

26/10

भारत सरकार
केन्द्रीय विद्युत प्राधिकरण
प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग
सेवा भवन, रामकृष्णपुरम्, नई दिल्ली 110066

क्र० सं०: 26/10/2002/प्रयोपमू/ 693-200

दिनांक: 30.10.2006

- | | | | |
|---|---|----|--|
| 1 | सदस्य सचिव,
पश्चिमी क्षेत्रीय विद्युत समिति, एम. आई. डी. सी क्षेत्र,
मेरोल, अंधेरी पूर्व, मुम्बई-400094
फैक्स सं. 022-28370193 | 8 | सदस्य (पारेषण एवं वितरण),
छत्तीसगढ .रा. वि. बोर्ड,
दानगनिया, रायपुर (छत्तीसगढ) -492013
फैक्स सं. 0771 5066071 |
| 2 | कार्यपालक निदेशक (अभियंत्रिकी),
पावरग्रिड कार्रपोरेशन ऑफ इंडिया लि.,
सौदामिनी, प्लॉट सं० 2, सैक्टर-29, गुडगाँव-122001
फैक्स सं. 95124-2571802 | 9 | सदस्य (पारेषण),
महाराष्ट्र राज्य विद्युत पारेषण क० लि०, 'प्रकाशगढ',
प्लॉट सं०.जी-9, बांद्रा - पूर्व, मुम्बई-400051
फैक्स सं. 022 26472868 |
| 3 | कार्यपालक निदेशक (अभियंत्रिकी),
नेशनल थर्मल पावर कॉरपोरेशन लि,
इंजीनियरिंग ऑफिस कॉम्प्लेक्स, ए-8, सैक्टर-24,
नोएडा-201301 फैक्स सं. 95120 2410201 | 10 | निदेशक (प्रचालन),
पी० टी० सी० लि०, द्वितीय तल,
15 एन बी बी सी टावर, भीका जी कामा प्लेस,
नई दिल्ली-110066 फैक्स सं. 011 51659504 |
| 4 | श्री एन एस एम राव,
मुख्य अभियंता (ई डी/टी ए पी स)
न्यूक्लीयर पावर कॉरपोरेशन ऑफ इंडिया लि,
12वीं मंजिल, नॉर्थ विंग, वीएस भवन, अणुशक्ति नगर,
मुम्बई-400094 फैक्स सं. 022-25563350 | 11 | प्रबन्ध निदेशक,
जी.ई.ट्रां.नि.लि, सरदार पटेल विद्युत भवन,
रेस कोर्स, बड़ोदा-390007
फैक्स सं. 0265 2338221, 2337918/2338164 |
| 5 | सदस्य (विद्युत),
नर्मदा नियंत्रण प्राधिकरण,
113-बीजी, स्कीम सं. 74-सी, विजय नगर,
इंदौर-452010 फैक्स सं. 0731 2559888 | 12 | श्री आर० एन० शर्मा,
विशेष कार्यधिकारी,
दादरा एवं नागर हवेली यू० टी०, सिल्वासा,
पिन-396235 फैक्स सं. 0260.2642787 |
| 6 | सदस्य (पारेषण),
म. प्र. ट्रांस्को., ब्लॉक सं. 3,
शक्ति भवन, रामपुर, जबलपुर-482008
फैक्स सं. 0761 2664141 | 13 | कार्यपालक इंजीनियर (परियोजना),
विद्युत विभाग, 220/66 के० वी० खरडपाडा उपकेन्द्र,
दादरा एवं नागर हवेली यू० टी०, पोस्ट नरोली,
पिन-396235 फोन न० 0260-2650857 |
| 7 | मुख्य अभियंता,
विद्युत विभाग, गोवा सरकार, पणजी
फैक्स सं. 0832 2222354 | 14 | कार्यपालक इंजीनियर,
विद्युत विभाग, दमन एवं दीव यू० टी०,
मोती दमन, पिन-396220
फोन न० 0260-2250889, 2254745 |

विषय : पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 25वीं बैठक ।

पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 25वीं बैठक के कार्यवृत्त संलग्न है।

संलग्न - उपरोक्त

31.10.06

का० ५०

पी.के. पाहवा
30/10/06
निदेशक

Government of India
Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan: R.K.Puram
New Delhi-110066

