



भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग
System Planning & Project Appraisal Division
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Sewa Bhawan, R. K. Puram, New Delhi-110066
वेबसाइट / Website: www.cea.nic.in



[ISO: 9001:2008]

No. 26/10/2011-SP&PA/

Date: 15th Nov., 2011

To

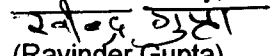
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|----|--|----|--|
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Sub: Minutes of the 33rd meeting of the Standing Committee on Power System Planning in Western Region held on 21st Oct 2011 at NRPC, Katwaria Sarai, New Delhi.

Sir,

The minutes of the 33rd meeting of the Standing Committee on Power System Planning in Western Region held on 21st Oct 2011 at NRPC, Katwaria Sarai, New Delhi are available on CEA website (www.cea.nic.in at the following link: Home page-Power Systems-Standing Committee on Power System Planning-Western Region).

Yours faithfully,


(Ravinder Gupta)
Director, SP&PA



भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
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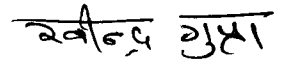
दिनांक: 15.11.2011

- 1 सदस्य (विद्युत प्रणाली),
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फैक्स 011-28052046

विषय :- पश्चिमी क्षेत्र की विद्युत प्रणाली योजना पर 21 अक्टूबर, 2011 को एन आर पी सी, कटवरिया सराय, नई दिल्ली में आयोजित की गयी
स्थाई समिति की 33वीं बैठक का कार्यवृत्त।

महोदय,

पश्चिमी क्षेत्र की विद्युत प्रणाली योजना पर 21 अक्टूबर, 2011 को एन आर पी सी, कटवरिया सराय, नई दिल्ली में आयोजित की गयी
स्थाई समिति की 33वीं बैठक का कार्यवृत्त केन्द्रीय विद्युत प्राधिकरण की वेबसाइट www.cea.nic.in पर लिंक Home page - Wing specific
documents-Power Systems-Standing Committee on Power System Planning-Western Region पर उपलब्ध है।
संलग्न - उपरोक्त

भवदीय,

(रवीन्द्र गुप्ता)
निदेशक

Minutes of the 33rd Meeting of Standing Committee on Power System Planning of Western Region held on 21st Oct, 2011

- 1.0 The 33rd meeting of the Standing Committee on Power System Planning of Western Region was held on Friday the 21st October, 2011 at NRPC, Katwaria Sarai, New Delhi. The list of participants is at Annex – 1.
- 1.1 The meeting was chaired by Member (PS), CEA. Member (PS), CEA welcomed all the participants to the meeting and wished them happy & prosperous Diwali. He requested Director (SP&PA) to take up the agenda items.
- 2.0 **Confirmation of the minutes of 32nd meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 13th May, 2011 at Katwaria Sarai, New Delhi.**
- 2.1 The minutes of the 32nd SCPSPWR issued vide CEA letter No.26/10/2011-SP&PA/ 209-222 dated 9th June 2011 were confirmed with following addition of two no. of LTA applications at sl. no. 6 and 7 in the list of Modification in LTA quantum/commencement of LTA given at para H, on page 33 under summary of OA:

S.No.	LTA Applicant	LTOA / LTA granted for	Modifications agreed in the LTOA / LTA
6	TRN Energy(2X300 MW)	Transfer of 600 MW from their generating station (600 MW) in Chattishgarh from Jul'12.	At the time of signing of BPTA the applicant has requested for change in LTA quantum and commencement date. Modified LTA: • Transfer of 393 MW (WR-243 MW, NR-150 MW) from their generating station(600 MW) in Chattishgarh from September 2013 onwards.
7	M/s CSPTCL(Chattisgarh State Power Trading Co.Ltd)for their share from M/s TRN		Modified LTA: • Transfer of 207 MW (WR-123 MW, NR-84 MW) from M/s TRN Energy (600 MW) in Chattishgarh from September 2013 onwards.

3.0 Review of Progress on Earlier Agreed Transmission Schemes

- 3.1 Director (SP&PA), CEA requested POWERGRID to intimate the latest status of progress of ongoing / earlier agreed transmission schemes.
- 3.2 AGM, PGCIL intimated that the Bilaspur Pooling station along with the LILO of Sipat-Seoni 765 kV 2XS/C lines is scheduled for commissioning by February 2012. Regarding the pooling stations associated with IPPs in Chattishgarh, he informed that land for Raipur pooling station and Dharamjaygarh pooling station has been acquired. The land acquisition

is in progress for 765/400 kV pooling station at Raigarh (near Kotra), Raigarh (near Tamnar) and Champa.

3.3 The details of the status of implementation of the earlier agreed schemes under construction / approved furnished by Powergrid is enclosed as Annexure-II.

3.4 Member (PS) enquired about the status of Mundra UMPP- Bachau- Ranchodpura 400 kV D/C line. Executive Director (SEF), PGCIL informed that the one circuit has already been charged with 63 MVAR bus reactor at Mundra UMPP switchyard. The second circuit would be charged after converting the one of the four line reactors at UMPP switchyard to bus reactor to the overcome high voltage problem. MD (GETCO) informed that interconnecting 220 kV lines at Bachau would be commissioned by November 2011.

4.0 Proposal of UT of Dadra and Nagar Haveli for establishment of 220/66 kV 2X160 MVA Vagchipa.

4.1 Director (SP&PA), CEA stated that UT of DNH has proposed to establish a 220/66 kV, 2X160 MVA Vagchipa / Dadra substation by LILO of both circuit of Vapi-Khadoli 220 kV D/C line. Vapi- Khadoli 220 kV D/C line being an inter state transmission line, DNH has requested the concurrence of the WR constituents. He further stated that as per information provided by DNH, the present demand of about 600MW of DNH is being met through the following 220/66 kV lines:

- (i) Vapi(PG)-Khadoli 220kV D/C line-240MW
- (ii) Vapi(PG)-Kharadpada 220kV D/C line-150MW
- (iii) Vapi(GETCO)-Dadra/Vagchipa 66kV D/C -50MW
- (iv) Bhilad(GETCO)-Amla 66kV D/C line -100MW
- (v) Bhilad-Mosat 66kV D/C -50MW.

