

**Minutes of the Standing Committee meeting of Northern Region
for Transmission System Planning held on 24/05/02 at Dehradun**

List of the participants is given at Annex-I.

Welcoming the participants, Chief Engineer (SP&PA), CEA conveyed his special thanks to Uttaranchal Power Corporation Ltd.(UPCL) specially CMD Uttaranchal for taking personal interest in extending hospitality for conducting the 13th Standing Committee meeting of Northern Region at Dehradun. He stated that this meeting was called to discuss many issues which were pending for the approval of the Northern Regional constituents. He asked Director (SP&PA), CEA to present the issues item-wise for deliberation by the members of the Committee.

Before taking up the main agenda for discussion, Director (SP&PA) asked the participants of the 13th standing committee for any comments/objections on the minutes of the 12th standing committee which were circulated to all the Constituents of Northern Regional vide letter No.1/9/02-SP&PA/3751 Dated 8/2/02. Since no comment/ objection was received from members of Northern Regional Constituents, so minutes of the 12th standing committee was considered as approved.

Item: I Power evacuation system for RAPP Generating Units No. 5,6 (2x220 MW) and 7,8 (2x700 MW).

Director (SP&PA) stated that RAPP – A (Unit 1 & 2) – 2x220 MW and RAPP – B (Unit 3 & 4) – 2x220 MW of Nuclear Power Corporation Ltd. (NPCL) were existing at Rawatbhata in Rajasthan with the following evacuation system

RAPP A (2x220 MW) 300 MW Derated Capacity

- RAPP A-Kota 220 kV D/C line
- RAPP A-Nimbahera 220 kV S/C line

RAPP B (2x220 MW)

- RAPP B - Kota 220 kV S/C line

- RAPP B - Udaipur 220 kV S/C line
- RAPP B - Chittorgarh 220 kV D/C line

He stated that NPCL had now proposed the establishment of four more generating units at Rawatbhata in two stages. The first stage would comprise of two units of 220 MW each (RAPP 5&6) expected to be commissioned by 2007 and the 2nd stage of two larger units of 700 MW each, expected by 2009. He informed that the existing system from RAPP 'B' did not had enough redundancy to evacuate power from RAPP unit 5&6.

Director (SP&PA) stated that studies were carried to identify the alternate transmission proposal for evolving the ultimate evacuation system from RAPP units 5 to 8. Alternative I envisaged stepping up of the power from Stage I RAPP unit 5&6 (2x220 MW) at 220 kV and evacuate through 400 kV lines initially to be operated at 220 kV. With Stage II, the 400 kV lines operating at 220 kV under Stage I would be stepped up to 400 kV and the RAPP unit 7&8 of Stage II (2x 700 MW) would be stepped up at 400 kV along with other 400 kV lines for evacuation of power from RAPP 5 to 8 . Alternative II envisaged stepping up of the power from RAPP unit nos. 5 to 8 at 400 kV and evacuate through 400 kV lines. He stated that comparison have been made between these alternatives from techno-economic angle and the alternative II i.e. the proposal for evacuation of RAPP unit 5 to 8 power at 400 kV was found to be more suitable from techino-economic as well as keeping in view the following aspects:

- Grid Security
- The existing 220 kV lines being old and considering high ambient temperature in RAPP area, the overloading of lines under 220 kV operation would become unsafe from system safety point of view.
- Higher number of ROW requirement in case of 220 kV alternative
- Constraint of space for accommodating any additional bays near existing 220 kV substations.

Director (SP&PA) further stated that RRVPN had planned for putting up generation at Kota unit 6 (195 MW), and had proposed for construction of 400 kV, S/C on D/C tower line from Kota to Kankroli (RRVPN would construct a new 400/220 kV S/S at Kankroli near Udaipur with 2x315 MVA ICT) for evacuation of power from existing Kota unit 5 (210 MW) & proposed Kota unit 6 (195 MW). The redundancy available in the 400 kV

Kota - Kankroli line could be gainfully utilized for providing necessary redundancy for evacuation of power from RAPP Stage I (#5&6). He stated that under RAPP Stage II, RRVPN would require to string 2nd 400 kV circuit between Kota to Kankroli. As such the system proposed for the ultimate stage of RAPP at 400 kV under Alternative II along with Kota- Kankroli D/C line would be adequate to meet any single as well as double contingency of 400 kV line as being practiced for planning evacuation system from nuclear power plant.

Chief Engineer (SP&PA) mentioned that for evolving the evacuation system from RAPP Stage I & II, the existing generation at RAPP, KTPS and Anta may be treated as one, since these were in a very close proximity to the location of the proposed generating units at RAPP.

Executive Engineer (PSS), RRVPN stated that considering the futuristic requirement of Rajasthan and the non-availability of any space at the 220 kV Beawar and Nimbahera substations of RVPNL for any future expansion in case of evacuation at 220 kV under Stage I, RRVPNL was strongly in favour for evacuation from RAPP Stage I and II at 400 kV # and agreed with the proposal of alternate II as given in the agenda. He further requested to consider 400 kV RAPP- Merta D/C line in place 400 kV RAPP- Jaipur D/C line as proposed in alternative II.

Chief Engineer(SP&PA) stated that since RAPP #5 to 8 was a central sector project so 400 kV RAPP - Jaipur D/C line was considered, keeping in view of 400 kV Jaipur S/S as a Nodal point for dispersal of power to rest of the Northern grid.

Director (SP&PA) informed that the proposal of RRVPN, was also studied considering 400 kV RAPP- Merta in place 400 kV RAPP- Jaipur line, however, it was observed that with this arrangement, the transmission losses in the Rajasthan system would increase by 2 MW.

Executive Engineer.(PSS), RRVPN stated that Hirma power was also proposed to to be terminated at 400 kV Jaipur S/S for further dispersal to the rest of the Northern grid. So taking line to Jaipur from RAPP as proposed under Alternative II might further crowd the existing 400 kV Jaipur(POWERGRID) substation. He stated that the 400 kV Kota- Kankroli S/C on D/C tower line would be ready by the time frame of RAPP 5&6, so the committee may consider one circuit from RAPP to Merta.

Chief Engineer(SP&PA) stated that the proposal could be studied but the main emphasis of the meeting should be for deciding the step up voltage from RAPP #5&6.

Chief Engineer (NPCIL) stated that the bids for RAPP unit 5&6 were likely to open soon, so it was very important for the committee to take a decision regarding the step up voltage level. He said that considering two levels of transformation i.e. step up required at 220 kV under stage I and 400 kV stepup under stage II and also a likely gap of only three year between the commissioning of RAPP unit 5,6 and 7,8. NPCIL was of the view that the 400 kV step up voltage for RAPP unit 5 to 8 would be a better alternative.

Director (op.) UPCL stated that the transmission lines from the proposed RAPP # 5 to 8 would not directly benefit Uttaranchal.

Chief Engineer (SP&PA) stated that the proposed generation at RAPP was to be located at the southern part of Rajasthan, so as such it was not possible to link all the states of Northern Region directly from the RAPP generating station. The power from the proposed RAPP project would likely to be absorbed by the constituents beside Rajasthan by way of displacement only.

Member Secratery (NREB) stated that whether the location of the proposed RAPP # 5 to 8 would be near existing RAPP plant at Rawatbhata and also asked for confirmation of the time frame for commissioning of RAPP # 7&8. Chief Engineer (NPCIL) intimated that the location of the units proposed at RAPP would be near the existing RAPP A & B station at Rawatbhata. He further stated that units 7&8 at RAPP would likely to be available within a period of 3 year from RAPP unit 5 & 6. Member Secratery (NREB) mentioned that considering the high quantum of generation capacity addition likely to be taken place at RAPP, the evacuation of the power from RAPP unit 5 to 8 should be planned at 400 kV level. He, however, stated that technical feasibility of the proposal of RVPN for one 400 kV circuit from RAPP to Merta and one circuit from RAPP to Jaipur instead of RAPP to Jaipur D/C line might also be considered.

Chief Engineer (SP&PA) stated that the cases as proposed by Member Secratery (NREB) were also carried out and it was found that the system as proposed under Alternative-II was found suitable for evacuation of RAPP

power. The proposed system would also be able to meet a 400 kV double circuit outage or two 400 kV circuits outage.

AGM (POWERGRID), stated that with RAPP 5 to 8, the 400 kV alternative would be costly proposition compared to the proposal of stepping up of generation under stage I at 220 kV and stage II generation at 400 kV. As such the cost analysis of the proposed 400 kV vis-à-vis 220 kV under RAPP stage I might be worked out before arriving at the final proposal for identifying the evacuation system from RAPP generation 5 to 8.

Executive Engineer.(RRVPN) informed that 220 kV evacuation system from RAPP could not be considered in view of severe space constraint at 220 kV Nimbahera S/S and 220 kV Beawar S/S of RRVPN.

AGM (POWERGRID) further stated that in case of the space constraint as informed by RRVPN then new 220 kV substations both at Nimbahera and Beawar might be created. He further mentioned that as per the study result under alternative II for RAPP Stage I, the 400 kV RAPP-Kota line was nearly floating and in the event of the outage of 400 kV RAPP-Kankroli D/C line, the S/C line between Kota - Kankroli gets overloaded. As such heavy investment incurred in creation of 400 kV system would become infructuous.

Chief Engineer (SP&PA) stated that the methodology followed while carrying out the study was to evolve a composite system for RAPP unit 5 to 8 and out of which the evacuation system for RAPP 5&6 could be segregated. As regards to loading on 400 kV RAPP- Kota S/C line, he stated that the line was basically a link provided to take care of the contingency outage of line between RAPP to Kankroli. He stated that considering the information regarding non-availability of any space in the 220 kV switchyard of RRVPN at Nimbahera and Beawar for taking out any line from RAPP to these substations, the evacuation from RAPP Stage I at 220 kV would not be feasible.

