Minutes of XIIth meeting of National Committee on Seismic Design Parameters (NCSDP) for River Valley Projects held in Central Water Commission on August 13, 2002.

The twelfth meeting of National Committee on Seismic Design Parameters (NCSDP) was held on August 13, 2002 in the Committee Room of Central Water Commission, New Delhi, under the Chairmanship of Shri R. Jeyaseelan, Member (D&R), CWC and Chairman, NCSDP. The list of Committee members, project representatives and invitees who attended the meeting is given in Annex. 1.

Item 12.1 Welcome by Chairman, NCSDP

The Chairman, NCSDP welcomed all participants to the XIIth meeting. A brief self-introduction was given by the officials present.

The Chairman thereafter briefly recounted the background of the formation of NCSDP in 1991 by broad basing the then Standing Committee for earthquake parameters. The Standing Committee was constituted in June 1969 to suggest design seismic coefficient for hydraulic structures and river valley projects. During its tenure the Standing Committee held 25 meetings upto August 1991 under the Chairmanship of Member (D&R), CWC. Thereafter, NCSDP came into existance and eleven meetings have been held. The Chairman brought out that as per the decision taken in the XIth meeting of NCSDP a Sub Committee was constituted to prepare the Guidelines for the site specific seismic studies for river valley projects. The Sub Committee headed by Dr. A.S. Arya, Prof. Emiritus and Member (NCSDP) held two meetings (in August 2001 and March 2002) wherein detailed discussions took place and the draft for the desired guidelines was finalised.

The Chairman expressed appreciation and congratulations to Dr. A.S. Arya, an eminent earthquake expert and esteemed member of NCSDP on being awarded the *Padam Shree* on Republic Day 2002 and put on record the felicitations of the entire Committee.

Thereafter the agenda was taken up for discussion.

Item 12.2 Confirmation of the minutes of the last meeting

The minutes of eleventh meeting of NCSDP held on 7.6.2001 at CWC, New Delhi were circulated to all the members vide Lr. No. CWC/FE&SA/2/2/2001/483-99 dt. 17.7.2001. As no comments / observations were received, the same was confirmed.

Item 12.3 Guidelines for the site specific seismic study for river valley project prepared by NCSDP Sub-Committee.

Before the start of the discussion, a letter dated 31.7.2002 from Dr. I.D. Gupta, Jt. Director CWPRS and a member of the Sub Committee, containing his observations on the draft guidelines was circulated to the members of NCSDP. His comments could be summarised as below:

1. Use of the peak ground acceleration and normalised response spectrum framed can not be considered an acceptable approach for arriving at the site specific design parameters.

2. To overcome the limitations of using PGA, direct use of attenuation relations for response spectral amplitudes need to be adopted.

3. The response spectrum for vertical component can not be obtained appropriately simply by scaling down the corresponding spectrum for the horizontal component uniformly in all the natural periods.

4. The response spectrum compatible time histories should be generated independently for the horizontal and the vertical components using appropriate phase difference.

Dr. Gupta explained his above comments and mentioned that his suggestion was as an addition in the draft guidelines prepared by the Sub Committee so as to make them comprehensive.

Dr. S. Basu, another member of the Sub Committee made his observations and pointed out that he did not agree to para 5 of the draft guidelines (para 2 of the minutes of the 2nd meeting of Sub Committee). He reiterated that he had expressed his strong reservation about this issue in the 2nd meeting of Sub Committee itself. He has also expressed his opinion in his letter of August 9, 2002. The other provisions in the Guidelines, according to him are dependent on para 5. Prof. L.S. Srivastava, Consultant and former faculty member of Deptt. of Earthquake Engg., I.I.T. Roorkee expressed the view that the draft guidelines needed review and suggested for their wide circulation to the experts for eliciting their comments. In view of the above observations, it was decided that a third meeting of the Sub Committee would be convened to sort out the pending issues so that draft guidelines could be finalised based on consensus. The draft guidelines, in the present form, will also be circulated to other experts for obtaining their comments.

Item 12.4 Tungabhadra Dam, Karnataka

As decided in the tenth (Xth) meeting, the seismic design parameters for Tungabhadra dam based on the study done by CWPRS can be decided only after the finalisation of guidelines for site specific study by the Sub Committee. As the guidelines are still not finalised and the parameters are only required for a safety review, the decision regarding the seismic parameters for the project was deferred till the said guidelines are ready.

Item 12.5 Chamera H.E. Project Stage-II, Himachal Pradesh

The revised site specific seismic study report of the project was presented and discussed. It was observed that the earthquake magnitude of 7.5 for Kangra block considered in the study may not be adequate. The Committee recommended that the PGA and response spectra may be revised considering an earthquake magnitude (moment) of M = 8, in order to incorporate the historical Kangra earthquake and the latest revision of IS-1893 : 2002 for seismic zone V. Prof. Srivastava, Consultant for the site specific seismic study, indicated that the multiplying factors for MCE and DBE conditions will be 0.36 and 0.18 for the earthquake magnitude (moment) 8. Accordingly, the Committee approved the

proposed spectra (as per the revised report of November 2000 for Earthquake Parameters of the project) with a multiplying factor of 0.36 for MCE condition and 0.18 for DBE condition. The ground motion time history should be modified accordingly for the design of Chamera dam Stage-II.