4.2 Director (SP&PA), CEA stated that the present load at Vagchipa / Dadra is about 100MW which is met from Vapi (PG) and Kharadpada (DNH) over 66kV lines. DNH has informed that by 2013-14 the anticipated load at Vagchipa / Dadra would be around 200MW as a lot of industrial growth is taking place in that area. The studies carried out by POWERGRID for DNH system for 2012-13 time frame have also recommended the establishment of Vagchipa / Dadra substation.

4.3 MD (GETCO) stressed the need for expediting the installation of 3rd 400/220 kV ICT at Vapi.

4.4 After further deliberation, the proposal of DNH was agreed and is to be implemented by DNH.

5.0 Proposal for establishment of GIS substations at Betul and Vataman

5.1 Director (SP&PA), CEA stated that establishment of 2X315 MVA, 400/220kV substation at Betul was agreed as a part of transmission system of Mauda Stage-II (1320 MW) and it was also agreed that in case of difficulty in getting land for substation at Betul, POWERGRID may implement this substation as GIS. Similarly establishment of 2 X 500MVA, 400/220kV substation at Vataman was agreed as a part of transmission system associated with 3960 (6X660) MW Chhattisgarh UMPP. PGCIL had intimated that while exploring the land for establishment of Vataman and Betul 400 kV substation, they found that only 12 – 15 acre of Govt. land was available as against the requirement of about 30- 40 acres for setting 400 kV AIS. Further, in view of requirement of large piece of private land, its acquisition problem and high cost of land, POWERGRID have proposed that 400/220kV substation at Betul as well as Vataman may be developed as GIS.

5.2 MPPTCL representative expressed their reservation for the GIS at Betul as the cost of 400kV AIS substation is less than 400kV GIS substation even if private land is purchased

and availability of land in Betul was not an issue and they would prefer to have an AIS substation at Betul.

- 5.3 MD (GETCO) stated that keeping in view less land requirement, low maintenance cost, increasing land cost and high reliability associated with GIS, he was in favour of establishment of GIS at Vataman and Betul, even if initial cost is high.
- 5.4 POSOCO representative stated that the 400 kV GIS comprised double bus scheme and a stuck breaker condition could cause disruption of a number of feeders connected to a single bus which was not desirable. Hence reliable switching scheme may be adopted. Executive Director (SEF), PGCIL stated that the one and half breaker switching scheme is being adopted for future 400 kV GIS.
- 5.5 After further deliberation, the members agreed for establishing 400/220kV substations at Betul and Vataman as GIS as a part of Mauda-II and Chhattisgarh UMPP transmission system respectively.

6.0 Interconnection of Vindhyachal Stage –IV (2X500 MW) generation project with existing stage-III switchyard

- 6.1 Director (SP&PA), CEA intimated that in the 32nd meeting of Standing Committee of WR, an interim arrangement for evacuation of power from Vindhyachal-IV (2X500MW) generation project was agreed due to non availability of associated transmission system in the matching time frame of Vindhyachal-IV generation project. The interim arrangement involves bunching of Vindhyachal Pooling Station-Sasan 400 kV D/C line and interconnecting it with Vindhyachal-IV at one end, bypassing Vindhyachal Pooling Station and interconnecting with Sasan at the other end. The interim arrangement would utilize the transmission system associated with Sasan UMPP from Sasan onwards. The interim arrangement would have provided only one outlet from Vindhyachal-IV and in the event of outage of the interim arrangement the power from Vindhyachal-IV would have bottled up. Therefore, in the previous meeting, it was decided to study the interconnection of Vindhyachal-IV with Vindhyachal-III to improve the reliability of power evacuation from Vindhyachal-IV. The system studies carried out after interconnecting Vindhyachal-IV with Vindhyachal-III indicate normal loading in the event of outage of the interim arrangement. However, the event of double contingency i.e. non-availability of interim arrangement and outage of one of the circuit of Vindhyachal-Satna 400 kV D/C line may cause overloading of other lines. In that case M/s NTPC shall have to back down generation from Vindhyachal-IV as per the instruction from regional load dispatch centre.
- 6.2 Executive Director (SEF), POWERGRID stated that for charging Satna-Bina 765 kV S/C line at 400 kV voltage level, 125 MVAR line reactor would be required at Bina and the same would be arranged from other location. It was also informed that charging of Sasan-Satna-Bina 765kV line shall be at 400kV level as an interim arrangement. The Bina-Gwalior 765 kV lines shall also remain charged at 400kV level.
- 6.3 NTPC representative intimated that the interconnection of Vindhyachal-IV STPP 400 kV bus with the existing Vindhyachal-III STPP 400 kV bus would be implemented by them through a 400 kV D/C line of about 4 km length.
- 6.4 After further deliberations, the interconnection of Vindhyachal-IV STPP 400 kV bus with the existing Vindhyachal-III STPP 400 kV along with 1x125 MVAR reactor at Bina end was agreed as an interim arrangement was agreed till the commissioning of Vindhyachal-IV transmission system.

7.0 Interim arrangement for charging of 765kV Bina - Indore(PG) S/c line at 400kV level along with 400kV Indore(PG) – Indore(MPPTCL) D/c line as part of Regional System strengthening in WR for Sasan UMPP

7.1 Director(SP&PA), CEA stated that the following transmission system has been agreed as part of Regional System strengthening in WR for Sasan UMPP and the same is being implemented by Powergrid:

- (i) Bina(PG)-Indore 765 kV S/c.
- (ii) New 765/400 kV, 2x1500 MVA S/s at Indore
- (iii) Indore(PG)-Indore 400 kV D/c (quad)
- (iv) Upgrading Bina and Gwalior S/s to 765 kV: 2x1000 MVA 765/400 kV at Bina and 2x1500 MVA 765/400 kV at Gwalior.