CMD (UPCL) stated that the transmission system from RAPP might be evolved taking into consideration the technical requirement as well as the cost of various alternatives in totality. He mentioned that since the time frame of RAPP 7&8 was uncertain so decision regarding creation of 400 kV system under alternative II with RAPP 5&6 might be taken judiciously. He further stated that since that load demand of Uttaranchal state could be met from the

share of power from the hydro stations located within the state and also from the share of power for Uttaranchal from central sector Hydro/Thermal power stations so UPCL might not be interested for availing the share of power from RAPP which would otherwise be costly.

Chief Engineer (SP&PA) stated that the 400 kV alternative II had been proposed since it was technically better as well as the most cost effective solution.

Member Secretary (NREB) stated that keeping in view the short time gap in the commissioning of RAPP Stage I and Stage II as intimated by NPCIL, it would be more appropriate to evolve the consolidated evacuation system at 400 kV from RAPP complex and segregate the system Stage I and Stage II as had been given in the agenda.

Executive Engineer (HVPN) stated that since RAPP being a central sector station so the share of the RAPP generation to the beneficiaries of the Northern Region might be identified. He mentioned that 400 kV line from RAPP to Jaipur should be considered instead of 400 kV RAPP-Kankroli line since Jaipur S/S was well connected with Northern Region including Hissar substation.

Chief Engineer (SP&PA) stated that the essence of transmission planning was to meet the load of the nearby area in case the generation was remotely located and the drawl of the share of power by other beneficiaries would generally be taken place by way of displacement. He mentioned that in the ultimate stage 400 kV RAPP - Jaipur line had been considered keeping in view the supply of power to the other beneficiary states in Northern grid.

Executive Engineer (HVPNL) stated that as a whole HVPNL agreed with the proposal of stepping up the generation of RAPP at 400 kV as given under alternative II of the agenda.

Executive Engineer (UPPCL), agreed with the proposal for evacuation of RAPP generation at 400 kV, however, he enquired about the allocation of the share of power from RAPP to the states.

Chief Engineer (SP&PA) stated that that the allocation of shares from RAPP 5 to 8 had not yet been made but it would generally be as per Gadgil formula as being practiced for the other RAPP units.

Director(SP), HPSEB stated that he had no comments on the proposed alternative as recommended in the agenda.

SE (BBMB) stated that whether any short circuit study had been carried out considering the effect of RAPP generation on the short circuit level of 220 kV Samaypur substation of BBMB.

Chief Engineer (SP&PA) stated that no specific fault level study was carried out for checking the effect of the RAPP generation on the fault level of 220 Samaypur S/S. However, in general there would not be any appreciable increase of fault level at various buses of Northern Grid due to RAPP generation.

Chief Engineer (NPCIL) stated that the time frame for both RAPP 5&6 (2007-08) and RAPP 7&8 (2010-11) had been intimated by CMD NPCIL so there must not be any ambiguity regarding the time-frame/commissioning of RAPP generation. He requested the member of Standing Committee to decide the step up voltage from the proposed RAPP units 5 to 8.

CE (SP&PA) stated that considering the views of the constituent states and the constraints indicated for taking up the evacuation of power of RAPP 5&6 generation at 220 kV, the proposal of step up of RAPP power at 400 kV (as proposed under alternative II given in the agenda note) was recommended for evacuation of power from RAPP units 5 to 8. The proposed evacuation system would be as under:-

Stage-I Power evacuation system for RAPP generation Unit No. 5&6 (2x220 MW).

Generation of Unit No. 5,6 (2x220 MW) was proposed to be stepped up to 400 kV and evacuated through following lines:

- i RAPP - Kankroli 400 kV D/C line
- ii RAPP-Kota, 400 kV S/C line
- iii Augmentation of 400/220 kV Kankroli substation by 1x315 MVA (3rd ICT).

Stage II Additional power evacuation system for total generation of RAPP Unit No. 5 to 8.

- i Kota – Kankroli stringing of 2nd 400 kV circuit (By RRVPNL)
- ii RAPP – Jaipur 400 kV D/C line*
- iii Kankroli - Sirohi 400 kV D/C line and opening one circuit of 400 kV RAPP-Kankroli and 400 kV Kankroli-Sirohi D/C line from Kankroli end and connecting them directly, so as to form RAPP-Sirohi line.
- iv Sirohi - Jodhpur 400 kV S/C line.
- v Establishment of 400/220kV 2x315 MVA Sirohi substations(new)
- vi Augmentation of 400/220 kV Kankroli substation by 1x315 MVA (4th ICT).

Note(*):- The proposal of RVPNL for one 400kV circuit from RAPP to Merta and second 400kV circuit from RAPP to Jaipur would be studied and finalized with ATS of RAPP 5 to 8.

Item II: Evacuation System from Unchahar Stage-III (1x210 MW)

Director (SP&PA) stated that NTPC had furnished a project report for expansion of its Unchahar III TPS (1x210 MW) in Uttar Pradesh. The project was expected to be commissioned during 10th plan period. He mentioned that studies carried out for evolving power evacuation system from the project indicated that the existing system was adequate for evacuation of power from Unchahar Stage-I & II as well as power from Unchahar Stage III. However, he stated that with the establishment of a 220 kV substation at Raibareilly by LILO of one line of Unchahar-Lucknow 220kV D/C line (approved under 7th plan Transmission works of then UPSEB) the loading on other circuit from Unchahar to Lucknow would get critical in the event of outage of 220 kV Unchahar- Raibareilly line. As such, there was a need for strengthening this portion of the line. He therefore proposed that NTPC should keep space provision at Unchahar 220 kV switchyard for 220 kV D/C line from Unchahar to Raibareilly.

CGM (Planning) stated that Raibareilly 220kV substation was expected for commissioning by the end of 10th plan period and agreed with the proposal as given in the agenda.

DGM, NTPC informed that there was limitation of space in Unchahar TPS switchyard and only one line bay could be accommodated.

Member Secretary (NREB) opined that one direct circuit from 220kV Unchahar to Raibareilly might be provided.

After detailed discussions it was agreed that the one circuit of 220kV Unchahar-Lucknow D/C line would be LILOed at Raibareilly by UPPCL as already approved and NTPC would keep provision for one line bay at Unchahar switchyard for the construction of 220kV Unchahar-Raibareilly S/C line to be constructed by POWERGRID.

Item III: Evacuation System from Dadri-II TPS(1x490 MW)

1. Chief Engineer (SP&PA) stated that NTPC had submitted the project report for Dadri-II TPS (1x490 MW) for TEC of CEA. NTPC had informed that the generation was expected somewhere around 10th plan time frame. Presently at Dadri-I, 4x210 MW of coal fired and 4x130.19 MW+2x150.15 MW CCGT were existing. The generation from both thermal as well as gas generating plant was stepped up to 220 kV. The generation was then stepped up to 400 kV at NCR Dadri switchyard. He said that the fault level studies were carried out for the Dadri 400 kV bus corresponding to the end of 10th plan time frame and it was found that the fault current level at Dadri 400 kV bus was critical. He mentioned that with the addition of generation in the existing Dadri bus, the fault level at 400kV Dadri bus would be 40 kA which would be above the rating of the existing equipments. Accordingly, various studies were carried out considering different alternatives to contain the fault level at Dadri with the addition of Dadri-II generation. He asked Director (SP&PA) to give the details.

Director (SP&PA) stated that studies for the evacuation system were carried out keeping in view:-

- the requirement for reconfiguring the existing evacuation system from Dadri in view of high fault level
- system required for evacuation of power from Dadri-II

Director (SP&PA) stated the results of short circuit studies with Dadri-II generation by 10th plan condition indicated that the fault current at Dadri bus would be more than the equipment rating at the generation switchyard. He mentioned that with a view to restrict the fault current at Dadri, Dadri-II generation was isolated from existing Dadri-I generation, and the 400kV line to Malerkotla LILOed at Dadri-II bus and one circuit of Panipat and Muradnagar in the existing Dadri-I bus was shifted to the new Dadri-II bus. With this arrangement, the results of study indicated that the fault currents on the existing and new Dadri buses were within limits of the equipment rating of the generation switchyard.

Later on, an interaction with engineers of NTPC, it was informed by them that there would be physical constraints in creating the separate Dadri-II bus. The space for the Dadri-II was available only in between the existing generation at Dadri TPS and Dadri CCGT. As such the creation of a

separate bus with Dadri-II generation along with the line to Muradnagar, Panipat and Malarkotla would be difficult because of its locational aspect, space constraint at Dadri station and also to minimize the shifting/crossing of lines in the generation switchyard. Accordingly, the following alternative arrangements were worked out.

- i) Inject the generation of Dadri II generation at the existing Dadri 400 kV bus.
- ii) Splitting of the existing 400 kV Dadri bus with thermal machines of 4x210 MW along with 2x3, 1-Phase, 167 MVA ICTs and the lines to Muradnagar, Panipat and Malerkotla (New proposed line) in one section and Dadri-II Generation (1x490 MW) with GT units in the other section alongwith other 400kV lines and HVDC.

Director (SP&PA) stated that load flow as well as short circuit studies were carried out with the above arrangement. The result of the studies indicated the decrease in the short circuit level at the existing Dadri bus from 35.14 KA to 33.83 KA. The loading on the other circuits were also within limit. However, the interconnection between 400kV Dadri and Dadri split bus would normally remain open. There would be need to provide interlocking arrangement so that in case of outage of Dadri Thermal machines, the breaker get closed and Dadri split bus gets connected with 400kV Dadri bus.

He requested the members of the committee to give their views.

DGM (NTPC) stated that they agreed with the proposal as given in the agenda. But with the proposed arrangement, both the 400kV bus at Dadri would be isolated since there was no space for putting up a sectionalising breaker between the split buses at Dadri.

Chief Engineer (SP&PA) stated that in the event of outage of 400/220 kV ICT No. 3 in the CCGT side of the 220 kV bus, there could be problem of uneven load distribution between the two buses at Dadri. He stated that if there was no alternative solution to the breaker between the Dadri split bus, then NTPC had to give standing instruction to its operation staff to deal contingency outage condition arising out of the tripping of ICT No. 3 at Dadri otherwise the proposal for Dadri II generation had to be dropped.

DGM NTPC stated that they had referred the matter to their design group and a final decision regarding provision of breaker between the split bus would be taken after receipt of their recommendation. Otherwise also requisite instruction would be given to the operation people to deal with any contingency condition.