No.26/10/2002-SP&PA/

Dated 30th Oct. 2006

- | | |
|--|--|
| The Member Secretary,
Western Regl. Electricity Board,
MIDC Area, Marol, Andheri East, Mumbai
<i>Fax 022 28370193</i> | 8 Member (Transmission & Distribution),
Chhatisgarh State Electricity Board,
Dangania, Raipur (CG)-492013
<i>Fax 0771 4066566</i> |
| 2 The Executive Director (Engg.),
Powergrid Corp. of India Ltd., "Saudamini",
Plot No. 2, Sector-29, Gurgaon-122001
<i>Fax 95124-2571760</i> | 9 Member (Transmission),
MAHATRANSCO, 'Prakashgad', Plot No.G-9,
Bandra-East, Mumbai-400051
<i>Fax 022 26452868</i> |
| 3 The Executive Director (Engg.),
NTPC Ltd., Engg. Office Complex,
A-8, Sector-24, NOIDA 201301
<i>Fax 95120-2410201</i> | 10 The Chief Engineer,
Electricity Department,
The Government of Goa, Panaji
<i>Fax 0832 222354</i> |
| 4 Shri N.S.M. Rao,
Chief Engineer (ED/TAPS),
Nuclear Power Corp. of India Ltd.,
12 th Floor, North Wing, VS Bhavan,
Anushakti Nagar, Mumbai-400094
<i>Fax 022 25556513</i> | 11 The Director (O)
PTC Ltd., 2 nd Floor, 15 NBCC Tower,
Bhikaji Cama Place, New Delhi-66
<i>Fax 011 28659502</i> |
| 5 Member (Power),
Narmada Control Authority, 113-BG, Scheme
No.74-C, Vijay Nagar, Indore-452010
<i>Fax 0731 2559888</i> | 12 Shri R. N. Sharma,
Officer on Special Duty,
UT of Dadra & Nagar Haveli,
Silvasa Pin-396235 Fax 0260-2642787 |
| 6 The Managing Director,
GETCO, Sardar Patel Vidyut Bhawan,
Race Course, Baroda-390007
<i>Fax 0265 2337918 / 2338164</i> | 13 Executive Engineer (Projects)
Electricity Department, 220/66 kV Kharadpada
S/S, UT of Dadra & Nagar Haveli, Post Naroli-
396235
<i>Ph. 0260-2650857</i> |
| Member (Transmission),
MPPTCL, Block No.3,
Shakti Bhawan, Rampur, Jabalpur-482008
<i>Fax 0761 2665593</i> | 14 Executive Engineer
Electricity Department, UT of Daman & Diu Moti
Daman-396220
<i>Ph. 0260-2250889, 2254745</i> |

Subject: 25th meeting of Standing Committee on Power System Planning in Western region

Sir,

Minutes of the 25th meeting of Standing Committee on Power System Planning in Western region held on 30th Sep. 2006 at CEA, New Delhi are enclosed.

Encl. As above

(P. K. Pahwa)
Director, SP&PA, CEA

Minutes of the 25th meeting of the Standing Committee on Power System Planning of Western Region held on 30th September, 2006 in CEA, New Delhi.

The 25th meeting Standing Committee on Power System Planning of Western Region was held on Saturday the 30th September, 2006 in CEA Conference Room, New Delhi.

The list of participants is at Annex-I.

Shri V. Ramakrishna, Member (Power System), CEA welcomed the participants to the meeting and stated that under the Government of India's initiative a number of ultra mega power projects having capacity of 4000 MW were being perused by the Government through Special Purpose Vehicle (SPV). Out of these, ultra mega projects at Sasan in M.P. and Mundra in Gujarat, both located in Western Region, were on fast track and bidding document was being finalized and the response from various developers was encouraging. Northern Region and Western Region constituents would be the beneficiaries from these projects. Power from these projects would get injected in to Western grid requiring evacuation system together with system strengthening in Western grid and the Northern Region constituents would be getting power from these projects through displacement requiring strengthening in Northern grid. Associated transmission system and switchyard provision for Sasan and Mundra Ultra Mega Projects was to be deliberated and finalized.

Thereafter, the agenda items were taken up for discussions.

1. Confirmation of the minutes of 24th meeting of Standing Committee

CE (SP&PA) informed that minutes of the 24th meeting of the Standing Committee on Power System Planning of Western Region held on 26.9.2005 at Mumbai were circulated vide CEA letter no.26/10/2002-SP&PA/498-511, dated 8.11.2005.

No comments had been received from any of the constituents

Thereafter, the minutes of the meeting were confirmed.

2. Transmission System associated with Gandhar-II and Kawas-II

- 2.1 CE (SP&PA) stated that transmission system associated with Gandhar-II and Kawas-II was agreed during the 23rd meeting of the Standing Committee of WR held on 23rd November, 2004. Subsequently, during the PIB meeting for investment approval of these schemes, investment approval for transmission system associated with Gandhar-II was accorded with the stipulation that implementation would commence only after gas supply agreement was done. For Kawas-II transmission due to uncertainty in time frame of generation project, it was recommended that system strengthening elements covered under Kawas-II transmission namely Vapi-Navi Mumbai 400 kV D/C, LILO of Kalwa-Pune at Navi Mumbai and establishment of 400 kV GIS sub-station at Navi Mumbai be implemented separately and the other elements of evacuation system for Kawas-II be implemented along with generation project. DNH had also intimated that they had taken up works for 220 kV Khadoli substation for which Vapi-Khadoli 220 kV D/C line was required on priority. As implementation of these works was required to meet the increased load draws of Mumbai and DNH area, these should be taken up as regional system strengthening works.
- 2.2 To a query from Chief Engineer, MPTRANSCO regarding justification of Vapi-Navi Mumbai ahead of Gandhar-II/Kawas-II, CE (SP&PA) clarified that though the time frame of Gandhar-II and Kawas-II was uncertain, some other projects viz. Torrent Power Plant (1095 MW) near Surat, Hazira CCPP (2x700 MW) in Hazira, Korba-III of NTPC, Jindal TPP (4x250 MW) in Raigarh, Lanco Amarkantak Pathadi TPS (300 MW) in Korba, and Bhilai Electric Supply Company Ltd generation project (500 MW) were likely to materialize early and Western Region constituents would be availing this power. Thus, the proposed transmission elements would be meeting the transmission needs for increasing load demand of Mumbai as well as handling additional power.
- 2.3 Member (PS) CEA stated that at the time of planning of transmission system for Gandhar-II and Kawas-II, Torrent CCGT which was located in the same area was also considered and LILO of Gandhar-Vapi 400kV line at Torrent and Torrent-Dehgam 400 kV D/C line were identified as a requirement for power evacuation

Minutes of the 25th meeting of the Standing Committee on Power System Planning of Western Region held on 30th September, 2006 in CEA, New Delhi.