7.2 Director (SP&PA), CEA added that POWERGRID has informed that the Bina – Indore (PG) 765kV S/C and Indore (PG) - Indore (MPPTCL) 400kV D/C lines would be ready for commissioning by Nov'11/Dec'11, whereas commissioning of 765kV Indore (PG) substation would be delayed. POWERGRID has proposed the following interim arrangement to facilitate transfer of power to Madhya Pradesh :

- (i) Charging of 765kV Bina – Indore (PG) S/c line at 400kV level with direct termination at Indore (MPPTCL) by bypassing Indore (PG) through the 400kV Indore (PG) – Indore (MPPTCL) D/c line.
- (ii) Interconnection of the Bina - Indore(PG) 765 kV S/c line charged at 400kV level at Bina end by using 420 kV, 63 MVAR bus reactor bay at Bina and using the bus reactor as line reactor.
- (iii) Provision of one 400kV, 80MVAR / 125MVAR line reactor (to be arranged suitably) at Indore (MPPTCL) end to facilitate smooth charging of the line.

Implementation of the above interim arrangement as well as termination of 765kV line at 400kV bus at Bina along with bypassing at Indore(PG), requires installation of 400kV CVTs for the reactor terminal at Bina S/s and other equipments including line reactor at Indore (MPPTCL) end.

7.3 MPPTCL representative stated that they are facing over voltage problem at Indore and charging of this line may aggravate the over voltage problem especially during light load condition. A no. of lines are being switched off in light load conditions to contain the over voltage problem. As most of the equipments in MPPTCL system are about 20 years old and excessive voltage may cause damages to the equipments.

7.4 Member (Power System), CEA appreciated the concern of MPPTCL. He said that the Northern and Southern Regions are also facing over voltage problem. This was mainly due to wide variation in load during the peak and off-peak conditions in the grid. To contain the over voltages within permissible limits, operational measures such as switching off 400 kV lines, bringing in bus reactors into service etc, were being resorted. Also to mitigate over voltage problem, adequate reactive compensation is also being planned.

7.5 Executive Director, POWERGRID stated that for dispersal of power beyond Bina, charging of Bina- Indore (MPPTCL) was required. Charging of Bina – Indore 765 kV line at 400 kV level would be through a 63 MVAR line reactor at Bina end and a 125 MVAR line reactor at Indore (MPPTCL) end.

7.6 To a query of mismatch in the implementation time schedule of Indore 765/400 kV substation and Bina – Indore 765 kV S/C line, Powergrid clarified that Gwalior and Indore 765 kV substations are being implemented through World Bank funding, whereas other transmission system under Sasan UMPP are being implemented through domestic funding.

This has caused the some delay in award of contract for Gwalior and Indore 765/400 kV substations.

7.7 After further deliberations, members agreed to the above proposal.

8.0 MPPTCL proposal of LILO of one ckt. of Khandwa – Rajgarh 400 kV D/C line at their proposed 400kV Chhegaon substation.

8.1 Director (SP&PA), CEA stated that the LILO of one circuit of Khandwa-Rajgarh 400 kV D/c line at proposed 400kV Chhegaon substation of MPPTCL was agreed in principle in the 32nd meeting of Standing Committee of Power System Planning in WR, for improving the reliability of evacuation of power from Malwa TPS. It was also agreed that the proposal would be confirmed after joint study by CEA, PGCIL and MPPTCL. Subsequently, Load flow studies were carried out in the time frame of 2012-13 considering following transmission system associated with Malwa TPS (1200 MW):

- (i) Malwa TPS - Pithampur 400kV D/c line.
- (ii) Malwa TPS - Julwania 400kV D/c one ckt via Chhegaon
- (iii) Malwa TPS - Chhegaon 220 kV D/C line.
- (iv) Pithampur400 – Pithampur 220 kV D/C interconnector.
- (v) LILO of both ckt of Nimrani- Julwania 220 kV D/C line at Julwania 400 kV substation.
- (vi) 1X315 MVA, 400/220 kV substation at Chhegaon, 2X315 MVA, 400/220 kV substation at Julwania and 2X315 MVA, 400/220 kV substation at Pithampur, 2X315 MVA, 400/220 kV transformer at Malwa generation switchyard.

The studies indicate normal loading on the lines.

8.2 After deliberations, the proposal of MPPTCL of LILO of one ckt. of Khandwa – Rajgarh 400 kV D/C line at proposed 400kV Chhegaon (MPPTCL) substation was agreed along with provision of 125 MVAR bus reactor at Chhegaon by MPPTCL.

9.0 CSPTCL proposal of LILO of 400kV S/c line between Raipur (PG) and Khedamera (Bhilai) S/c at proposed Raipur (Raita) 400kV substation.

9.1 Director (SP&PA), CEA stated that CSPTCL proposal of LILO of 400kV Raipur – Khedamera line at their proposed Raipur (Raita) 400kV substation was discussed in the 32nd meeting of Standing Committee of Power System Planning in WR to improve the reliability of evacuation of power from Marwa (2x500 MW) TPS. It was decided in the meeting that studies would be carried out considering additional transmission elements planned by CSPTCL from Raita sub-station. System studies had been carried out by POWERGRID considering following transmission elements for evacuation of power from Marwa (2X500 MW) TPS for 2012-13 time frame:

- (i) Marwa STPP- Raita (Raipur) 400kV D/c
- (ii) Raita – Jagdalpur 400 kV D/c
- (iii) Raita – Khedemara(Bhilai) 400 kV D/c
- (iv) LILO of 400kV Korba(W)- Khedamera one ckt at Marwa
- (v) Marwa – Baneri 220kV D/c line
- (vi) 400/220kV, 1x315 MVA transformer at Marwa generation switchyard
- (vii) Establishment of 400/220 kV, 2x315 MVA S/s at Raita, Jagdalpur

The studies carried out indicate normal loading on 400 kV lines.

9.2 After deliberations, the proposal of CSPTCL was agreed along provision of 125 MVAR bus reactor at Raita and switchable line reactors in both circuits of Raita – Jagdalpur 400 kV D/C line at Jagdalpur end by CSPTCL.