Director (Planning), PSEB stated that in the proposal for the evacuation of power from Dadri II, 2nd line from Dadri to Malerkotla had been provided, But no provision had been made for an additional ICT at Malerkotla or line from Malerkotla - Patiala.

Chief Engineer (SP&PA) said that the study result indicated that provision of two ICTs at Malerkotla was adequate to take care of the additional generation from Dadri II and 400 kV Patiala - Malerkotla S/C line and 400 kV Malerkotla- Ludhiana S/C line were covered as a part of Rihand II and Hirma transmission scheme respectively. He explained that in the load flow study enclosed with the agenda, maximum load in Punjab had been considered with high thermal generation available from the eastern part of the grid. He stated that such a condition had been simulated in order to test the adequacy of the evacuation network from Dadri complex. However in actual operating conditions the maximum load in Punjab would occur only during high hydro season when agriculture load of the State would be high. During that period the hydro machines available in the North Western part of the grid would be operating in full. As such, the possibility of overloading of Malerkotla ICTs would not arise.

Concluding the discussion, Chief Engineer (SP&PA) stated that following system would be associated with the evacuation of Dadri II TPS (490 MW):

- i) Step-up the generation of Dadri II at 400kV and inject it to the existing Dadri 400 kV bus.
- ii) Splitting of the existing 400 kV Dadri bus with thermal machines of 4x210 MW along with 2x3, 1-Phase, 167 MVA ICTs (No. 1 & 2) and the line to Muradnagar, Panipat (existing and 2nd proposed ckt.) and MalerKotla (New proposed line) on one section.

- iii) 2nd 400 kV line from Dadri (Split Bus) to Malerkotla
- iv) On the other section of the 400 kV bus, the Dadri II TPS(490 MW) generation stepped up at 400 kV, ICTs (No. 3 & 4), and the generation from Dadri CCGT along with 2x3x1-Phase 167 MVA and other the 400kV lines to Malerkotla, Mandaula, Ballabgarh (Samaypur) and the power from HVDC.

Item-IV LILO of Tehri-Meerut 765 kV line (charged at 400 kV) at 400 kV Rishikesh Substations of Uttaranchal.

Chief Engineer (SP&PA) stated that the Uttaranchal Power Corporation Ltd.(UPCL) had asked for a direct touch point from central sector grid and desired that the one circuit of the 400 kV Tehri-Meerut 765 kV line might be LILOed at 400 kV Rishikesh substation. He informed that UPCL had stated that the newly formed Uttaranchal state did not have any direct link with the National grid, so the proposed arrangement would help the state to get supply directly from central sector project. He stated that the proposal of LILO of one ckt. of Tehri-Meerut 2xS/C 765 kV lines (initially to be operated at 400 kV) was studied and the results of the studies were circulated and discussed in detail in the 12th Standing Committee meeting held at Udaipur. The results of the study indicated that due to small load of Uttaranchal by 10th plan the utility of the proposal for LILO of Tehri-Meerut 765 kV line (charged at 400 kV) at 400 kV Rishikesh substation would be minimal. He further mentioned that considering the possibility of load growth in view of the prospective industrialization, studies were carried out taking the 400 kV D/C line from Tehri (pooling point) to Rishikesh. The result of studies indicated that 400 kV Rishikesh - Muzaffarnagar as well as Rishikesh - Roorkee 220 kV D/C line would be overloaded. With the commissioning of the generation at Tehri-II, the loading on the proposed 765 kV Tehri-Meerut 2xS/C line would become lightly loaded if direct feed to Rishikesh was extended from Tehri Pooling Point.

Chief Engineer (SP&PA) stated that further studies were also carried out by reconfiguring the system at and around Muzaffarnagar and creation of 400kV S/S at Roorkee by LILO of Rishikesh-Muradnagar 400kV S/C line. With this arrangement, it became possible to reduce the overloading on 400 kV and 220 kV transmission system of Uttaranchal.

CMD (UPCL) inviting the attention of Committee, stated that in the 12th standing committee meeting decision were taken for creation of 220 kV Pithoragarh substation by LILO of one ckt of 220 kV Dhauliganga – Bareilly D/C line and 220 kV Kitchcha substation by LILO of one circuit of 220 Tanakpur - Bareilly D/C line. It was also decided that 220/132 kV transformers and the 132 kV bay would be in the scope of the State. Later on UPCL had requested for covering the total scope of the Pithoragarh substation and Kitchcha substation (new location Sitarganj) under central sector as the same would amount to O&M problem between POWERGRID and UPCL. He requested the members to give their views on the issue.

Chief Engineer (SP&PA) stated that CEA had no objection to covering the total scope of Pithoragarh 220/132 kV substation and Kitchcha 220/132 kV substations under central sector, if the members of the committee concurred to the proposal. The matter could be open for discussion.

CMD (UPCL), addressing the chairman and members of the committee stated that Uttaranchal was a newly created State and had a lot of potential for development in the near future. The state was expecting a high industrial load growth, which would require heavy investment on the power sector from State as well central sector. He said that Uttaranchal was a developing state and had got only 132 kV lines and very limited 220 kV lines/substations and as such the present transmission requirement of the state should not be compared with the other developed states of Northern Region. He further stated that the issue of a touch point from National Grid besides being a technical issue had a great sentimental as well as emotional value for the people of Uttaranchal. He appealed the members of the committee to give a sympathetic consideration for the transmission system requirement of the Uttaranchal State, which was in its very nascent stage of development. He asked the members of the committee to agree for covering the total work of Pithoragarh 220/132 kV substation & Kitchha 220/132 kV substation under central sector as a special concession to Uttaranchal state.

AGM (Engg.) PGCIL agreeing to the proposal, stated that total control of Pithoragarh 220/132 kV substation & Kitchha/Sitarganj 220/132 kV substation should be with one agency in order to avoid any O&M problem.

Considering the request of CMD UPCL, all the constituents agreed for covering the total works (including 220 kV side bays, 220 /132 kV ICTs and the 132 kV side bays) of Pithoragarh 220/132 kV substation & Kichha 220/132 kV substation in the scope of Central Sector as a one time special case for Uttaranchal.

CMD UPCL, acknowledging the gesture thanked the members for their helpful and friendly approach towards Uttaranchal and stated that UPCL would develop their own sub-stations in future. He further stressed the need for providing a direct touch point at 400kV Rishikesh S/S of UPCL from Tehri-Meerut line for UPCL to draw its share from central sector projects. CMD (UPCL) stated that the prospective industrial growth in Uttaranchal would be around Kashipur/Udham Singh Nagar and Roorkee area. He stated that Kashipur substation had been agreed under state sector as part of evacuation system under Vishnuprayag & Srinagar HEPs. However for Roorkee area, there was a need to have direct touch point from Rishikesh GSS.

CE (SP&PA) stated that as seen from the earlier studies that extending direct touch point from Tehri / Tehri pooling point to Rishikesh as desired by UPCL would create overloading on the 400 kV as well as 220 kV lines beyond Rishikesh S/S. As such, he suggested that the committee may consider proposal of installing 400/220 kV ICT at the pooling point, so as to enable UPCL to draw their share of power from Tehri radially at 220kV.

AGM (POWERGRID) stated that the drawl of power at 220 kV from Tehri pooling point must be restricted to radial feed only, otherwise there would be problem of overloading of UPCL system.

CMD UPCL stated that since high load growth around Roorkee area was expected, so only radial feed at 220 kV level from the Tehri Pooling to feed the UPCL area would not solve the problem of Uttaranchal. As such he urged the committee to consider for extending direct touch point also at 400 kV level from central sector station.

AGM (Engg.) PGCIL stated that considering the problem intimated by Chief Engineer (SP&PA) for direct touch point at 400 kV from Tehri pooling point and the apprehension expressed by CMD UPCL regarding inadequacy of 220 kV touch point in radial mode, he would suggest that the Uttaranchal should go for 400 kV substation at Roorkee with a direct 400 kV

line between Roorkee to Meerut. He said that similar arrangement had also been indicated in the agenda note also. He expressed that with this arrangement UPCL would get a direct touch point from central sector station to draw their share of power.

After detailed discussion, it was decided that

- (i) POWERGRID would construct a 400/220 kV substation at Roorkee by LILO of the 400 kV S/C line between Rishikesh-Muzaffarnagar.
- (ii) The portion of the line between Roorkee-Muzaffarnagar would be opened from Muzaffarnagar end and would be extended to Meerut substation of POWERGRID so as to form Roorkee to Meerut S/C line.

With this reconfiguration, UPCL would be able to draw its share of power directly from the Northern grid.

Further it would also enable UPPCL to draw power from Roorkee to meet loads around Saharanpur. As this S/S would benefit more than one State, the S/S would be Regional in nature and its cost could be pooled in the Regional Transmission. The proposal for providing direct 400 kV line between Roorkee and Meerut would be examined by CEA and on the basis of studies it would be decided whether a 400kV line need to be extended to Roorkee or the line built upto Muzaffarnagar to utilize the Roorkee-Muzaffarnagar portion for providing connection to Roorkee. The matter would be further discussed in the next meeting.

As regards to the direct touch from Tehri system it was decided that the same could be covered by providing a 400 / 220 kV ICT at Tehri pooling point, which was associated with the commissioning of generation at Koteshwar HEP from where UPCL will draw power at 220kV in radial mode.

Item-V STRENGTHENING OF BHAKRA TRANSMISSION SYSTEM

Chief Engineer (SP&PA) stated that BBMB had forwarded a proposal for uprating of Bhakra left bank Power House from existing 5x108 MW to 5x126 MW. He said that Bhakra Right Bank Power House had already been

uprated from 5x132 MW to 5x157 MW. He mentioned that the BBMB lines from Bhakra complex were old and some of these lines were constructed with lower size conductor. As such for evacuation of power by uprating of the machines at Bhakra Left & Right bank Power House, the transmission system from BBMB complex would get overloaded and as such the existing Bhakra transmission system would need to be reviewed. He said that studies carried out with the uprated generation at Bhakra complex showed that the outgoing lines from Bhakra complex as well as Ganguwal would require reconductoring with higher size conductor.