The 25th meeting Standing Committee on Power System Planning of Western Region was held on Saturday the 30th September, 2006 in CEA Conference Room, New Delhi.

The list of participants is at Annex-I.

Shri V. Ramakrishna, Member (Power System), CEA welcomed the participants to the meeting and stated that under the Government of India's initiative a number of ultra mega power projects having capacity of 4000 MW were being perused by the Government through Special Purpose Vehicle (SPV). Out of these, ultra mega projects at Sasan in M.P. and Mundra in Gujarat, both located in Western Region, were on fast track and bidding document was being finalized and the response from various developers was encouraging. Northern Region and Western Region constituents would be the beneficiaries from these projects. Power from these projects would get injected in to Western grid requiring evacuation system together with system strengthening in Western grid and the Northern Region constituents would be getting power from these projects through displacement requiring strengthening in Northern grid. Associated transmission system and switchyard provision for Sasan and Mundra Ultra Mega Projects was to be deliberated and finalized.

Thereafter, the agenda items were taken up for discussions.

1. Confirmation of the minutes of 24th meeting of Standing Committee

CE (SP&PA) informed that minutes of the 24th meeting of the Standing Committee on Power System Planning of Western Region held on 26.9.2005 at Mumbai were circulated vide CEA letter no.26/10/2002-SP&PA/498-511, dated 8.11.2005.

No comments had been received from any of the constituents.

Thereafter, the minutes of the meeting were confirmed.

from Torrent. Till Gandhar-II was not materializing, the Torrent evacuation system could be optimized by constructing 400kV D/C line from Torrent only up to Gandhar and LILoing this in to one of the circuits of the existing Gandhar-Dehgam 400kV D/C line. Later, when Gandhar-II materializes, the 400kV D/C line from Torrent could be extended up to Dehgam and LILo from Gandhar-Dehgam circuit removed so that finally to have Gandhar-Dehgam 400kV D/C as per existing and the Torrent-Dehgam 400kV D/C. He further stated that with Mundra Ultra Mega Project, the flow patterns would undergo change and hence Gandhar-II transmission agreed earlier may need a re-look which could be done when the time frame of Gandhar-II generation project was firmed-up.

- 2.4 AGM, POWERGRID stated that there was also a requirement for 400kV s/s at Pirana on the route of Torrent-Dehgam 400kV D/C line with which the proposal for the line from Torrent to Dehgam would become Torrent-Pirana-Dehgam 400 kV D/C line. As such, in the first phase (pre-Gandhar-II), when the line from Torrent was taken only up to Gandhar, for meeting the requirement of supply from Pirana, the Dehgam-Pirana 400kV line together with Pirana 400kV s/s would need to be taken-up.
- 2.5 After discussions it was agreed that the following transmission schemes may be taken-up:

Western Regional System Strengthening Scheme-V (WRSSS-V) :

- (i) Vapi (PG)-Navi Mumbai 400 kV D/C
- (ii) LILo of Kalwa-Pune (PG) 400 kV S/C at Navi Mumbai
- (iii) Establishment of 400/220 kV 2x 315 MVA GIS substation at Navi Mumbai, (LILo of 220kV Apta-Kalwa and Kharghar-Kandalgaon line at Navi Mumbai under purview of MSEB, 220kV bay provision at Navi Mumbai by PGCIL)
- (iv) Vapi (PG)-Khadoli 220 kV D/C

Kawas-II Transmission System:

To be implemented matching with Kawas-II Project

- (i) Kawas II – Vapi 400 kV D/C quad

- (ii) 3rd 315 MVA 400/220kV transformer at Vapi

Gandhar-II Transmission System:

To be reviewed when time frame of generation project is firmed-up.

Torrent Evacuation System:

Phase-1 ; (pre Gandhar-II)

- (i) LILO of Gandhar-Vapi 400kV S/C line at Torrent
- (ii) Torrent-Gandhar section of Torrent-Pirana 400kV D/C to be LILOed in to one of the circuits of Gandhar-Dehgam 400kV D/C line
- (iii) Dehgam-Pirana 400kV D/C with 400kV Pirana s/s (2x315MVA) to be constructed as system strengthening scheme

Phase-2 ; (when Gandhar-II comes up)

- (iv) Gandhar-Pirana section of Torrent-Pirana 400kV D/C line, LILO from Gandhar-Dehgam line to be removed so as to finally have Torrent-Pirana 400kV D/C line, and both circuits of Gandhar-Dehgam 400kV D/C restored as per existing.