10.0 Provision of 1x315 MVA ICT for reliable auxiliary power supply at HVDC back-to-back station at Bhadrawati.

- 10.1 Director(SP&PA), CEA stated that POWERGRID has informed that at present the auxiliary power supply to the HVDC back-to-back station at Bhadrawati was fed through two number 33 kV dedicated feeders of MSEDCL (one from MSEDCL 220 kV Warora Sub-station and the other from MSEDCL 220 kV MIDC Sub-station). However frequent tripping of 33 kV feeders and poor quality of power supply from MSEDCL has been affecting smooth operation of HVDC Back-to-Back Station. For reliable auxiliary power supply at Bhadrawati, POWRGRID has proposed provision of 1x315 MVA ICT (along with 220kV line bays) at Bhadrawati. The tertiary of the 315 MVA ICT would be utilized for supply of reliable auxiliary power supply to HVDC back-to-back station at Bhadrawati and the two nos. of 220 kV line bays could be utilized by MSETCL for drawl of power.
- 10.2 MSETCL representative stated that in vicinity Bhadrawati, there are many generation projects coming up, therefore utilization of the 220 kV bays for drawl of power from Bhadrawati cannot be ensured. However, they have taken up the issue with MSEDCL for provision of reliable power supply to Bhadrawati HVDC back to back station.
- 10.3 MD (GETCO) stated that the issue of provision of 1x315 MVA ICT for reliable auxiliary power supply at HVDC back-to-back station at Bhadrawati has already been agreed in the 18th WRPC meeting held on 1st October 2011. MS, WRPC stated that in the meeting on the issue of reliable power supply to Bhadrawati, MSETCL has ensured that they will take up the matter with MSEDCL for maintaining reliable power supply.
- 10.4 Member (Power System), CEA stated that the issue can be discussed afresh in the standing committee and subsequently can be taken up in the WRPC meeting. He enquired about the load requirement for auxiliary power supply and availability of DG set at Bhadrawati. Powergrid clarified that about 2 MVA was the load requirement for the auxiliary power supply and the DG set was used only in case there was no power supply.
- 10.5 POWERGRID stated that HVDC poles have tripped six (6) times during the current calendar year due to sudden dip in 33kV auxiliary power supply. Further utilization of HVDC back-to-back station at Bhadrawati was as high as 90% and with high instances of auxiliary power supply failures, reliability of the HVDC back-to-back station at Bhadrawati was getting compromised.
- 10.6 The issue was further deliberated and keeping in view high utilization factor HVDC back-to-back station at Bhadrawati and large no. of instances of auxiliary power supply failures, provision of 1x315 MVA ICT along with 2 nos. 220kV line bays for reliable auxiliary power supply at HVDC back-to-back station at Bhadrawati was agreed by the members. It was also agreed that in case of space constraint, GIS shall be considered for 400 kV & 220kV bays. Further proposal being strengthening of existing system, it was agreed that scheme shall be implemented by POWERGRID as system strengthening scheme.

11.0 Provision of Line Reactor at Solapur (PG) for 400kV Solapur (PG) - Karad S/c line.

- 11.1 Director (SP&PA), CEA stated that 2x315MVA, 400/220kV Solapur (PG) S/s has been established through LILO of Solapur (MSETCL)–Karad (MSETCL) 400kV S/c line as a part of WR System strengthening scheme-II. After establishment of LILO, the length of 400kV Karad (MSETCL) – Solapur (PG) & Solapur (PG) – Solapur (MSETCL) section has increased to about 300km and 178km respectively. In view of the increased length of 400kV Solapur (PG)-Karad section, POWERGRID has proposed provision of 1x80MVAR switchable line reactor at Solapur (PG) end for Solapur(PG)-Karad 400kV line as a regional system strengthening scheme.

11.2 The proposal was agreed by the members for implementation by POWERGRID as system strengthening scheme.

12.0 Provision of additional spare converter transformers for HVDC back to back station at Chandrapur (Bhadrawati).

12.1 POWERGRID representative informed that Pole-I of HVDC Back-to-Back (BTB) station (2x500MW) at Bhadrawati was commissioned in Oct. 97 and Pole-II in March 98. The Bhadrawati BTB was planned for exchange of power between WR and SR during contingency conditions. Recently the BTB is being used as power evacuation corridor with utilization factor of more than 93 % during 2011. The high utilization of the BTB and frequent change of power order causes enormous stress on converter transformers due to frequent operation of on load tap changer. This has bearing on the life of converter transformers. At present there are 12 no. converter transformers (6 for each pole) and only one spare converter transformer is available at Bhadrawati. Further, these converter transformers are off shore manufactured items. Any multiple failures of converter transformers may result in long outage of the pole and restrict the power transfer capability through this BTB to 500 MW. In view of such high capacity utilization of HVDC BTB at Bhadrawati, it is proposed to have one spare Converter Transformer for each pole at each regional bus i.e., total three nos. of single phase converter transformers. The estimated cost of one single phase Converter Transformers is Rs.12 Crores.

12.2 Members enquired about failure of converter transformers in India and abroad and the time taken for restoration of the pole. POWERGRID representative narrated the instance of converter transformer failures at Bhadrawati and Vizag. He added that converter transformer failures are world wide phenomenon and converter transformers of all make had failed at one time or other in India and abroad. He said with the availability of spare converter transformer, the pole could be restored with in 72 hours, otherwise it may take longer time.

12.3 After further deliberations, members agreed to the proposal of providing one (1) spare converter transformer for each pole at each WR and SR bus. As one spare converter transformer is already provided, accordingly, it was decided that POWERGRID shall implement provision of three (3) additional spare converter transformers at HVDC BTB at Bhadrawati as system strengthening scheme.

13.0 400 kV interconnection at Bhopal – Agenda proposed by MPPTCL

13.1 Director (SP&PA), CEA stated that MPPTCL has informed that they have initiated the activities for establishment of 2nos. of 400 kV bays at Bhopal 400 kV substation of MPPTCL for interconnection with 765 kV Bhopal substation. They have requested to intimate the timeline for completion of 765 kV substation at Bhopal. He further stated that the 2X1500 MVA , 765/400 kV substation at Bhopal is a part of the System strengthening scheme for WR being implemented by M/s Sterlite Transmission Project Limited through tariff based competitive bidding route. The implementation period of the scheme is 36 months and is scheduled for completion by March 2014.

