting the hooks like on 440V or 11kV lines are not possible in case of 132 kV lines, as the distance of the line conductors from ground is sufficiently high. **Hence possibilities of accidents, is very low. Also protection being highly sensitive, the chances of accidents becomes less.**

iii. If the underground cable is to be laid down in the eco-sensitive zone of 26 kms inclusive of 16.311 kms, capacitive current would be increased as the length of cable is more than 20 kms. **Hence any type of fault occurs on underground cable would be more hazardous to wild animals.**

iv. For laying the 132 kV EHV underground cable, cable trench of minimum 2 meters width will be required throughout the periphery of 26 kms. Also for laying the cable, the movement of machinery and excavation units will require a passage of minimum10 mtrs for 26 kms. For carrying out the maintenance works if any in future, the free access will have to be provided in this corridor. It would be opened after cutting of the trees in this corridor. **The deforestation would be more for underground cabling as compared to the work of erection of 132 kV overhead transmission line.**

v. In future when the load demand will increase, the underground cable or the transmission line will have to be upgraded. **Up-gradation of 132 kV transmission line would be easily possible.**

vi. The bushfire or wildfires are likely to occur specially during the summer season. **In case of bushfire or wildfire, the underground cable may catch fire if proper precautions are not taken, for which the risk is low in case of overhead 132 kV transmission line**

vii. Cost of installation of underground cable is 8 to 10 times the cost of erection of 132 kV overhead transmission line and also the maintenance

viii. Using the link of 132 kV Mul-SICOM, the power demand in the tribal and naxal area of Chandrapur and Gadchiroli will be fulfilled. Also voltage profile and overall reliability will be improved thereby benefitting all the customers. Further leading to agricultural and industrial growth in the area and hence leads to more socio-economic advantages.

ix. As recommended by the PCCF (Wildlife), Government of Maharashtra about Installation of 'Bird Reflectors' at proper places may avert any possible mishaps on GIB or Saras crane or any other birds habited in this areas

8.0 Conclusion: Looking towards the observations and findings the committee is opined that though 132 kV EHV underground have advantages as stated in point no. 4.0, it does not offer sufficient environmental advantages to justify the substantial increase in costs as compared to the 132 kV EHV overhead transmission line. **The underground cabling option would be inherently less efficient and less economic than the OHL section. Hence after following the required norms of forests Government of India, erection of 132 kV transmission line from SICOM Chandrapur to Mul is recommended for the entire distance.**

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