3. Deletion of proposed TCSC from scope of Raigarh-Raipur 400 kV D/C 2nd Circuit Scheme

3.1 Chief Engineer (SP&PA) stated that 400 kV Ranchi-Rourkela-Raigarh-Raipur D/C 2nd along with 40% fixed series compensation and 5-15% TCSC on Raigarh-Raipur section was agreed during the 20th meeting of the Standing Committee held on 23rd January, 2004. Subsequently, Ranchi-Sipat 400 kV D/C was agreed as part of Kahalgaon phase-II transmission. PGCIL had intimated that based on studies done by them, it was observed that provision of 40% Raigarh-Raipur section would be adequate to maintain the system stability and 5-15% TCSC agreed earlier may not be required. Accordingly, they had proposed deletion of the TCSC from the scope of the scheme.

3.3 To a query from members regarding the cost implication due to deletion of 5-15% TCSC, Executive Director (PGCIL) informed that there would be reduction of about Rs.50 crores due to deletion in TCSC.

3.4 The members noted and concurred the deletion of TCSC and consequent modification of scope of works for East-West Transmission Corridor Strengthening Scheme.

4. LILO of Korba-Damoh-Bhopal 400 kV line at Birsinghpur TPS

4.1 Chief Engineer (SP&PA) stated that Korba-Damoh-Bhopal 400 kV D/C line was agreed during the 20th Standing Committee meeting and was under implementation by PGCIL. MP had suggested LILO of Korba-Damoh section at Birsinghpur TPS. During the 24th meeting, the issue of utilization of regional transmission network for state sector generation projects was raised. Subsequently, MPPTCL vide their letter no. 401/PSP/14B, dated 28.6.2006 addressed to PGCIL and copy endorsed to CEA had stated that adequate evacuation system had been planned and implemented by MPPTCL for their Sanjay Gandhi TPS, Birsinghpur and there was no requirement for MPPTCL to apply for open access. On the basis of their planned transmission system for Sanjay Gandhi TPS, Birsinghpur, transmission requirement of MP would be met even without LILO of the line. Technically Korba-Damoh section was 450 km and either bussing or installation of series compensation was necessary.

4.2 To a query from members regarding cost of bussing vis-à-vis series compensation, Executive Director (PGCIL) informed that cost of bussing or provision of series compensation on the line was almost similar.

4.3 After discussion, it was agreed to provide LILO of Korba-Damoh 400 kV D/C section of the line at Birsinghpur as a regional transmission scheme.

5. Transmission system for North Karanpura (1980MW) and Maithon RB (1000MW).

5.1 Chief Engineer (SP&PA) stated that the transmission system had been evolved for power evacuation from North Karanpura (1980 MW) and Maithon RB (1000 MW) generation projects in Eastern Region. Northern Region and Western Region would be the major beneficiaries from these projects. Based on studies the following transmission system for North Karanpura and Maithon had been evolved

With North Karanpura:

- (i) North Karanpura-Sasaram 765kV S/C line with 2x1500MVA, 765/400kV s/s at Sasaram
- (ii) North Karanpura-Ranchi 400kV D/C line
- (iii) North Karanpura- Sipat 765kV S/C line
- (iv) Sipat-Seoni 765kV S/C line (3rd line)

With Maithon RB:

- (v) Maithon RB-Maithon PG 400kV D/C line
- (vi) Maithon RB-Ranchi 400kV D/C line
- (vii) Biharshariff-Sasaram 400kV D/C line

With North Karanpura or Maithon RB for the Northern Region:

- (viii) Sasaram-Fatehpur-Agra 765kV S/C lines with 765kV s/s at Agra having 2x1500 MVA 765/400kV transformers and 765/400kV s/s at Fatehpur having 2x1500 MVA 765/400kV & 2x315 MVA 400/220 kV transformer and LILO of Singrauli/Allahabad-Kanpur/Mainpuri 400 kV lines at Fatehpur.
- (ix) Sasaram-Balia 400 kV D/C (quad) line (with N. Karanpura or Maithon RB whichever comes first)
- (x) Agra-Gurgaon 400kV D/C line (with N. Karanpura or Maithon RB whichever comes first)

5.2 Regarding sharing of the transmission charges for the above lines Chief Engineer (SP&PA) stated that works at (viii), (ix) and (x) to be basically part of NR transmission system to be shared by NR constituents as their regional transmission system, works at (iii) and (iv) to be basically part of WR transmission system to be shared by WR constituents as their regional transmission system. Works at (i) and (ii) are proposed to be shared by beneficiaries having allocation of power from North Karanpura. Works at (v), (vi) and (vii) are proposed to be shared by beneficiaries having allocation from Maithon RB power.

5.3 CE, SP&PA, CEA further stated that it was also for consideration that instead of taking the 765kV line from North Karanpura to Sipat and the 3rd 765kV Sipat-Seoni line, a 765/400kV pooling station near Sipat connecting to North Karanpura, Sipat and Seoni through 765kV S/C lines be established where power from Korba-III and other generation projects in the vicinity could be pooled at 400kV. Executive Director (PGCIL) stated that based on their interaction with NTPC, space for 2 no. 765 bays at Sipat switchyard was available for North Karanpura-Sipat 765 kV S/C line and Sipat-Seoni 765 kV S/C (3rd ckt) and separate pooling station near Sipat may not be required under North Karanpura transmission system. NTPC representative also confirmed availability of space for 2 no. 765 kV line bays at Sipat switchyard. Based on this, it was agreed to have 765kV North Karanpura-Sipat-Seoni under North Karanpura transmission system and new pooling station, if needed, to be tie-up with evacuation system for other generation projects.