14.0 Erection and Commissioning of Interstate line from 132kV Kistampeth S/S (AP) to proposed 132kV Sironcha S/s (MSETCL)

14.1 Director (SP&PA) stated that MSETCL had proposed an interstate line from 132kV Kistampeth S/S (AP) to proposed 132kV Sironcha S/s (Maharashtra). MSETCL has informed that at present 66kV S/S at Sironcha was fed from 220kV Gadchandur S/S, situated about 240km away. As this line passes through dense forest area, frequent supply interruptions takes place and the line being long causes low voltage problem in this area. MSETCL had a planned new 132kV S/S at Alapalli, Yetapalli and Sironcha but due to dense forest it is not possible to construct 132kV lines from Alapalli to Sironcha. The 132kV S/s at Kistampeth in

AP is about 35km away from Sironcha and is fed from 220kV Ramagundam S/s. The load at Sironcha S/s would be around 5 MW and future load growth would be very small. Since this is an interstate issue, the proposal has been put up for deliberation in the standing committee.

- 14.2 Member (PS) informed that the issue was discussed in 33rd SCM on Power System Planning of Southern Region held on 20th October, 2011. APTRANSCO was not in favour of the proposal of MSETCL. Therefore, MSETCL is advised to discuss the proposal with APTRANSCO.

15.0 High Voltage Studies of Western Region Grid.

- 15.1 AGM (SEF), POWERGRID informed that as decided in the 32nd Standing Committee Meeting on Power System Planning in Western Region, POWERGRID has carried out high voltage studies for off peak condition. He said that the studies has been carried out considering off peak demand of about 35,000 MW in WR for 2013-14 condition, considering implementation schedule of 22-24 months for new reactive compensation. The seven corridors were studied in consultation with WRLDC in which high voltage is being experienced and frequent opening of lines is being carried out. Due to growing complexities of WR grid, provision of dynamic reactive compensation requirement under different operating conditions has also been studied. The corridors studied and summary of recommendation is given below:

S. No.	Section of WR Grid Considered	Name of the 400kV substations	Reactive Compensation suggested
1	Jabalpur-Itarsi-Khandwa - Rajgarh	Jabalpur (PG), Khandwa (PG)	125 MVAR (fixed) 125 MVAR (fixed)
2	Bina-Shujalpur-Nagda	Shujalpur (PG)	125 MVAR (fixed)
3	Raigarh-Raipur-Bhatapara/Bhilai	Bhatapara (PG), Raigarh (PG)	125 MVAR (fixed) 125 MVAR (fixed)
4	Wardha-Aurangabad-Bhusawal	Aurangabad(PG)	125 MVAR (fixed)
5	Parli-Sholapur-Kolhapur	Parli (PG)	1X150MVAR variable reactor
6	Ranchodpura-Dehgam-Pirana	Ranchodpura (GETCO), Pirana (PG)	125 MVAR (fixed) 1x150MVAR (variable)
7	Versana-Rajkot-Jetpur-Amreli	Versana (GETCO), Rajkot (GETCO), Amreli (GETCO)	125 MVAR (fixed) 125 MVAR (fixed) 125 MVAR (fixed)
8	SVC at 400 kV Indore (PG)		+200/-150 MVAR

- 15.2 WRPC representative suggested that STU and POWERGRID should provide adequate space at their new sub-stations for providing reactive compensation. He enquired about the studies carried out by POWERGRID to optimize the requirement of reactors by way of relocation of reactors from one place to other.
- 15.3 POWERGRID stated that to optimize the requirement of reactors over the already existing as well as planned reactors, studies have been carried out considering all available standard

ratings i.e., 50, 63, 80 and 125 MVAR. However, considering the strong interconnections of buses, it is seen that the sensitivity of lower rating towards controlling high voltage is low. That is why higher available rating of reactors viz. 125MVAR has been considered. It was also informed that considering the prevailing high voltage scenario in WR, requirement of additional reactors is identified considering all the existing and planned reactive compensation in place. Therefore relocation of existing reactors has not been considered.

- 15.4 Member (PS) stated that fixed reactor compensation proposed is bare minimum requirement to contain high voltages within permissible limits as the off peak load of 35,000 MW considered in the study is very optimistic figure. He added that requirement of variable reactors and SVC could be reviewed further.
- 15.5 Managing Director (GETCO) also endorsed the views of Member (PS) and said that they are also providing large size 125 MVAR bus reactors at Jetpur, Chorania, Kosamba and Charanka substations to contain over voltages. He suggested reactors proposed at Ranchodpura, Versana, Rajkot and Amreli may be provided by POWERGRID, as it is system requirement. He opined that the maximum continuous rating of 400 kV equipments may be revised from 420 kV to 440 kV.
- 15.6 Executive Director (SEF), POWERGRID stated that reactive requirement envisaged at STU sub-stations are mainly for providing reactive support in the STU network and same may be provided by respective STUs as a part of intra-state strengthening scheme.
- 15.7 NLDC representative supported the requirement of proposed reactive compensation. He informed that at present a number of lines in the WR System are kept open to control high voltage. This introduces structural deficiency in the system and the reliability of the transmission system also reduces on account of the skeletal connectivity. The members were informed that on a typical day of low demand in Western Region (Period: July to August 2011) when peak demand met was 27715 MW, 51 number of lines (400 kV and above) were opened due to high voltage. Even on a high demand day (Period: March-April 2011) when the peak demand met was 36117 MW, as many as 29 lines were opened.
- 15.8 After further deliberation, provision of fixed reactive compensation as indicated above was agreed. The reactive compensation provision in STU sub-stations would be implemented by respective STUs and in ISTS sub-stations would be implemented by POWERGRID. It was also decided that WRPC along with WR constituents would carry out study to assess the additional reactive compensation requirement including sizing of dynamic compensation in Western Region network, for which requisite load flow data would be provided by POWERGRID.