Chief Engineer (SP&PA) further stated that 220 kV Bhakra (Right) - Panchkula S/C line was to be constructed by Haryana Vidyut Prasaran Nigam. The same was not materialising and HVPN had conveyed their decision not to construct this line. The bay for the line was still laying vacant and the same could be utilized by Punjab for constructing line to their load centre like Jalandhar. He asked BBMB constituents to give their views, on this issue.

Director (Plg.) PSEB stated that since the lines from Bhakra were overloaded for absorbing the Punjab share of power from other central sector stations and also for wheeling the share of Rajasthan and Haryana from Bhakra through these lines. So the line from Bhakra (Right) - Jalandhar should be covered under BBMB scope of works.

SE (BBMB) stated that completion of uprating of Bhakra Left Bank units might take 7-8 years time. So load flow studies might be carried out with Bhakra (R) (5x157 MW) and Bhakra (L) (5x108 MW) to ascertain if there was any overloading under the present circumstances and the need for strengthening of BBMB system.

Member Secretary (NREB) expressed that this issue pertains to BBMB constituents exclusively and whether this meeting was a proper forum to discuss the issue pertaining to BBMB matters.

Chief Engineer (SP&PA) explained that though the issues related to operational matter but since the matter had come to CEA and all the representatives of BBMB constituents were present, so their views could be obtained. He stated that since the members had expressed the need for strengthening of transmission system from Bhakra Complex, so the matter could be forwarded to BBMB for taking up the issue at a proper forum.

Additional Agenda Item:

Computation of transmission losses of the transmission network of states of Northern Regional

Director (SP&PA) informed the members that CEA had taken up an activity of computation of the transmission losses in the respective transmission system of the Northern regional constituents. He stated that scope of work envisaged the representation of the transmission network of each state of Northern Region upto 33 kV bus. He informed that presently CEA had got the system data of the states mostly upto 220 kV level and upto 132 kV level for few states. He mentioned that letters to this effect were already sent to the Northern Regional states requesting them to furnish the requisite data. However no information was received from any of the State. He requested the representatives from the states to furnish the following data pertaining to the present day system condition of the network of the state to CEA for carrying out the study.

- i) Transmission line parameters, line lengths in the state up to 66 kV level
- ii) Installed ICTs, their capacities, Voltage ratings and their percentage/p.u impedance.
- iii) Capacitors Installed in the system.
- iv) Names of Substations up-to 33 kV and the load incidental on the Substation up-to 33 kV level.
- v) Connectivity of the various Substations
- vi) Scaled power map of the transmission network of the states indicating the connectivity of the substations at up-to 33 kV level.
- vii) Existing generations considered within the state
- viii) Present load of the state during winter peak as well as during summer peak hours.

All the members from the constituent states agreed for furnishing the details regarding their state at the earliest.

Chief Engineer (SP&PA)/Chairman of the Standing Committee thanked all the members for their valuable suggestions and the decision given for making the meeting a success. He conveyed his special thanks to CMD, UPCL for all the support and guidance he had given to the Committee.

**List of the Participants of the 13th Standing Committee meeting held at
Dehradun on 24.05.02**

Name	Designation
CEA	
Shri V Ramakrishna	Chief Engineer
Shri A K Aggarwal	Director
Shri Goutam Roy	Dy. Director
Shri Naveen Seth	Dy. Director
NREB	
Shri Santosh Kumar	Member Secretary
NTPC	
Shri A K Gupta	DGM
POWERGRID	
Shri I.S. Jha	AGM (Engg.)
Shri Y K Sehgal	DGM (Engg.)
Shri Mukesh Khanna	DCDE (Engg.)
HVPN	
Shri T.K. Dhingra	EXICUTIVE ENGINEER (plg.)
BBMB	
Shri P.P. Wahi	Superintending Engineer.
UPPCL	
Shri B.B. Bhatia	CGM (Plg.)
Shri V.P. Tewari	EE (Plg.)
UPCL	
Shri A.R. Aggarwal	CMD
Shri S.P. Singh Raghav	Director (O)
Shri S.K. Mittal	DGM (SO)
PSEB	
Shri J.S. Mahal	Director /PP&C
Shri R.P. Singh	Director (Planning)
RRVPLtd.	
Shri L N Nimawat	EXICUTIVE ENGINEER (PSS)
NHPC	
Shri Raj Kumar	Chief Engineer (Design E&M)

NPCIL

Shri S.B. Agarkar
Shri Rajesh Laad
Shri D.V. Raman

Chief Engineer
Dy. Chief Engineer
Sr. Ex. Engr.

HPSEB

Shri C.M. Madhaik

Director (SP)

Agenda Note For 13th Standing Committee Meeting of Northern Region

Item-I Power evacuation system for RAPP Generating Units No. 5,6 (2x220 MW) and 7,8 (2x700 MW).

1 Introduction

1.1 The following generating units of Nuclear Power Corporation Ltd. (NPCL) are existing at Rawatbhata in Rajasthan:

RAPP – A (Unit 1 & 2) – 2x220 MW

RAPP – B (Unit 3 & 4) – 2x220 MW

The evacuation system existing from RAPP A & B are as follows

RAPP A (2x220 MW) 300 MW Derated Capacity

- RAPP A-Kota 220 kV D/C line
- RAPP A-Nimbahera 220 kV S/C line

RAPP B (2x220 MW)

- RAPP B - Kota 220 kV S/C line
- RAPP B - Udaipur 220 kV S/C line
- RAPP B - Chittorgarh 220 kV D/C line

It may be mentioned that the 220 kV RAPP 'A' and 220 kV RAPP 'B' switchyard are operating in isolation due to low fault current capacity of RAPP 'A' switchyard .

1.2 NPCL have now proposed for the construction of four more generating units at Rawatbhata in two stages. The first stage will comprise of two units of 220 MW each (RAPP 5,6) expected to be commissioned by 2007 and the 2nd stage of two larger units of 700 MW, expected by 2009.

The existing system from RAPP 'B' does not have enough redundancy to evacuate power from RAPP unit 5&6.

1.3 With the addition of generation at Kota unit 6 (195 MW), RRVPN have proposed to construct 400 kV, S/C on D/C tower line from Kota to Kankroli (new 400/220 kV SUBSTATIONS near Udaipur with 2x315 MVA ICT) at Kankroli for evacuation of power from existing Kota unit 5 and proposed Kota unit 6.

1.4 Accordingly, power system studies for evacuation of power from RAPP 5&6 and RAPP 7&8 have been carried out in CEA with additional transmission system. Various transmission alternatives have been considered. Two alternative studies have been carried out considering two stages of RAPP- Stage I (unit 5 & 6) & Stage II (Unit 7 & 8). The studies have been carried out for ultimate capacity and the transmission system has been so staged that the power evacuation system for Stage-I i.e. generation unit No. 5 & 6 could dovetail in the ultimate power evacuation system from generation units 5 to 8.

2. System Studies

Alternative -I Stepping of the power from RAPP unit 5&6 (2x220 MW) to 220 kV and unit 7&8 (2 x700 MW) to 400 kV

Consolidated power evacuation system from RAPP Generation Units

2.1 The proposed unit No. 5 & 6 of RAPP would be stepped up to 220 kV. The generating unit No. 7 & 8 is proposed to be stepped up at 400 kV. The generation of unit no.5&6 would further be stepped up to 400 kV by providing 2x315 MVA, 220/400 kV ICTs. The following transmission system is proposed under Alternate I for evacuation of total generation of power from unit No. 5 to 8

- a) RAPP – Kota 400 kV S/C
- b) Kota – Kankroli (stringing of 2nd 400 kV line)*
- c) RAPP – Jaipur 400 kV D/C
- d) RAPP – Kankroli 400 kV D/C
- e) Kankroli-Sirohi 400 kV D/C and opening one circuit of 400 kV RAPP-Kankroli D/C line and 400 kV Kankroli-Sirohi D/C line from Kankroli end and connecting them directly, so as to form RAPP-Sirohi line.
- f) Sirohi – Jodhpur 400 kV S/C
- g) 400/220 kV Sirohi SUBSTATIONS 2x315 MVA (new)

- h) 220/400 kV, 2x315 MVA ICTs at RAPP.
- i) Kankroli S/S(Aug.). 400/220 kV, 2x315 MVA (3rd & 4th) Trfs.

The result of the studies indicating power flows are given in Exhibit-I-1.

System for RAPP Unit 5 & 6

2.2 Out of the above system, the lines at Sl.No. c) & d) would be constructed under stage I for evacuation of power from RAPP unit 5 & 6 and initially to be operated at 220 kV.i.e.

- i) RAPP - Kankroli 400 kV D/C line (initially operated at 220 kV)
- ii) RAPP - Jaipur 400 kV D/C line (initially operated at 220 kV)

The result of the studies with system under stage I is presented at Exhibit I-2.

The line from RAPP to Jaipur has been considered as it fits in the ultimate stage of RAPP system. Moreover, if RAPP to Kota 400 kV S/C line (operated at 220 kV) is considered instead of RAPP-Jaipur 400 kV D/C line (operated at 220 kV), then under the outage of RAPP-Kankroli 400 kV line (op. at 220 kV), there would be evacuation constraints from RAPP(5 & 6).

Alternative -II Stepping of the power from units 5 to 8 at 400 kV

Consolidated power evacuation system for Generation Unit No.5 & 6 (2x220 MW) and 7,8 (2 x700 MW).

2.3 The proposed transmission system for evacuation of power from the generation of units 5 to 8 are given as under;

- a) RAPP – Kota 400 kV S/C
- b) Kota – Kankroli 2nd circuit stringing of 400 kV line*
- c) RAPP – Jaipur 400 kV D/C
- d) RAPP-Kankroli 400 kV D/C line
- e) Kankroli - Sirohi 400 kV D/C and opening one circuit of 400 kV RAPP-Kankroli and 400 kV Kankroli-Sirohi D/C line from Kankroli end and connecting them directly, so as to form RAPP-Sirohi line.
- f) Sirohi – Jodhpur 400 kV S/C

- g) 400/220 kV Sirohi SUBSTATIONS 2x315 MVA (new)
- h) Kankroli S/S(Aug.). 400/220 kV, 2x315 MVA (3rd & 4th) Trfs.