5.4 Members concurred with the above proposed transmission for North Karanpura and Maithon and the proposed sharing of transmission charges.

6. Establishment of 400/220 kV substation at South Sholapur in place of Pandharpur as a part of System Strengthening Scheme-II

6.1 CE (SP&PA) informed that 400 kV Parli (PG)-Sholapur and Sholapur-Kolhapur regional grid lines were agreed during the 20th Standing Committee meeting of WR held on 23.1.2004. Subsequently, in the 21st meeting, because of possible difficulty in terminating lines at Sholapur due to ROW constraints, it was agreed to have a 400/220 kV 2x315 MVA regional grid substation at Pandharpur by LILO of Sholapur-Karad 400 kV S/C line at Pandharpur and terminating Parli (PG) and Kolhapur lines at Pandharpur. PGCIL had now informed that based on their interaction with Government of Maharashtra and MSETCL, a site for 400 kV substations in South Sholapur has been identified. Accordingly, the proposal was updated as: (a) Establishment of 400/220 kV 2x315 MVA S/S at South Sholapur (PG) by LILO of Sholapur-Karad 400 kV S/C line; (b) Parli (PG)-South Sholapur (PG) 400 kV D/C line; and (c) South Sholapur (PG)-Kolhapur 400 kV D/C line. ED

(ENGG), POWERGRID informed that land for the proposed 400 kV substation has been acquired in South Sholapur.

Member took note of the above change and concurred with the same.

7. Transmission System for power evacuation from Sasan (400MW) and Mundra (4000MW) Ultra mega projects

7.1 CE, SP&PA, CEA stated that studies for evolving transmission system for Sasan and Mundra ultra mega power projects had been carried out in CEA and POWERGRID had also carried out studies and the evacuation system had been evolved. As per the target schedule, one unit of each of these ultra mega projects was expected by end of XI Plan viz 2011-12 and all the units by 2013-14. Accordingly, for the studies, winter peak scenario for 2013-14 had been considered. Report on the studies was circulated with the agenda note. In the studies, a numbers of options were considered of which the main options were reported in the studies. From Sasan, the first reported alternative was to have step up voltage of 765 kV with Sasan-Satna-Bina 765 kV 2xS/C and Sasan-Fatehpur 765 kV S/C (a direct interconnection to Northern Region) and Bina-Indore 765 kV S/C, together with necessary network expansion in WR and NR. In this alternative, it was observed that margins on the Agra-Gwalior 765 kV 2xS/C lines could be utilized for power transfer to Northern Region and another interconnection to Northern Region from Sasan to Fatehpur may not be necessary. The second alternative was studied considering step up voltage of 765 kV with 765 kV circuits between Sasan and Satna either 2x D/C or 3x S/C and Satna -Gwalior 765 kV S/C line instead of Sasan-Fatehpur 765 kV line and Bina-Indore 765 kV S/C line and other strengthening same as in alternative-1. It was observed that provision of 2xD/C lines was overprovision and 3xS/C would require more right of way. The third alternative was studied considering step up voltage of 765 kV, Sasan-Satna-Bina 765 kV 2xS/C lines and LILO of both circuits of Vindhya-Chal-Satna 400 kV D/C line (2nd line) with provision of 765/400kV at Sasan switchyard and Bina-Indore 765 kV S/C line etc. same as in alternative-1. Based on various cases studied, alternative-3 was found to be optimum.

- 7.2 Regarding Mundra Ultra mega power Project Chief Engineer informed that most of power of Mundra would be consumed locally and supply to Northern Region would be through displacement. He stated that for Mundra two alternatives were studied. In the first alternative 3 no 400 kV D/C lines with Quad conductor, one line to Limbdi, 2nd to Ranchhodpura and third to Jetpur. In the second alternative instead of Quad lines, 3 no 400 kV D/C lines with triple.moose conductor were considered. He stated that alternative -2, which was more cost effective and also met the evacuation requirement and was recommended.
- 7.3 CE, SP&PA, CEA further stated that in addition to the above, system strengthening in Western Region and Northern Region would also be required to absorb the additional quantum of power.
- 7.4 Executive Director (Engg), POWERGRID stated that agenda note indicated a requirement of 2x1000 MVA at Gwalior whereas PGCIL study indicated 2x1500 MVA. He further stated that contingency of one transformer would cause overloading of other 1 000 MVA transformer. After discussions, it was agreed to have 2x1500 MVA 765/400 kV transformation capacity at Gwalior.
- 7.5 Executive Director (Engg) PGCIL stated that in the agenda note the total scheme was broken-up in many separate schemes. For speedy formulation, approval and implementation, this should be formulated as a comprehensive scheme and the implementation schedule for various elements could be indicated within the scheme. This was agreed too.
- 7.6 Regarding VSC based HVDC transmission system between Mumbai New Location (PG) – Mumbai major load centers (Colaba / Andheri / Bandra area) HVDC with DC cable/submarine, it was discussed and agreed that this should under purview of MSEB.
- 7.7 Based on the above discussion and the studies/proposal details circulated with the agenda note, the following transmission system was agreed and concurred by the members:

Switchyard Provision at Sasan:

All units stepped-up to 765kV

765/400 kV 2x1000 MVA ICT at Sasan generating switchyard

Switchyard provision at Mundra:

All units stepped up to 400kV

Sasan Transmission System In WR:

- (i) Sasan-Satna 765 kV 2xS/C
- (ii) Satna 765/400 kV, 2x1000 MVA S/S
- (iii) Satna 765 kV-Satna 400 kV D/C quad inter-connecting line
- (iv) Satna-Bina (PG) 765 kV 2xS/C
- (v) Bina (PG)-Bina (MP) 400 kV D/C (2nd line) *
- (vi) LILO of both circuits of one of the Vindhychal-Satna 400 kV D/C line at Sasan 400 kV 2xD/C
- (vii) Fixed Series Comp 30% on 400kV Sasan-Satna D/C
- (viii) Fixed Series Comp. 30% on both of Satna-Bina 2xD/C
- (ix) Bina (PG)-Indore 765 kV S/C
- (x) New 765kV substation at Indore, 2x1500 MVA 765/400kV
- (xi) Indore 765kV s/s – Indore existing 400kV s/s 400 kV D/C quad inter-connecting line
- (xii) 765 kV operation of Agra-Gwalior-Bina-Seoni 765 kV lines and Upgrading Bina and Gwalior s/s to 765kV: 2x1000MVA 765/400kV at Bina and 2x1500MVA 765/400kV at Gwalior

Mundra Transmission System In WR:

- i) Mundra-Limbdi 400 kV D/C (Triple Moose)
- ii) Mundra-Ranchhodpura 400 kV D/C (Triple Moose)
- iii) Mundra-Jetpur 400 kV D/C (Triple Moose)
- iv) Kawas-Navsari 400 kV D/C
- v) Navsari 400 kV substation 2x315 MVA 400/220 kV
- vi) LILO of both ckts of Kawas-Navsari 220kV D/C line at Navsari 400kV s/s
- vii) Navsari-Mumbai New Location (PG) 400kV D/C and connecting to HVDC side of MSEB at this new s/s

- viii) Wardha 765kV s/s with 2x1500 MVA, 765/400kV
- ix) 765kV operation of Seoni-Wardha 2xS/C lines
- x) Wardha-Aurangabad 400kV D/C quad with 40% Fixed Series Capacitor

7.8 Member (PS), CEA stated that transmission of Sasan and Mundra power to the load centers of Northern region would take place through displacement. As such, additional transmission system for Sasan and Mundra in the Northern region would also be required. This would be evolved based on Northern region focused studies and firmed-up in the Standing Committee of Northern region and included in the associated transmission system for Sasan and Mundra.

Members of WR Standing Committee concurred to the above.

7.9 CE, SP&PA, CEA stated that in addition, system strengthening in Western Region and Northern Region to augment the transformation capacity at 400/220kV was also needed. ED (Engg), PGCIL endorsed the same. The following additional transformation capacity in Western grid as identified was agreed:

- **Western Region System Strengthening Scheme**
 - 3rd 1500MVA 765/400kV transformer at Wardha
 - Additional 1x315MVA 400/220kV transformer each at Wardha, Pune, Gwalior, Bina and Raipur substation of PGCIL

- **Strengthening in States' system of WR constituents**
 - (i) Additional 3rd 315 MVA 400/220kV transformer at Bhopal (under purview of MPPTCL)
 - (ii) Additional 3rd 315 MVA 400/220kV transformer at Aurangabad (under purview of MSETCL)
 - (iii) VSC based HVDC transmission system between Mumbai New Location (PG)- Mumbai major load centers (Colaba / Andheri / Bandra area) HVDC with DC cable/submarine (under purview of MSEB)

7.10 Regarding sharing of transmission charges CE, SP&PA, CEA suggested transmission charges for Sasan and Mundra Ultra mega projects could be pooled and form part of WR regional pooled transmission charges and NR beneficiaries could share the same based on their allocation from Sasan and Mundra Ultra mega Power Projects. Member (PS), CEA stated that another option could be that the transmission charges for the total transmission system required for evacuation of power from Sasan and Mundra UMTPs, both in WR as well as NR, be divided between NR and WR in proportional to their shares for Sasan and Mundra UMTPs and pooled within the regional charges of respective regions. He suggested that both option should be kept open so as to facilitate agreement in Northern region.

After discussion, it was agreed that any of the following two options were agreeable by WR constituents:

- Option-1: Transmission charges for Sasan and Mundra transmission system in WR be pooled in to WR regional pooled transmission charges and NR beneficiaries sharing the same based on their total allocation from WR pool including Sasan and Mundra power. And transmission charges for Sasan and Mundra transmission system in NR shared by NR beneficiaries.
- Option-2: Total transmission charges for Sasan and Mundra transmission system in WR as well as in NR be divided in to NR and WR in ratio of their allocation from Sasan and Mundra and pooled in to regional pooled transmission charges of the respective regions.

In both the above options, transmission charges for system strengthening to be part of respective regions only.

Both the above options were acceptable to WR constituents, and it was agreed that the option that would be agreeable to the NR constituents would be adopted.