16.0 Proposal for laying of Fibre Optic cable on upcoming lines of POWERGRID in Western Region

- 16.1 In the meeting, the requirement of OPGW and associated OFC equipments at substations in Western Region was also discussed. POWERGRID stated that the problems were being faced for grid management and substation operations in absence of reliable communication. Further, the requirement of bandwidth was increasing manifold due to high volume of SCADA data, implementation of several Special protection Schemes (SPS) and PMUs etc under Smart Grid Projects, therefore, OPGW (Minimum 24 Fibers) and associated OFC equipment should be provided along with the construction of transmission and generation projects so as to connect all the substations and generating stations. In Western Region, fiber optic connectivity was being provided to connect all the existing substations and major power plants and has already been approved by WRPC.
- 16.2 In view of above, following was agreed:
 - i. The OPGW and associated OFC equipments shall be installed to provide the fiber optic connectivity to all the newly planned substations and generating station for

which the transmission system is planned by this Standing Committee. The lines where OPGW is to be installed shall be identified in such a way that the communication network meets the N-1 criteria for reliability of the communication network. This identification would be carried out by CTU. The identified lines would be discussed in the Standing Committee for finalization.

- ii. The cost of OPGW and associated OFC equipments at substations shall be included in the project cost of transmission/generation scheme.
- iii. Accordingly, OPGW will be installed on the following lines which were approved in the present meeting, i.e. under the transmission system for Mauda Stage-II and Chhattisgarh UMPP i.e.,
 - a) 400kV Mauda II-Betul line
 - b) 400kV Betul-Khnadwa line
 - c) 400kV Vataman-Vadodra line
 - d) 765kV Chhattisgarh UMPP – Jabalpur Pooling Station line
 - e) 765kV Chhattisgarh UMPP – Champa Pooling Station line
 - f) 765kV Bhopal – Indore line

16.3 It was also agreed that, in short lines where distance protection is not feasible, OPGW shall be provided for current differential protection

17.0 MSETCL proposal of connectivity of Ghodbunder with Boisar

17.1 Director (SP&PA) stated that MSETCL's proposal of 400kV Boisar-Ghodbunder (R-Infra) D/C line for connectivity to PGCIL network was discussed in the 32nd SCM of Power System Planning in WR. During that meeting, POWERGRID had intimated that space for termination of 400kV bays at Boisar (PG) substation was not available. It was decided that MSETCL would review the proposal in consultation with POWERGRID and MSETCL may plan suitable outlet from 220kV side of Boisar.

17.2 Director (SP&PA) further informed that in view of increasing load demand in North Mumbai region, MSETCL has requested for review of the proposal of 400kV connectivity of Ghodbunder with Boisar (PG).

17.3 POWERGRID reiterated the problem of space at 400 kV side of Boisar sub-station and suggested MSETCL should plan outlet from 220 kV side of Boisar by using HTLS conductor to meet increasing load demand. He stated that another 500MVA transformer is in the process of ordering at Boisar so 220kV outlets need to be planned by MSETCL.

17.4 MSETCL informed that three number of 220kV substations have been planned for drawing power from 500MVA transformer at Boisar.

17.5 After further deliberations it was decided that POWERGRID and MSETCL would carry out a joint survey to access the availability of space at 400 kV Boisar.

18.0 GETCO's views/suggestions on CTU transmission planning in Gujarat

18.1 Director (SP&PA) said that CEA has recently received following proposals from GETCO.

- a) LILO of one circuit of 400kV D/C Mundra UMPP-Chorania line at GETCO's proposed 400kV Halvad substation.
- b) Creation of 765 or 400 kV ISTS pooling station around Gondal or Jasdan area in West Gujarat for pooling power from Saurashtra region LTA applications and its connectivity with Vadodara (PG) and Pirana (PG).
- c) Expedite the completion of Varsana (GETCO)-Bhachau (PG) 400 kV D/C line

- d) Expedite the completion of Kasor-Rajgarh 400 kV D/C line
- e) Expedite the completion of Jhanor-Navsari-Boisar 400 kV D/C line
- f) Identification of strengthening of ISTS network in Gujarat in view of about 4600 MW generation addition in Gujarat in state and private sector during 2007-08 to 2010-11 and anticipated addition of 4000 MW from Mundra UMPP.

18.2 The above proposals of GETCO were deliberated. POWERGRID was requested to expedite the implementation of the agreed transmission schemes. It was also decided that the joint study would be carried out by CEA, PGCIL and GETCO to study the proposals and identify the strengthening of ISTS network in Gujarat.

19.0 CSPTCL proposal of LILO of Korba - Budhipadar 220 kV line at proposed Naharpalli (CSPTCL) substation.

19.1 Director (SP&PA) stated that in 32nd SCM of WR the proposal for LILO of 220kV Korba – Budhipadar at Naharpalli was agreed as an interim arrangement for giving connectivity to Monnet Ispat and the Korba-Budhipadar being an inter-regional line the issue was to be further discussed in the SCM of ER. Subsequently, MS, WRPC has intimated that the above issue was discussed in the 63rd OCC of WRPC held on 17.06.2011 wherein the proposal has not been agreed in view of evacuation constraints at Budhipadar.

19.2 CSPTCL representative intimated that they have dropped the proposal of LILO of Korba - Budhipadar 220 kV line at proposed Naharpalli (CSPTCL) substation and to facilitate interconnection of Monet Ispat, a separate 220kV interconnection with Naharpalli has been planned.

Members took note of the above.

20.0 Open Access Meeting.

20.1 The minutes of the Connectivity, Open Access (Medium term and Long term) cases discussed in the 15th meeting of WR constituents regarding Connectivity / Long Term Access (LTA) applications in Western Region received from POWERGRID is enclosed as Annexure-OA.

The meeting ended with thanks to the chair.

List of Participants during the 33rd Meeting of Standing Committee of Power System Planning in WR held on 21.10.2011 at NRPC, New Delhi.