***1st ckt. of Kota-Kankroli 400kV line S/C on D/C tower is proposed to be constructed by M/s. RRVPNL as a part of transmission system for evacuation of power from Kota TPS Stage-IV.**

The result of the studies indicating power flows are given in Exhibit-I-3.

System for RAPP Unit 5 & 6

2.4 Out the above system, the lines at Sl.No. a) & d) would be constructed under stage I for evacuation of power from RAPP unit 5 & 6.i.e.

- i) RAPP-Kota, 400 kV S/C line
- ii) RAPP - Kankroli 400 kV D/C line

In addition the transformation capacity of Kankroli SUBSTATIONS is proposed to be augmented by installing the 315 MVA, 3rd ICT.

The result of the studies, indicating power flows are given in Exhibit-I-4.

3. Analysis of alternatives

3.1 The result of the studies with RAPP unit 5 to 8 is tabulated as under

Line Loading of the system with ultimate stages at RAPP # Unit 5 to 8

Sl.No	RAPP-Kankroli 400 kV S/C	RAPP-Sirohi 400 kV S/C	RAPP-Jaipur 400 kV D/C	KTPS-Kankroli 400 kV D/C	RAPP-KTPS 400kV S/C	Kankroli 400/220 kV ICTs
	(MW)	(MW)	(MW)	(MW)	(MW)	(MW)
Alt-I	361	306	719	634	270	759
Alt-II	364	307	705	642	278	768

Cost comparison of system with ultimate stages at RAPP # Unit 5 to 8 under Alternative I and II

Alternative	Cost of Transmission line works	Cost of SUBSTATIONS works	Total Cost of Transmission system
	(Rs. Lacs.)	(Rs. Lacs.)	(Rs. Lacs.)
Alternative-I	38200	14450	52650*
Alternative-II	38200	10100	48300*

*** Stringing of 400Kv Kota-Kankroli 2nd Ckt. would be done by RRVPNL, so cost for the same is not considered**

It is observed that the power flow on various transmission lines under Alternative I are within the normal limits and the system envisaged can easily meet the contingency outage of a 400 kV D/C line. However, in the case of contingency outage of one of the 220 / 400 kV ICT at RAPP, the generation of unit No. 5 & 6, (440 MW) would be restricted to the MVA capacity of the remaining ICT i.e. 315 MVA only. Therefore provision has been made for an additional 220/400 kV ICT at RAPP under Alternative-I to take care of the contingency conditions.

In case of Alternative -II, the power flows on various lines are within limits. The system proposed is fully capable to take care of any contingency outage of D/C line or any two 400 kV line around RAPP (as per the practice for evolving evacuation system from Nuclear power plant). The transmission losses of Rajasthan as well as of NR in case of Alternative-II are also less than that of Alternative I.

The estimated cost of system under Alternative-II is also less than that of Alternative-I.

3.2 The result of studies with RAPP unit 5&6 is given as under

Line Loading with 2x220 MW unit at RAPP 5 & 6

Sl.No	RAPP-Kankroli 400 kV D/C	RAPP-Jaipur 400 kV D/C	KTPS-Kankroli 400 kV S/C	RAPP 'A'- Nimbahera 220kV S/C	Kankroli 400/220 kV ICTs
	(MW)	(MW)	(MW)	(MW)	(MW)
Alt-I	309 (op. at 220 kV)	86 (op. at 220 kV)	365	167	360
Alt-II	375	20 RAPP- Kota	385	156	754

Cost comparison of system with 2x220 MW unit at RAPP 5 & 6 under Alternative I and II

Alternative	Cost of Transmission line works (Rs. Lacs.)	Cost of SUBSTATI ONSworks (Rs. Lacs.)	Total Cost of Transmission system (Rs. Lacs.)
Alternative-I	24750	900	25650
Alternative-II	12900	2200	15100

From above, it can be seen that line loadings in the system under both the alternatives are within limit. However the system losses in RRVPNL system with Alternative II is less. The cost of the system required under both the alternatives have been calculated and it is seen that Alternative II is less expensive than Alternative I.

3.3 The comparative statement indicating the cost of proposed system with capitalization of losses for different alternative considered for the ultimate stage of RAPP is enclosed at Annexure-I-1. It is seen that with the transmission system developed at 400 kV (Alternative-II), the evacuation of power from ultimate stage of RAPP is techno-economically better solution

compared to that of two steps development i.e. 220 kV and 400 kV (Alternative-I).

4. Contingency Studies

4.1 As per the above, following contingency studies have also been carried out considering the system evolved with Alternative-II for the ultimate system from RAPP. The results of the following outage studies indicating power flows are given in Exhibits I-3 (a), I-3 (b) & I-3 (c):

- Outage of Kota-Kankroli, 400kV D/C line Exhibits I-3 (a)
- Outage of RAPP 'C'-Jaipur (PG)
400kV D/C line Exhibits I-3 (b)
- Outage of RAPP-Kankroli & RAPP-Sirohi,
400kV S/C lines Exhibits I-3 (c)

The result of the studies indicates that with the contingency outages indicated above, in the system under Alternative- II, no overloading on any of the line is observed.

From the above load flow studies (Exhibits-I-1 toI-4) it is seen that with the establishment of 400/220 kV Kankroli S/S, the underlying 220 kV transmission system emanating from Kankroli needs strengthening for absorption/disposal of power further from Kankroli. Accordingly, the part loads of Udaipur area would need to be shifted to 400/220 kV Kankroli SUBSTATIONSby RRVPNL. Though RRVPNL has proposed strengthening of following system as a part of Kota TPS Stage –IV evacuation system with creation of 400kV Kankroli SUBSTATIONS

- LILO of 220 kV Chittorgarh-Udaipur line at 400 Kankroli GSS
- LILO of 220 kV Bhilwara-Kankroli line at 400 Kankroli GSS
- 220 kV S/C line from Kankroli 220 kV SUBSTATIONS–
Kankroli 400 kV S/S

4.2 It may be mentioned that POWERGRID have also carried studies for developing the evacuation system from RAPP 5 to 8. They have suggested for the following evacuation arrangement.

Transmission System with RAPP # 5 to 8

- RAPP-Beawar 220 kV D/C

- RAPP- Nimbahera 220 kV D/C
- RAPP-Jaipur 400 kV D/C
- RAPP-Kota 400 kV D/C
- Kankroli-Sirohi 400 kV S/C
- Kota-Merta 400 kV S/C
- 2x315 MVA ICT at RAPP and Kota
- New SUBSTATIONS at Sirohi with 2x315 MVA ICT

Out the above system, the following lines would be constructed under stage-I for evacuation of power from RAPP unit 5 & 6.

- RAPP-Beawar 220 kV D/C
- RAPP- Nimbahera 220 kV D/C

POWERGRID have indicated a cost of Rs. 738 Crs. for the transmission system with the ultimate Stage and Rs. 112 Crs. (approx.) for the Stage I transmission system.

It is observed that the system proposed by POWERGRID though is less expensive at the initial stage but the cost of the ultimate stage would be high. The ROW requirement from RAPP complex for evacuation of power at 220 kV as well at 400 kV would also be more.

It is observed that in the system suggested by POWERGRID, the 220 kV lines gets overloaded during contingency outage. Considering the lines from RAPP being very old and high ambient temperature of that area and large number of 220 kV lines emanating from RAPP, Kota and Anta complex, it is felt that such loading is not safe from the grid security point of view.

In the study, interconnection between KTPS 400 kV and 220 through 400/220 ICT have been proposed. it may be mentioned that at Kota SUBSTATIONS(Sakatpura bus) has 26 nos. of bays at 220 kV and 23 nos. of bays at 132 kV and there may be constraint of space for accommodating any additional bays. Further in case of outage 400 kV D/C line or two 400 kV lines, as per the general practice considered for evolving the transmission system from nuclear power plant, the system proposed would be inadequate.

4.3 Keeping in view the above limitations, under the system suggested by POWERGRID as well keeping in view of the Security of Grid and Nuclear Power plant, the transmission system proposed as given in Alternative II (under para-2.3 of system studies above) would be required for evacuation of power from RAPP # 5 to 8.

5. **Recommendation**

Based on the result of the above alternative studies and considering the gap of only 3 years in the commissioning of both the Stages of RAPP (indicated by Sr. ED (T&P), NPCL, copy of the letter enclosed at Annex I-2), the following system can be recommended for evacuation of power from RAPP generating units 5&6 (Stage I) and units 7 & 8 (Stage II).

Stage-I Power evacuation system for RAPP generation Unit No. 5&6 (2x220 MW).

Generation of Unit No. 5,6 (2x220 MW) is proposed to be stepped up to 400 kV and evacuated through following lines:

- a. RAPP - Kankroli 400 kV D/C line
- b. RAPP-Kota, 400 kV S/C line
- c. Augmentation of 400/220 kV Kankroli substation by 1x315 MVA ICT (3rd).

Stage II Additional power evacuation system for total generation of RAPP Unit No. 5 to 8.

- d. Kota – Kankroli stringing of 2nd 400 kV circuit (By RRVPNL)
- e. RAPP – Jaipur 400 kV D/C line
- f. Kankroli - Sirohi 400 kV D/C line and opening one circuit of 400 kV RAPP-Kankroli and 400 kV Kankroli-Sirohi D/C line from Kankroli end and connecting them directly, so as to form RAPP-Sirohi line.
- g. Sirohi - Jodhpur 400 kV S/C line.
- h. Establishment of 400/220kV 2x315 MVA Sirohi SUBSTATIONS(new)
- i. Augmentation of 400/220 kV Kankroli substation by 1x315 MVA ICT (4th).

Members may like to discuss and concur on the above mentioned proposal.