8. Review of the conductor provision on Raipur – Wardha 400V D/C line

Chief Engineer (SP&PA) stated that studies done by PGCIL have shown need of system strengthening requirement by providing another 400 kV D/C line with twin moose conductor from Raipur- Wardha (2nd line). This line was required for additional transfer of power from Eastern part of Western Grid wherein a number of generating projects were being proposed. He stated that if feasible, the 400kV D/C Raipur-Wardha line agreed as a part of WRSSS-II may be constructed with higher specification of quad conductor & 95% temperature design or multi-conductor High SIL design. To a query from Members regarding feasibility of changing specification at this stage, Executive Director (PGCIL) stated that the 400 kV Raipur-Wardha D/C line agreed as part of WRSS-II strengthening works is under tendering stage for implementation and if the members desired they could consider revised tendering for quad specification.

The change in specification was agreed by all the constituents and it was decided that the 400kV D/C Raipur-Wardha line agreed as a part of WRSSS-II may be constructed with higher specification of quad conductor.

9. Switchyard provisions for Korba-III (1x500MW)

Chief Engineer (SP&PA) stated that Korba-III (1x500 MW) generation project of NTPC which was earlier scheduled for 2011-12 has been postponed and this project was now under implementation by NTPC with commissioning schedule of Nov 2009. He stated that PGCIL had proposed Korba- Jabalpur 400 kV D/C line. This requirement need to be further studied with regard to transfer of power from Eastern Region and eastern part of Western Region. To a query from members regarding availability of bays at Korba switchyard, NTPC confirmed that space for 3 no 400 kV bays (2 no line bays+ bus reactor bay) was available at Korba switchyard.

It was decided that provision of two nos. line bays plus bus reactor bay would be made in the generating switchyard and transmission requirements for Korba –III would be discussed after further study.

10. Follow up on the decisions taken in earlier meeting

PGCIL informed the status of progress of implementation of various schemes agreed in the earlier meeting. The status as furnished by PGCIL during the meeting is enclosed at Annex-II

11. Conclusion

Following transmission schemes as detailed in earlier para were agreed:

Western Regional System Strengthening Scheme-V (WRSSS-V)

- Kawas-II Transmission System: to be implemented matching with Kawas-II Project.

Gandhar-II Transmission System: to be reviewed when time frame of generation project is firmed-up.

- Torrent Evacuation System
- Deletion of proposed TCSC from scope of Raigarh-Raipur 400 kV D/C 2nd Circuit Scheme
- LILO of Korba-Damoh-Bhopal 400 kV line at Birsinghpur TPS as a regional scheme

Transmission system for North Karanpura (1980MW) & Maithon RB (1000MW).

- 400/220 kV substation at South Sholapur as a part of System Strengthening Scheme-II

Transmission System for power evacuation from Sasan and Mundra Ultra mega projects & western regional strengthening for augmentation of transformer capacity

- Quad specification for Raipur – Wardha 400kV D/C line and related change in the scope of WRSSS-II
- Switchyard provision at Korba-III (1x500MW)

It was decided to take-up the other agenda items in the next meeting.

The meeting ended with a vote of thanks to the chair.

**STATUS OF WESTERN REGION TRANSMISSION SCHEME AS FURNISHED BY
PGCIL DURING 25th MEETING SCM of WR**

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Comm. Schedule	Status
1.	Associated Tr. System of Vindhayachal-III (2x500MW) a) Vindhayachal-Satna-Bina 400kV D/c b) Raigarh 400/220kV 2x315 MVA S/s by LILO of Rourkela-Raipur D/c line c) Bina (PG) 400/220kV Switching S/s by LILO Satna-Bina (MPSEB) D/c line d) Aug. of transformation capacity by 1x315 MVA at Satna	596	2007-08	Investment approval obtained. Project Under implementation
2.	Vindhayachal-Korba 400kV 2 nd S/c	164	2007	Investment approval obtained. Project Under implementation
3.	Bina-Nagda 400kV D/c line	267	2007-08	Investment approval obtained. Project Under implementation
4.	Associated Tr. System of Sipat-I (3x660MW) a) Sipat-Seoni 765kV 2xS/c b) Seoni-Khandwa 400kV D/c c) Nagda-Dehgam 400kV D/c d) LILO of 400 kV Korba-Raipur at Sipat e) LILO of Bhilai – Satpura 400kV S/c at Seoni f) Seoni 765/400kV 3000 MVA and 400/220kV 2x315 MVA S/s g) Rajgarh 400/220kV 2x315MVA S/s by LILO of S.Sarover-Nagda D/c line	1673	2007-08	Investment approval obtained. Project Under implementation
5.	Associated Tr. System of Sipat-II (2x500MW) a) Khandwa-Rajgarh 400kV D/c b) Bina-Gwalior 765kV S/c (initially op. at 400kV) c) Seoni 765/400kV 1500MVA ICT (Aug.) d) Gwalior 400/220kV, 2x315 MVA S/s e) Bhatapara 400/220kV 2x315MVA S/s by LILO of Korba-Raipur line	602	2007-08	Investment approval obtained. Project Under implementation
6.	Sipat-II Supplementary Tr. System a) Seoni-Wardha 765kV S/c (initially op. at 400kV) b) Wardha-Akola 400kV D/c c) Akola-Aurangabad 400kV D/c d) Wardha 400/220kV 2x315MVA s/s	813	2007-08	Investment approval obtained. Project Under implementation
7.	WR Strengthening Scheme-I	199	2007-08	Investment approval