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STATUS OF WESTERN REGION TRANSMISSION SCHEME

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Date of firming up in WR standing committee	Date of FR	Date of investment approval	Target date as of now	Remarks
1.	Western Region System Strengthening Scheme-II Set-A: For absorbing import in eastern and central part of WR Grid (POWERGRID)	5222 1700	20 th (23.01.04)	Sep'05 (Rev)	July'06		
	a) Raipur – Wardha 400kV D/c b) Seoni – Wardha 765kV 2 nd S/c (initially to be operated at 400kV) c) Wardha – Parli(PG) 400kV D/c (Quad)..commissioned d) Bhadravati – Parli(PG) 400kV D/c..commissioned e) Parli(MSEB) – Parli(PG) 400kV D/c..commissioned					Feb'12 Dec'11	
	Set-B: For regional strengthening in Southern Maharashtra (100 % private)	1050					Implementation by Reliance scope
	a) Parli(PG) - Pune 400kV D/c b) Pune – Aurangabad 400kV D/c c) Parli(PG) – Solapur 400kV D/c d) Solapur - Kolhapur 400kV D/c e) LILO of Lonikhand – Kalwa 400kV D/c line at Pune f) LILO of Sholapur – Karad 400kV S/c line at South Solapur .commissioned					Dec'11 Jan'12 Aug'11 Dec'11 Aug'11	
	Set-C: For regional strengthening in Gujarat (100 % private)	600					Implementation by Reliance scope
	a) Rajgarh – Karamsad 400kV D/c b) Limdi(Chorania) – Ranchodpura 400kV D/c.. .commissioned c) Ranchodpura – Zerda(Kansari) 400kV D/c					Mar'12 Aug'11	
	Set-D: For regional Strengthening in Northern Madhya Pradesh (POWERGRID)	1050					
	a) Korba STPP – Birsinghpur 400kV D/c b) Birsinghpur - Damoh 400kV D/c .. . commissioned c) Damoh - Bhopal 400kV D/c commissioned					Feb'12	

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Date of firming up in WR standing committee	Date of FR	Date of investment approval	Target date as of now	Remarks
	d) Bina – Gwalior 765kV 2 nd S/c (initially to be operated at 400kV)..commissioned Sub-Stations (POWERGRID) a) Establishment of 400/220kV 2x315MVA substation at Pune and South Solapur..commissioned b) Establishment of 400kV switching station at Parli(PG).. .commissioned c) 25% Fixed Series Compensation at Rajgarh & Wardha.. commissioned d) Bay extension of existing substations to terminate lines under : Set-A,Set-B,Set-C,Set-D	830				Dec'11	
2.	Western Region System Strengthening -V a) 400 kV Vapi- Navi Mumbai D/c b) LILO of 400 kV Lonikhand/Pune - Kalwa line at Navi Mumbai c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai d) 220 kV Vapi- Khadoli D/c...commissioned	471	25 th (30.09.06)	Jan'07	Dec'07	Mar'13	Under implementation
3.	Western Region System Strengthening -VI a) Pirana – Dehgam 400 kV D/c..commissioned b) Establishment of 400/220 kV, 2 x 315 MVA S/s at Pirana..commissioned c) Installation of additional 400/220 kV, 1x315 MVA transformers along with associated 220 kV line bays at Wardha, Pune, Gwalior, Raipur and Bina(PG)..commissioned	311	25 th (30.09.06)	Jan'07	Feb'08	Nov'11	Under implementation
4.	Tr. System of Sasan Ultra Mega Power Project (4000 MW) Transmission Lines a) Sasan – Satna 765 kV 2xS/c b) Satna - Bina(PG) 765 kV 2xS/c c) Bina(PG)-Indore(PG) 765 kV S/c d) LILO of Vindhyaachal-Jabalpur 400 kV D/c at Sasan	5323	26 th (23.02.07)	Jun'07	Dec'08	Dec'12	Under implementation

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Date of firming up in WR standing committee	Date of FR	Date of investment approval	Target date as of now	Remarks
	e) Indore (MP)– Indore(PG) 400kV D/c (Quad) f) Bina(PG)-Bina(MP) 400 kV D/c Substations a) Establishment of new 765/400 kV, 2x1500MVA substation at Gwalior and 765/400 kV, 2x1000 MVA at Bina(PG) for charging of Bina-Gwalior and Agra-Gwalior 2xS/c lines at 765 kV level b) Provision of 765 kV Bays for charging of Seoni- Bina S/c line at 765 kV level c) Establishment of new 765/400 kV, 2x1000 MVA substation at Satna d) Establishment of new 765/400 kV, 2x1500 MVA substation at Indore(PG)						
5.	Tr. System of Mundra Ultra Mega Power Project (4000 MW) Transmission Lines a) Mundra – Bachchau-Ranchodpura 400 kV (Triple) D/c...commissioned b) Mundra – Jetpur 400 kV (Triple) D/c c) Mundra – Limbdi 400 kV (Triple) D/c d) Gandhar-Navsari 400 kV D/c e) Navsari- Boisar 400 kV D/c f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG) g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date) Substations a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari & Bachchau c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level	4546	26th (23.02.07)	Jun'07	Oct'08	Mar'12 Dec'11 Mar'12 May'13 Mar'12 Oct'12 Oct'12	Under implementation
6.	Western Region strengthening scheme-X ■ Establishment of 400/765kV	446	27 th (30.07.07)	Sep'07	Feb'09	Feb'12	Under implementation