Item II: Evacuation System from Unchahar Stage-III (1x210 MW)

1. NTPC has furnished a project report for expansion of its Unchahar TPS in UP by 1x210 MW to be covered under stage-III of the project. It has been proposed that the generation is expected to be commissioned during 10th plan time frame. NTPC has not yet furnished any specific beneficiaries of power from Unchahar-III, however it has been indicated that all the constituents of the Northern grid are the beneficiary from Unchahar-III. It may be informed that following evacuation system were approved/existing for evacuation of power from Unchahar St- I & II.

- i) 220 kV Unchahar (NTPC)-Kanpur D/C line-I
- ii) 220 kV Unchahar(NTPC)-Kanpur D/C line-II
- iii) LILO of one ckt. of 220 kV D/C Panki-Mainpuri line at Kanpur SUBSTATIONS of POWERGRID
- iv) LILO of 220 kV S/C Panki-Nabasta line at Kanpur SUBSTATIONS of POWERGRID
- v) 220 kV Unchahar - Fatehpur D/C line (with Moose conductor)
- vi) 220 kV Unchahar- Lucknow D/C line (with Moose conductor)

Later on the 220/132 kV Raibareilly SUBSTATION was approved as a part of 7th plan transmission works of UPSEB (erstwhile) to be established by UPSEB by LILO of Unchahar-Lucknow D/C line. However the SUBSTATION has not yet come up.

2. For framing the evacuation of power from Unchahar-III, it has been assumed that the redundancy available in the existing system of Unchahar-I & II could be utilized for evacuation of power from Unchahar- III also. As such, no new transmission lines were added from Unchahar Switchyard for evacuation of power from Unchahar-III. Also for the purpose of the instant study, the 220 kV Raibareilly SUBSTATION has been considered. The result of the load flow study carried out is given in Exhibit-II-1.

Following outage studies were also carried out on the above base case.

- Outage of 220 kV Unchahar-Panki D/C line(Exhibit- II-2)
- Outage of 220 kV Unchahar-Fatehpur D/C line(Exhibit-II-3)
- Outage of 220 kV Unchahar-Raibareilly D/C line(Exhibit-II-4).

The result of the above cases are tabulated as under

Outage of 220 kV Lines	Loading on(MW)		
	Unchahar-Kanpur 2xD/C	Unchahar-Fatehpur D/C	Unchahar-Raibareilly D/C
No Outage (Ex-II-1)	409	237	294
Unchahar-Panki D/C (Ex-II-2)	274 (on the remaining D/C)	308	358
Unchahar-Fatehpur D/C (Ex-II-3)	560	-	380
Unchahar-Raibareilly D/C (Ex-II-4)	588	352	-

Since the 220 kV Unchahar- Fatehpur D/C and 220 kV Unchahar-Raibareilly-Lucknow D/C line is constructed with Moose conductor so the loading of 358 MW and 380 MW respectively during the D/C line outage condition as given above are within limit. However, in case of outage of one circuit between Unchahar and Raibareilly, the other circuit gets overloaded i.e 267MW. (Exhibit II-5).

3. The study for evolving the evacuation system from Unchahar -III was also studied by POWERGRID. They have also suggested that with the establishment of Raibareilly SUBSTATIONS of UPPCL, there is a problem in meeting the contingency of one circuit between Unchahar and Raibareilly.

4. In view of above, it is suggested that UPPCL may construct a direct 220 kV D/C line from Unchahar to Raibareilly. As such space provision for two nos. of additional 220 kV bays may be kept in the Unchahar generation switchyard.

Since transmission system of Unchahar TPS Stage-I & II is covered under central sector and the transmission system for evacuation of power from Unchahar-III is to be taken up by POWERGRID so Member of the standing committee may like to deliberate on this issue and give their views.

Item III: Evacuation System from Dadri-II TPS(1x490 MW)

1. NTPC vide letter dated 29/1/02 has furnished the project report for Dadri-II TPS (1x490 MW). NTPC have informed that the generation is expected somewhere around 10th plan time frame. Presently at Dadri-I, 4x210 MW of coal fired and 4x130.19 MW+2x150.15 MW CCGT is existing. The generation from both thermal as well as gas generating plant is stepped up to 220 kV. The generation is then stepped up to 400 kV at NCR Dadri switchyard. The further evacuation of power from Dadri-I is taking place through the following 400 kV system.

- i) Dadri-Malerkotla S/C line
- ii) Dadri-Muradnagar S/C line
- iii) Dadri-Panipat S/C line (2nd circuit approved with Rihand-II TPS)
- iv) Dadri to Samaypur D/C line with Quad conductor (these circuits to be LILOed at Greater Noida)
- v) Dadri-Mandaula D/C line with Quad conductor

2. It may be mentioned that the fault level study carried out for the Dadri 400 kV bus corresponding to the end of 10th plan time frame under maximum thermal condition indicates that the fault current level is touching nearly 40 kA. Under this circumstance, the addition of generation in the existing bus would increase the fault current level of the existing Dadri switchyard further. Considering the above fact it would be necessary to separate the two switchyards. Further, to limit the fault current with completion of stage-II, the transmission network from Dadri station would need to be reconfigured. Studies were carried out as per the details given below

- Power flow and the short circuit level with
 - i) Existing generating capacity at Dadri (Exhibit-III-1).
 - ii) Addition of Dadri-II generation in the present Switchyard without any extra outlet (Exhibit-III-2).
 - iii) Addition of Dadri-II generation isolated from existing Dadri-I generation. The 400 kV lines to Malerkotla as well as to Muradnagar shifted to new Dadri-II bus (Exhibit-III-3).
 - iv) Addition of Dadri-II generation isolated from existing Dadri-I generation. The 400 kV lines to Malerkotla, one circuit of

Panipat and Muradnagar in the existing Dadri-I bus now Shifted to the new Dadri-II bus (Exhibit-III-4).

The result of the above study on the fault current level of the existing Dadri switchyard is given as under.

Cases	Three Phase fault current		Single Phase fault current		Malerkotla line loading		Muradnagar line loading	
	Dadri I bus	Dadri II bus	Dadri I bus	Dadri II bus	Dadri I bus	Dadri II bus	Dadri I bus	Dadri II bus
	(KA)	(KA)	(KA)	(KA)	(MW)	(MW)	(MW)	(MW)
1. Without Dadri II Generation	40348		36001		695		867	
2. With Dadri II generation but without any extra lines	42514		39950		699		710	
3. Dadri II generation in isolated bus with 400 kV Malerkotla and Muradnagar lines at new bus	35140	17164	31793	14898	-	742	-	-302
4. Dadri II generation in isolated bus with 400 kV Malerkotla, Panipat and Muradnagar lines at new bus	34921	20477	31406	17388	-	708	-	-612

5. System as in 4. above with outage of 400 kV Malerkotla circuit	34400	18753	30930	16192	Dadri I- Panipat line 257	Dadri II- Panipat line 563	-	-123
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From the above result it is seen that

- By 10th plan end the Dadri (existing) bus fault level would be beyond the rating of the switchyard equipments at Dadri.
- Any addition of generation in the existing switchyard would further increase the fault level at Dadri bus.
- The loading on the Dadri - Malerkotla circuit would be beyond SIL loading even under normal condition.
- Fault current contribution from Muradnagar line to Dadri is of the order of about 8000 A.

3. It can be seen that the solution to the above problem lies in identifying the outlets from generation as well as to limit the fault current at Dadri switchyard. From the result tabulated at S.No. 3 & 4 above, it can be seen that with the splitting of Dadri bus (or separate bus) with Dadri II generation and the 400 kV lines to Malerkotla (by LILO of the existing line at the Dadri new bus) and Muradnagar lines shifted from Dadri (existing bus), the fault level at Dadri can be controlled within reasonable limit (about 35000 A). However the loading on the Malerkotla line would be high. The problem of the heavy loading on the Malerkotla bus can be mitigated by constructing the proposed 400 kV Dadri- Panipat (2nd ckt.) approved under Rihand II TPS from the Dadri II TPS new bus instead of at the existing Dadri bus.

With the above arrangement, following outage cases have been carried out to ascertain the adequacy of the evacuation arrangement from Dadri II

- Outage of Dadri II- Malerkotla S/C line (**Exhibit –III-5**)
- Outage of Dadri II - Muradnager S/C line (**Exhibit- III-6**)

It can be seen from the result that the loadings on the other lines from Dadri-II are normal under the above outage conditions.

Physical Location of Dadri-II TPS(1x490MW)

4. The matter regarding the availability of space at Dadri bus for evacuation of power from Dadri-II TPS (490 MW) was discussed in detail with NTPC engineers. It was informed that the space for the Dadri-II is available in between the existing generation at Dadri TPS and Dadri CCGT. As such creating a separate bus with Dadri-II generation along with the line to Muradnagar, Panipat and Malarkotla would be difficult because of its location aspect due to space constraint at Dadri station and also to minimize the shifting/crossing of lines in the generation switchyard. Accordingly, following alternative arrangement was worked out.

- i) Bring the generation of Dadri II generation at the existing Dadri 400 kV bus.
- ii) Splitting of the existing 400 kV Dadri bus along D-D (given in the single line diagram enclosed at **Exhibit-III-7**) with thermal machines of 4x210 MW along with 2x3, 1-Phase, 167 MVA ICTs and the lines to Muradnagar, Panipat and Malerkotla (New proposed line) in one section and 1x490 MW with GT units in the other section with other 400kV lines and HVDC.

The power evacuation arrangement indicating the generating units and transmission lines on each section of bus is shown as under:

The Load flow as well as short circuit studies were carried out with the above arrangement. The result of the studies indicates reduction in loading on the 400 kV Malerkotla line (**Exhibit-III-8**) and decrease in the short circuit level at the existing Dadri bus from 35.14 KA to 33.83 KA. The loading on the other circuits are within limit.

The result of studies with outage of Malerkotla 400kV line is given in **Exhibit-III-9**.

Incase of outage of ICT at Dadri gas plant, the spare ICT at Dadri would be so interconnected that the power generated from Dadri complex would be evacuated without any constraint. The result of the study is given in **Exhibit-III-10**.