Item No. 12.6 Teesta H.E. Project Stage-V, Sikkim

A brief presentation of the site specific seismic studies for the project was made. A graph showing the comparison of the seismic spectra for Teesta project with that of Tehri dam, as desired by the Committee in its last meeting, was presented. The spectral acceleration values in case of Teesta are much higher as compared to those for Tehri dam. The Committee opined that such a comparison may not be desirable.

After detailed deliberations, the Committee decided that a peak ground acceleration (PGA) of 0.32g for MCE condition and 0.16g for DBE condition alongwith the response spectra given in Fig 4 and Table III of the Site Specific Seismic Report (Project No. P-2000-04; November, 2000; Deptt. of Earthquake Engg., University of Roorkee) may be adopted for the seismic design of Teesta Project.

Item 12.7 Parbati Hydro-electric Project Stage-II, Himachal Pradesh

As per the recommendations of the Committee in its last meeting, the details of the revised PGA by enhancing the earthquake magnitude from 8 to 8.5 were presented by the consultants from Deptt. of Earthquake Engineering, I.I.T., Roorkee. The revised PGA corresponding to earthquake magnitude M=8.5 is 0.42g under MCE condition. The original study gives a PGA of 0.36g for MCE condition. After detailed deliberations the Committee favoured to retain the original site specific seismic study. The Committee decided that a peak ground acceleration of 0.36g for MCE and 0.18g for DBE alongwith the response spectra given in Fig. 4 and Table 4 of the site specific seismic report of Deptt. of Earthquake Engineering, I.I.T. Roorkee may be adopted for the seismic design of the project.

Item 12.8 Brutang Irrigation Project, Orissa

The project could not be taken up for discussion since no representative of the project was present in the meeting to present the case.

Item 12.9 Myntdu (Leshka) HE Project, Meghalaya

The salient details of the site specific earthquake study report carried out by the consultant, Deptt. of Earthquake Engineering, IIT Roorkee were presented. The study suggests that a value of PGA of 0.5g for MCE and 0.25g for DBE conditions corresponding to an earthquake magnitude of 8.5 be associated with Dauki fault may be adopted. The seismo tectonic set up around the project site as given in Fig. 2 of the report was deliberated. It was felt that the earthquake magnitude of 8.5 adopted for the Dauki fault in the study is on higher side and may be reduced to M=8.0. The Committee, therefore, recommended that the PGA and response spectra may be modified considering the earthquake magnitude M= 8 and submitted to NCSDP.

Item 12.10 New projects referred to NCSDP

12.10.1 Subansiri Lower HE Project, Arunachal Pradesh / Assam

The salient features of site specific seismic studies were presented by the consultant, Deptt. of Earthquake Engineering, IIT Roorkee. The seismo tectonic set up around the project site was also presented and discussed. It was observed that the earthquake magnitudes as given in Table 2 (*peak ground horizontal acceleration from various sources around Subansiri lower hydro electric project site, page 34 of the Report)* should be clearly identified whether they are 'actually observed' or 'projected for the specific site. This should also be clearly indicated in the table. The earthquake magnitude of 7.5 associated with the Main Boundary Thrust which has been considered for the determination of peak ground acceleration is considered low. The Committee recommended that the earthquake magnitude of 7.5 may be increased to M=8 and the site specific seismic study revised accordingly.

12.10.2 Jetpur Water Resources Project, Gujarat

The salient features of the project and the geological/geotectonic set up around the project site was briefly presented by the Project representative. It was observed that the distance of Narmada fault from the project site is about 3-4 km. In view of the proximity of the project to the Narmada fault, the Committee recommended that the site specific seismic studies for the project may be carried out and submitted for its consideration.

12.10.3 Upper Beda Medium Project, Madhya Pradesh

The salient features of the project and the geological/geotectonic set up of the project was briefly presented by the project representative. The project lies in the vicinity of Narmada (Indira) Sagar Dam (M.P.) in Zone III of the Seismic Zoning Map of India. The seismic parameters (revised) for the Narmada Sagar Dam were decided in the IX meeting of NCSDP (January 2000) with the horizontal seismic coefficient being 0.12g for (DBE). The project representative requested that the seismic parameters for the Upper Beda Project may be decided in the light of the seismic parameters of Narmada Sagar Project. The Committee desired that the seismic details of the Narmada Sagar Project submitted earlier to NCSDP including the site specific seismic study report may be linked up with the case of Upper Beda Project and submitted for its consideration.