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Comm. Schedule	Status
	a) Sipat-Raipur 400kV D/C line b) 40% Series Comp. on Seoni-Khandwa 400kV D/c c) Installation of 1x315, 400/220kV transformer at Itarsi			obtained. Project Under implementation
8.	Associated Tr. System of Kahalgaon-II Ph-I- WR portion a) Agra-Gwalior 765kV S/c (initially op. at 400kV)	310	2007-08	Investment Approval obtained. Project Under implementation
	Associated Tr. System of Kahalgaon-II Ph-II (3x500MW) a) Ranchi-Sipat 400kV D/C with 40% series compensation	464	2007-08	Investment approval obtained. Project under implementation
9.	WR Strengthening Scheme-III a) Vapi(PG)- Magarwada 220 kV D/c b) Vapi(PG)-Kharadpada 220kV D/c	75	2007-08	Investment Approval obtained. Project under implementation
10.	North-West Tr. Corridor Strengthening Scheme c) Agra- Gwalior 765kV 2 nd S/c (initially op. at 400kV) d) Kankroli-Zerda 400kV D/c	483	2008-09	Investment Approval obtained. Project under implementation
11.	Establishment of new 400/220kV 2x315MVA substation at Damoh	97	2008-09	Investment Approval obtained. Project under implementation
11.	Gandhar-II Tr. System a) Gandhar-Rajkot 400kV D/c b) Gandhar-Kawas 400kV D/c c) LILo of Bina-Nagda 400 kV D/c at Shujalpur d) Establishment of 2x315 MVA, 400/220 kV S/s at Shujalpur	653		Investment approval obtained on 31.08.06. Execution subject to Fuel tie up of NTPC
12.	Kawas-II Tr. System a) Kawas-Vapi 400kV D/c (Quad) b) Vapi-Navi Mumbai 400kV D/c c) LILo of Lonikhand-Kalwa 400kV S/c at Navi Mumbai d) Vapi(PG) – Khadoli 220kV D/c e) Establishment of 400/220kV, 2x315MVA S/s at Navi Mumbai(GIS)	831		PIB held on 08.03.06. Scheme has been segregated into two parts- WR Grid strengthening scheme and Kawas-II Tr. System.
13.	East-West Tr. Corridor Strengthening scheme a) Ranchi-Rourkela 400kV D/c b) Rourkela-Raigarh 400 kV D/c c) Raigarh-Raipur 400 kV D/c d) 40% FSC on Raigarh-Raipur 400 kV 2 nd D/c	803	2008-09	Investment Approval obtained. Project under implementation
14.	Western Region System Strengthening	5222	2008-09	Investment Approval

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Comm. Schedule	Sta
	<p>Scheme-II</p> <p>Set-A: For absorbing import in eastern and central part of WR Grid</p> <p>a) Raipur – Wardha 400kV D/c</p> <p>b) Seoni – Wardha 765kV 2nd S/c (initially to be operated at 400kV)</p> <p>c) Wardha – Parli(PG) 400kV D/c (Quad)</p> <p>d) Bhadravati – Parli(PG) 400kV D/c</p> <p>e) Parli(MSEB) – Parli(PG) 400kV D/c</p> <p>Set-B: For regional strengthening in Southern Maharashtra (100 % private)</p> <p>a) Parli(PG) - Pune 400kV D/c</p> <p>b) Pune – Aurangabad 400kV D/c</p> <p>c) Parli(PG) – South Solapur 400kV D/c</p> <p>d) South Solapur - Kolhapur 400kV D/c</p> <p>e) LILO of Lonikhand – Kalwa 400kV D/c line at Pune</p> <p>f) LILO of Sholapur – Karad 400kV S/c line at South Solapur</p> <p>Set-C: For regional strengthening in Gujarat (100 % private)</p> <p>a) Rajgarh – Karamsad 400kV D/c</p> <p>b) Limdi(Chorania) – Ranchodpura 400kV D/c</p> <p>c) Ranchodpura – Zerda(Kansari) 400kV D/c</p> <p>Set-D: For regional Strengthening in Northern Madhya Pradesh</p> <p>a) Korba STPP – Birsinghpur 400kV D/c</p> <p>b) Birsinghpur - Damoh 400kV D/c</p> <p>c) Damoh - Bhopal 400kV D/c</p> <p>d) Bina – Gwalior 765kV 2nd S/c (initially to be operated at 400kV)</p> <p>Sub-Stations</p> <p>a) Establishment of 400/220kV 2x315MVA substation at Damoh, Pune and South Solapur</p> <p>b) Establishment of 400kV switching station at Parli(PG)</p> <p>c) Bay extension of existing substations to terminate above lines</p>	<p>1700</p> <p>1050</p> <p>600</p> <p>1050</p> <p>830</p>		obtained. Project under implementation
15.	<p>Barh Transmission System (1980 MW) (WR Portion)</p> <p>a) Seoni- Bina 765 kV S/c (initially to be operated at 400kV)</p>	330	2008-09	Investment approval obtained. Project under implementation

S. No.	Description of Scheme	Estimated Cost (Rs. Cr.)	Comm. Schedule	Status
16.	North Karanpura (1980MW) transmission system (WR Portion) a) North Karanpura – Sipat 765kV S/c b) Sipat – Seoni 765kV 3 rd S/c	1400	2010-11	FR Submitted to MOP on April 2006.
17.	RAPP-7&8 Tr. System (WR Portion) a) RAPP- Nagda 400 kV D/c –250 km	300	2012-13	FR Under preparation