5. **Recomendations**

The following transmission system can be recommended along with Dadri-II TPS (490 MW)

- i) Bring the generation of Dadri II generation at the existing Dadri 400 kV bus.
- ii) Splitting of the existing 400 kV Dadri bus along D-D (given in the Single line diagram enclosed in **Exhibit XV**) with thermal machines of 4x210 MW along with 2x3, 1-Phase, 167 MVA ICTs and the line to Muradnagar, Panipat (existing and 2nd proposed ckt.) and MalerKotla (New proposed line).
- iii) 2nd 400 kV line from Dadri (Split Bus) to Malerkotla

The interconnection between 400 kV Dadri and Dadri split bus would remain normally open. There is a need for providing interlocking arrangement so that in case of outage of Dadri thermal machines, the breaker get closed and Dadri split bus gets connected with 400 kV Dadri bus.

Members of the standing committee may like to discuss and concur with the above proposal.

Item IV: LILO of Tehri-Meerut 765 kV line (charged at 400 kV) at 400 kV Rishikesh SUBSTATIONS of Uttaranchal.

1. CMD, Uttaranchal Power Corporation Ltd.(UPCL), in his letter dated 16th July 2001, has desired that the one circuit of the 400 kV Tehri-Meerut 765 kV line may be LILOed at 400 kV Rishikesh S/S. It was stated that the newly formed Uttaranchal state does not have any direct link with the National grid, so this arrangement would help the state to get supply directly from central sector project.

2. It is mentioned that the proposal of LILO of one ckt. of Tehri-Meerut D/C 765 kV line (initially to be operated at 400 kV) was studied and the results of the studies were circulated along with the agenda of 12th Standing Committee meeting held at Udaipur. The proposal was discussed in detail in the above Standing Committee meeting. From the result of the study it was observed that during high hydro and high thermal condition, the utility of the above proposal by 10th plan for Uttaranchal would be minimal, since most of the power through this interconnection would flow towards Muzaffarnagar of UP.

However, considering the fact that Uttaranchal being a new state and the specific request of UPCL regarding the possibility of load growth in view of the prospective industrialization, it was decided in the 12th standing committee meeting that further study might be carried out taking the 400 kV D/C line from Tehri (pooling point) to Rishikesh.

3. In line with the decision of the standing committee, system studies have been carried out in CEA considering the evacuation arrangement for Tehri Stage-I and Koteshwar and providing additional 400 kV D/C line from Tehri (pooling point) to Rishikesh. The results of the studies are enclosed in Exhibits (IV-1, VI-2 & VI-3).

4. From the result of studies it was observed that power flow on proposed 400kV D/C Tehri (pooling point) – Rishikesh line is about 443 MW and the flow on 400 kV Rishikesh - Muzaffarnagar also is about 460 MW (Exhibit-IV-1). With the commissioning of the generation at Tehri-II the loading on the proposed 400kV D/C Tehri (pooling point) – Rishikesh increases to 994 MW (Exhibit-IV-2) and the flow on 400 kV Rishikesh - Muzaffarnagar also increases to about 669 MW which is on higher side.

Whereas the loading on the 765 kV Tehri-Meerut 2xS/C line is only 1367 MW, which is much below the SIL loading of 765 kV line. As such the line is underutilized. Further heavy flow towards the Rishikesh 400/220 kV SUBSTATIONS also creates heavy over loading of the 220 kV lines of Uttaranchal particularly Rishikesh-Roorkee 220 kV S/C line(331 MW). Further, it was observed that in the event of outage of one ckt. of 765kV Tehri (pooling point) – Meerut 2xS/C line, the load on this proposed 400kV D/C Tehri (pooling point) – Rishikesh line and the flow on 400 kV Rishikesh - Muzaffarnagar increases to about 1145 MW and 728 MW respectively(Exhibit-IV-3).

5. Thus the results of studies indicates that the proposal for connection of Tehri(pooling point) to Rishikesh by a 400 kV line will over load the nearby transmission system during 10th plan conditions. As such the proposal does not appears to be feasible. However considering the specific request of UPCL for direct touch point from the Northern Grid, another alternate transmission proposal was studied by providing a 400 kV D/C line from Meerut(POWERGRID) to Muzaffarnagar and reconfiguring the existing 400 kV Rishikesh-Muradnagar line so as to make the network as under.

- Rishikesh-Meerut 400 kV S/C line
- Meerut-Muzaffarnagar 400 kV S/C line
- Muzaffarnagar-Muradnagar 400 kV S/C line

The result of the load flow studies considering the above arrangement (Exhibit-VI-4) indicates no overloading on any of the 400 kV line. This proposal would meet the requirement of UPCL as they could transmit the power to Uttaranchal during winter conditions. However, the overloading on the 220 kV Rishikesh – Roorkee S/C line of UPCL under high hydro conditions still persists.

5. This issue was discussed in detail with UPCL authority during the visit of CEA officers on 8th and 9th April 2002 to Uttaranchal. Considering the future prospect of heavy load growth around Roorkee area and the overloading in the 220 kV Rishikesh-Roorkee S/C line, two alternatives emerged.

- Alt-I Providing additional 220 kV Rishikesh-Roorkee D/C line.
- Alt-II Creating 400/220 kV SUBSTATIONS at Roorkee by LILO of the proposed Rishikesh-Meerut 400 kV S/C line at Roorkee.

The results of the load flow studies with the above two alternatives are given in Exhibit-IV-5 & IV-6. From the result of the study it has been observed that the loading on the 400 kV as well as in the 220 kV lines around Rishikesh are within permissible limits.

Since the above matter concerning the rearrangement of the 400 Rishikesh- Muzaffarnagar line and 400 kV SUBSTATIONS in Uttaranchal. As such it requires the concurrence of the Northern Regional constituents so the matter is put up for discussion.

Member of the committee may like to discuss and concur on the proposal.

Item V: Strengthening of Bhakra Transmission System

1. A DPR has been received from BBMB for renovation, modernisation and uprating (RM&U) of 5 units of Bhakra Left Bank Power House from 5x108 MW to 5x126 MW with an effective increase of 90 MW in generation.

The Bhakra Right Bank units were already uprated from 5x132 MW to 5x157 MW with an increase of 125 MW in generation. Thus with the uprating of the machines at Bhakra left, the generation capacity at Bhakra complex would increase by 215 MW.

2. Presently the generation from Bhakra complex is being evacuated through the following transmission system

- Bhakra (R)- Mahilpur- Jullunder (JaMember Secrateryher) 220 kV D/C line
- Bhakra (R)- Ludhiana (Jamalpur) 220 kV D/C line
- Bhakra (R)- Ganguwal 220 kV D/C line
- Bhakra (L)-Ganguwal 220 kV T/C line

Further the evacuation from Ganguwal is being taking place through the following lines

- Ganguwal-Ludhiana (Jamalpur) 220 kV D/C line
- Ganguwal-Ambala (Dhulkote) 220 kV D/C line
- Ganguwal-Govindgarh-Patiala 220 kV D/C line
- Ganguwal-Mohali 220 kV S/C on D/C line
- Ganguwal-Abdullapur 220 kV S/C line

Beside this, part of the generation from Dehar HEP also comes to Ganguwal at 220 kV through Dehar-Ganguwal D/C line. In addition to the above system there is a bay provision at Bhakra (R) for taking 220 kV line from Bhakra (R)- Panchkula.

3 Considering the existing transmission system, load flow studies have been carried out corresponding to 10th plan condition with the uprated generation at Bhakra complex. The result of the load flow is given in Exhibit V-1. From the result of the load flow studies, it can be seen that most of the lines from Bhakra/Ganguwal complex are critically loaded. The 220kV

Bhakra (L) – Gangwal T/C line (2x .3 + 1x .4 conductor size) carries about 575 MW after meeting the local loads of Bhakra (L) at 66 kV. The 220kV Bhakra (R) – Mahilpur D/C line (2x .4 conductor size) carries about 185 MW per circuit. It has been observed that the power flow on Bhakra (R) to Ludhiana (Jamalpur) increases to about 195 MW per circuit under outage of Bhakra (R) to Mahilpur 220kV D/C line. In case of outage of Bhakra (R) to Jamalpur 220kV D/C line, power flow on Ganguwal-Jamalpur increases to about 180 MW per circuit. Since the lines from Bhakra/Ganguwal complex are very old lines and are constructed with lower rating conductor, so any contingency outage of D/C line in this complex would not be sustainable. As such the existing transmission system from Bhakra needs to be strengthened to cater to the increased generation at Bhakra generation complex.

Further, the 220 kV bay at Bhakra (R) is still lying vacant and CE HVPNL (plg.) vide letter No. Ch-126/HSS-135 dated 25/04/00 has intimated that HVPNL has decided to drop the construction of 220 Bhakra (R) - Panchkula line (copy enclosed in Annex V-I). So under this circumstance, the space for bay at Bhakra (R) could be gainfully be utilized by PSEB for construction of line from Bhakra(R) to their load center like Jalandhar. Studies have also been carried out considering the additional line from Bhakra(R) to Jalandhar and reconductoring of the existing lines from Bhakra complex with 420 mm. AAAC conductor. The result of the studies is given in Exhibit V-2.

The studies have also been carried out with outage of following lines.

- Bhakra (R)-Mahilpur 220 kV D/C line (Exhibit V-3)
- Ganguwal-Ludhiana 220 kV D/C line (Exhibit V-4)
- Bhakra(R)-Ludhiana 220 kV D/C line (Exhibit V-5)
- Bhakra(R)-Ludhiana 220 kV D/C line with out the proposed line from Bhakra(R)-Jalandhar S/C line (Exhibit V-6)

From the result of the studies, it can be seen that with the proposed strengthening and additional circuit from Bhakra(R) to Jalandhar, the problem of overloading of lines from Bhakra complex can be mitigated.

4. The modifications/additions in the existing transmission system are proposed as under:

- a. Reconductoring of the following 220kV lines from Bhakra with AAAC, 420 Sq.mm. size conductor.**
- i) Bhakra(L) – Ganguwal T/C line - BBMB
 - ii) Bhakra(R) – Mahilpur D/C line – PSEB
 - iii) Bhakra(R) – Ludhiana (Jamalpur)D/C line –BBMB
 - iv) Ganguwal- Ludhiana (Jamalpur)D/C line -BBMB
- b. Addition of 220 kV Bhakra (R) – Jalandhar (Pb) S/C line.**

Constituent members are requested to discuss and concur on the issue.