12.10.4 Lower Goi Project, Madhya Pradesh

The basic features of the project alongwith geological/ geotectonic set up around the project were briefly presented. This project is also in the vicinity of the Narmada Sagar dam. As in case of Upper Beda Project, it was decided that the decision about seismic parameters for Lower Goi project could be taken after the relevant seismic details of Lower Goi project and the site specific seismic studies for Narmada Sagar Project are linked up in a cohesive manner and submitted for the consideration of NCSDP.

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

Annex-1

XIIth Meeting of National Committee on Seismic Design Parameters (NCSDP) for River Valley Projects held on 13.08.2002

List of participants who attended the meeting

Sl. No.	Name	Designation	Department / Organisation	Status/ Representative
I. Committee Members and Special Invitees				
1.	Sh. R.Jeyaseelan	Member (D&R)	Central Water Commission, New Delhi	Chairman, NCSDP
2.	Dr. D.K. Paul	Professor & Head	DEQ, IIT Roorkee	Member
3.	Sh. A.K. Bajaj	Chief Engineer (DSO)	CWC, New Delhi	Member
4.	Sh. Sujit Das Gupta	Sr. Geologist	GSI, Calcutta	Member
5.	Sh. H.V. Gupta	Dy. Director General (Seismology)	IMD, New Delhi	Member
6.	Brig. V.C. Tyagi	Director, G&RB	Survey of India, Dehradun	Member
7.	Sh. M. Ravi Kumar	Scientist E-I	NGRI, Hyderabad	Member
8.	Sh. M. Gopalakrishnan	Chief Engineer (N&W)	CWC, New Delhi	Special Invitee
9.	Sh. S. Masood Husain	Director (FE&SA)	CWC, New Delhi	Member-Secy., NCSDP
II. Sub Committee Members				
10.	Dr. I.D. Gupta	Jt. Director	CWPRS, Pune	Sub Committee Member
11.	Dr. S. Basu	Professor	DEQ, IIT Roorkee	Sub Committee Member
III. Project Representatives and Consultants				
12.	Sh. P. Padmanabhan	Secretary	Tungabhadra Board, Hospet	Tungabhadra Dam
13.	Dr. L.S. Srivastava	Consultant	Jaiprakash Industries, New Delhi	Chamera-II

14.	Sh. R.K. Garg	Chief Consultant	Jaiprakash Industries, New Delhi	Chamera-II
15.	Sh. Vinod Batta	Sr. Manager (C)	-do-	-do-
16.	Sh. C.K. Agrawal	Advisor	-do-	-do-
17.	Sh. Pankaj Punetha	Sr. Manager	NHPC Ltd. Faridabad	-do-
18.	Sh. M. Basu	Sr. Manager	NHPC Ltd., Faridabad	Teesta, Parbati & Subansiri
19.	Sh. S.N. Jha	Sr. Manager	NHPC Ltd., Faridabad	Teesta
20.	Sh. Sharad Bhatnagar	Sr. Manager	NHPC Ltd., Faridabad	Teesta
21.	Sh. A.K. Jain	Sr. Manager	NHPC Ltd., Faridabad	Parbati
22.	Sh. D.P. Bhattacharya	Chief Engineer (Civi)	Meghalaya S.E.B. Shillong	Myntdu (Leshka) H.E.P.
23.	Sh. Elias Lyngdoh	Director	M.S.E.B. Shillong	-do-
24.	Sh. G.K. Kaistha	Director	G.S.I. Shillong	-do-
25.	Dr. M.L. Sharma	Professor	DEQ, IIT Roorkee	Subansiri, Teesta
26.	Sh. Y.K. Chaubey	Sr. Manager	NHPC Ltd. Faridabad	Subansiri
27.	Sh. D.K. Joshi	-do-	-do-	-do-
28.	Sh. H.P. Pandya	Superintending Engineer	Karjan Canal Circle, Rajpipla	Jetpur Scheme
29.	Sh. Pradip Pophali	Geologist	NWR&WS, Vadodara	-do-
30.	Sh. O.C. Jain	Superintending Engineer	N.D. Circle, Khargone (M.P.)	Upper Beda & Lower Goi
31.	Sh. B.L. Sharma	Executive Engineer	N.D. Dn. 9, Khargone (M.P.)	Upper Beda
32.	Sh. Sudhir Raizada	Executive Engineer	N.D. Dn. 12, Khargone (M.P.)	Lower Goi
33.	Sh. G.P. Soni	Assistant Engineer	N.D. Circle No. 12, Khandwa (M.P.)	Upper Beda & Lower Goi
34.	Sh. C.K. Soni	Assistant Geologist	N.D. Circle No.1, Sonawad (M.P)	-do-
35.	Sh. V.K. Mittal	Director	I.M.D. New Delhi	Accompanied DDG, IMD