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Date of firming up in WR standing committee	Date of FR	Date of investment approval	Target date as of now	Remarks
	2x1500MVA WR Pooling Station near Sipat <ul style="list-style-type: none"> LILO of Sipat-Seoni 765kV S/c at WR Pooling Station 						
7.	Western Region strengthening scheme-XI <ul style="list-style-type: none"> LILO of Sipat-Seoni 765kV 2nd S/c at WR Pooling Station Installation of 765/400kV, 1x1500MVA 3rd transformer at WR Pooling Station 	425.28	27 th (30.07.07)	Nov'08	Feb'09	Feb'12	Under implementation
8.	Tr. System associated with DVC, Maithon in ER (Part system) <ul style="list-style-type: none"> Ranchi-WR Pooling Station 765kV S/c 	1100	27 th (30.07.07)	Sept'07	Aug'08	Aug'12	Under implementation
9.	Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion) <ul style="list-style-type: none"> Raichur – Sholapur 765 kV S/c Sholapur – Pune 765 kV S/c LILO of 400kV Aurangabad-Pune D/c & Parli- Pune D/c lines at Pune(GIS) Establishment of new 765/400 kV substations at Sholapur & Pune with 2x1500 MVA transformation capacity 	2100	27 th (30.07.07)	Jan'08		48 months from Inv. approval	Investment approval awaited
10.	Split Bus arrangement and reconfiguration/shifting of terminating lines at Raipur 400kV S/s <ul style="list-style-type: none"> Splitting 400kV Raipur bus into two sections between existing line bays of Chandrapur-1 & Chandrapur-2 through bus sectionaliser. Bypass 400kV Bhatapara-Raipur-Bhilai line at Raipur and restore the line as 400kV Bhatapara-Bhilai S/c Shifting of Chandrapur-2 and Chandrapur-3 line bays from Section Raipur-B* to Raipur-A*. 	16	28 th (06.12.08)	Apr'09	Aug'10	Nov'11	Under implementation
11.	Installation of 125 MVar Bus reactor at 400kV Rajgarh S/s	10	Special SCM (18.04.09)	Jun'09	July'10	May'12	Under implementation
12.	Associated transmission system of VSTPP-IV and Rihand-III <ul style="list-style-type: none"> Rihand-III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV) Vindhyachal-IV Vindhyachal Pool 400kV D/c(Quad) Vindhyachal Pool-Satna 765 kV 2xS/c 	4334	29 th (10.09.09)	Sep'09	Mar'10	Nov'12	Under implementation

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Date of firming up in WR standing committee	Date of FR	Date of investment approval	Target date as of now	Remarks
	<ul style="list-style-type: none"> ▪ Satna -Gwalior 765 kV 2xS/c ▪ Gwalior – Jaipur(South) 765 kV S/c ▪ Vindhyachal Pool-Sasan 765 kV S/c ▪ Vindhyachal Pool-Sasan 400 kV D/c ▪ Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool 						
13.	Associated transmission system of Mauda Transmission System <ul style="list-style-type: none"> ▪ Mauda – Wardha 400kV D/c (Quad) -125 km 	290	29th (10.09.09)	Oct'09	Feb'10	Mar'12	Under implementation
14.	Establishment of 400/220kV substation in UT DNH <ul style="list-style-type: none"> ▪ LILO of Vapi- Navi Mumbai 400kV D/c at Kala S/s in UT DNH ▪ Establishment of 400/220kV, 2x315 MVA substation at Kala in UT DNH 	179	28 th (06.12.08)	Jan'10	Jul'11	Jul'13	Under implementation
15.	Installation of transformer at Vapi sub station <ul style="list-style-type: none"> -Installation of 400/220kV, 1x315MVA transformer (3rd) at Vapi(PG) 	21	30 th (08.07.10)	Nov'10	Sep'11	Dec'12	Under implementation
16.	Spare transformers/reactors in WR <ul style="list-style-type: none"> ▪ 4 nos. 315 MVA ICTs 1x125+1x80 MVAR shunt reactors 	64	15 th WRPC (12.11.10)	Sep'10	Aug'11	Apr'13	Under implementation
17.	Establishment of 400/220kV substation in UT Daman <ul style="list-style-type: none"> ▪ LILO of Navsari- Boisar 400kV D/c at Magarwada in UT Daman-30 km ▪ Establishment of 400/220kV, 2x315 MVA substation at Magarwada 	234	30 th (08.07.10)	Mar'10		28 months from Inv. approval	Investment approval delayed due to delay in land finalisation
18.	Western Region System Strengthening Scheme-XIII <ul style="list-style-type: none"> • Bachau(PG) – Versana(GETCO) 400kV D/c-10 km 	49	30 th (08.07.10)	Jan'11		21 months from Inv. approval	Investment approval likely in Nov'11
19.	Solapur STPP(2x660MW) transmission system <ul style="list-style-type: none"> ▪ Solapur STPP – Solapur (PG) 400kV D/c ▪ Solapur STPP – Pune(PG) [Pune S/s under Krishnapatnam UMPP] 400kV D/c (Quad) ▪ Augmentation of 400/220kV ICT by 1x315MVA transformer (3rd) at Solapur (PG) 	630	30 th (08.07.10)	Jul'11		32 months from Inv. approval	Investment approval awaited

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Date of firming up in WR standing committee	Date of FR	Date of investment approval	Target date as of now	Remarks
20.	<p>Augmentation of transformer and bays in Western Region</p> <ul style="list-style-type: none"> ▪ Installation of 400/220kV, 1x315MVA transformer (3rd) at Mapusa(PG) along with 2 nos. 220kV line bays at Mapusa (PG) sub station ▪ Installation of 400/220kV, 1x500MVA transformer (3rd) at Navsari ▪ Two nos. 400kV line bays at 765/400kV Indore(PG) Substation ▪ Two nos. 220kV line bays at 400/220kV Pirana(PG) Substation. 	65	30th/32nd WR SCM	Aug'11		24 months from Inv. approval	Investment approval awaited
21.	<p>Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &4 (2x700 MW)</p> <ul style="list-style-type: none"> • Kakrapar NPP – Navsari 400kV D/c – 65 km • Kakrapar NPP – Vapi 400kV D/c - 120 km 	250	31 st (27.12.10)				DPR under preparation
22.	<p>Transmission System associated with Mauda Stage-II (2x660 MW)</p> <ul style="list-style-type: none"> • Mauda II – Betul 400KV D/c (Quad)-210 km • Betul– Khandwa 400KV D/c (Quad)-180 km • Khandwa – Rajgarh 400kV D/c (2nd)-215 km • Establishment of 400/220kV 2x315MVA substation at Betul 	1100	32 nd (13.05.11)				DPR under preparation