CENTRAL ELECTRICITY AUTHORITY
SYSTEM PLANING AND PROJECT APRAISAL DIVISION

No.1/9/01-SP&PA/

Dated : /05/02

-As per List enclosed-

**Sub: 13th meeting of the Standing Committee on Power System
Planning of Northern Region.**

Sir,

Please find enclosed the agenda note for 13th meeting of the Standing committee on Power System Planning of Northern Region. The date, venue & time of the meeting shall be intimated in due course.

Yours faithfully,

(A.K.AGGARWAL)
DIRECTOR(SP&PA)

LIST OF ADDRESSES

Chief Engg. (Plg.),
Haryana Vidyut Prasaran Nigam Ltd.,
Shakti Bhawan, Sector-6,
Panchkula-134109, Haryana,
(Fax No.0172-565746)

Shri B B Bhatia, CGM
U.P. Power Corporation Ltd.,
Shakti Bhawan Extn. (3rd Floor)
14, Ashok Marg, Lucknow-226001
(Fax. No.0522-287867)

Shri K.L.Vyas,
Chief Engineer(PP&M),
Rajasthan Rajya Vidyut Prasaran Nigam Ltd
Vidyut Bhawan,Jyoti Nagar,Janpath,
JAIPUR,
(Fax No.0141-740794)

Shri S C Varma
The Chief Engineer (Transmission system),
Bhakra Beas Management Board
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Industrial Area-I, Phase I, Chandigarh-160002
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Shri Anand Mohan,
Executive Director (Engg.)
POWERGRID Corpn. of India Ltd,
B-9, Institutional Area, Katwaria Sarai,
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Sh.Chandan Roy,
Executive Director(Engg.),
NTPC, Corporate Centre,Engineering Office Complex,
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Sh. S.B. Agarkar,
Chief Engineer (Electrical Design.),
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11th floor, South wing , V S Bhawan
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Sh. S.P.S. Raghav,
Director (O),
Uttranchal Power Corpn. Ltd.,
Kaulagarh Power House, F.R.I. Campus,
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(Fax No. 0135-752880)

Shri V P Attri,
Chief Engineer (Plg.)
Punjab State Electricity Board,
Mall Road, Patiala,-147001, Punjab.
(Fax No.0175-215897)

Shri J.N.Sachdeva,
The Superintending Engineer,
Electricity Operation Circle
U.T. Chandigarh,
(Fax.No.0172-775733, 742733)

Shri Vinod Sharma
The Development commissioner (Power)
Power.Development Deptt.,
Govt. of J&K,
Srinagar

Shri S.P.Gupta,
Chief Engineer(Plg.),
Delhi Vidyut Board, Shakti Deep Building,
Anarkai Market, DDA Complex,
Jhandewalan Extension, New Delhi-
110055. **(Fax No.3552070)**

Chief Engineer(SP),
H.P.State electricity Board,
Vidyut Bhawan, Shimla-171004.
(Fax No.01772-58984)

Shri Santosh Kumar, Member Secy.,
NORTHERN REGIONE.B., 18-A,
Shaheed Jit Singh
Sansanwal Marg, Katwaria Sarai, New
Delhi-110016**(Fax No.6868528)**

Shri Raj Kumar,
Chief Engineer,
NHPC, NHPC office complex
Sector-33, Faridabad-121003
(Fax No.-91-5256571)

CENTRAL ELECTRICITY AUTHORITY
SYSTEM PLANING AND PROJECT APRAISAL DIVISION

No.1/9/01-SP&PA/

Dated : 13 /05/02

-As per List enclosed-

Sub: The 13th meeting of the Standing Committee on Power System Planning of Northern Region.

Sir,

In continuation to our letter No. 1/9/01-SP&PA/ 206-20 dated 06/05/02 it is to intimate that the 13th meeting of the standing committee has been fixed **on 24th of May 2002 at 1000 Hrs. in Dehradun, Uttaranchal at Hotel Great Value, Rajpura Road, Dehradun-248001(PH. 0135/744086, 744762).**

It is requested that the name of the officer(s) participating the meeting from your organisation (spouse of officer accompanying to Dehradun) and the details of their inward/outward journey to and from Dehradun may kindly be confirmed to **Shri S K Mittal, DGM (SO), o/o CMD, UPCL, Dehradun through phone (O) 0135-753050, (R) 0135-760289 and Fax No. -0135-752880.**

Confirmation regarding your participation may also be sent to CEA to **Fax No. 011-6102045** or to E-mail address **krishna1950in@yahoo.com**

Yours faithfully,

(A.K.AGGARWAL)
DIRECTOR(SP&PA)

Copy to : i) **Shri A R Aggarwal, CMD, UPCL, Dehradun with a request to attend the meeting**
ii) **Shri S K Mittal, DGM (SO), o/o CMD, UPCL, Dehradun**

Fax Massage

**CENTRAL ELECTRICITY AUTHORITY
SYSTEM PLANING AND PROJECT APRAISAL DIVISION**

No.1/9/01-SP&PA/

Dated : 17 /05/02

To

**Shri S.K. Mittal
DGM (SO),
O/o CMD UPCL,Deharadun
Uttaranchal.**

Fax No. -0135-752880.

Sub: The 13th meeting of the Standing Committee on Power System Planning of Northern Region.

Sir,

With reference to Chief Engineer (PP&M), RVPN, Jaipur letter No. it is intimated that following officers of CEA will be participating in the 13th Standing Committee Meeting to be held at Dehradun, Uttaranchal on 24.5.2002:

<u>Name of the Officer</u>	<u>Date of Arrival</u>	<u>Date of Departure</u>
Sh. V. Ramakrishna Chief Engineer (SP&PA)	23 . 05.2002 By Shatabdi Exp.	24.05.2002 By Shatabdi Exp
Sh. A.K. Aggarwal Director (SP&PA)	23 . 05.2002 By Shatabdi Exp.	25.05.2002 By Shatabdi Exp
Sh. Goutam Roy Dy. Director (SP&PA)	23 . 05.2002 By Shatabdi Exp.	25.05.2002 By Shatabdi Exp
Sh. Naveen Seth Dy. Director (SP&PA)	23 . 05.2002 By Shatabdi Exp.	25.05.2002 By Shatabdi Exp

It is requested that arrangement for stay of the above officers at Dehradun and provision for Vehicle for Pickup/dropping at Railway station may kindly be made.

Yours faithfully,

DIRECTOR(SP&PA)

**List of the Participants of the 12th Standing Committee meeting held at Udaipur on
25/01/01**

Sl. No.	Name	Designation	TL.No.	Fax. No.	E-mail
CEA					
1	Shri V Ramakrishna	Chief Engineer			
2	Shri A K Aggarwal	Director			
3	Shri Goutam Roy	Dy. Director			
4	Shri Naveen Seth	Dy. Director			
NREB					
1	Shri Santosh Kumar	Member Secretary			
2	Shri P K Kumar	Suptg. Engineer (op.)			
NTPC					
	Shri A K Gupta	DGM	0120- 4410429	0121- 4410203	akgntpc@ hotmail.com
POWERGRID					
1	Shri Anand Mohan	Ex. Director (Engg.)			
2	Shri Y K Sehgal	DGM (Engg.)	6611191	6564758	
HVPN					
	Shri S K Gupta	Chief Engineer (plg.)	0172- 560547		Sudershan- Gupta@ Yahoo.com
BBMB					
	Shri R K Sud	Er. In Chief	0172- 654590	0172- 654590	
UPPCL					
	Shri V K Bansal	General Manager	0522- 287867	0522- 287867	
UPCL					
	Shri S P S Raghav	Director(O)	0135- 750115	0135- 752201	
Chandigarh					
	Shri J N Sachdeva	Suptg. Engineer	0172- 743710	0172- 742733	
RRVPLtd.					
1	Shri K L Vyas	Chief Engineer (plg.)	0141-	0141-	ppmrvpn@

			740827	740794	Sancharnet.in
2	Shri D K Gupta	Suptg. Engineer			
3	Shri L N Nimawat	EXECUTIVE ENGINEER(PSS)			
4	Smt. Sona Sisodia	AEN(PSS)			

ANNEX-I

List of the Participants of the 12th Standing Committee meeting on transmission system planning in Northern Region held at Udaipur on 25/01/02

<u>Sl. No.</u>	<u>Name</u>	<u>Designation</u>
<u>CEA</u>		
1	Shri V Ramakrishna	Chief Engineer
2	Shri A K Aggarwal	Director
3	Shri Goutam Roy	Dy. Director
4	Shri Naveen Seth	Dy. Director
<u>NREB</u>		
1	Shri Santosh Kumar	Member Secretary
<u>NTPC</u>		
	Shri A K Gupta	Dy. General Manager
<u>POWERGRID</u>		
1	Shri I S Jha	AGM (Engg.)
2	Shri Y K Sehgal	Dy. General Manager(Engg.)
3	Shri Mukesh Khanna	Dy. Chief Design Engg.(Engg.)
<u>HVPN</u>		
	Shri T K Dhingra	Executive Engineer. (plg.)
<u>BBMB</u>		
	Shri P P Wahi	SE
<u>UPPCL</u>		
	Shri B B Bhatia	Chief General Manager(Plg.)
	Shri V P Tewari	Executive Engineer(Plg.)
<u>UPCL</u>		
	Shri A R Aggarwal	CMD
	Shri S P S Raghav	Director(O)
	Shri S K Mittal	DGM(SO)
<u>Electricity Deptt.Chandigarh</u>		

Shri J N Sachdeva Suptg. Engineer

RRVPLtd.

- | | | |
|---|-----------------------------------|-----------------------|
| 1 | Shri K L Vyas | Chief Engineer (plg.) |
| 2 | Shri D K Gupta | Suptg. Engineer |
| 3 | Shri L N Nimawat | Ex. Engineer (PSS) |
| 4 | Member Secratery.
Sona Sisodia | Asstt. Engineer (PSS) |