

## **Minutes of the fifteenth National Committee on Dam Safety meeting held on 23.1.96 at Central Water Commission, New Delhi.**

The fifteenth meeting of the National Committee on Dam Safety (NCDS) was held on 23.1.1996 in CWC, New Delhi under the Chairmanship of Shri Ramesh Chandra, Chairman, CWC as well as NCDS. List of officers who attended the meeting is given at Annex I.

At the outset, the Chairman welcomed all the participants. After a brief introduction of the participants, the Chairman requested the Chief Engineer (DSO) to take up items of the agenda for discussion.

### **15.1.0 Confirmation of the minutes of the fourteenth meeting of NCDS.**

15.1.1 The minutes of 14<sup>th</sup> meeting were circulated vide CWC Letter No.3/19/NCDS/93-DS/1028-63 dated 11.8.1995. As there were no comments from any of the States, the minutes as recorded were confirmed.

### **15.2.0 Status of implementation of "Dam Safety Assurance and Rehabilitation Project" for information of the Committee**

15.2.1 The Chief Engineer (DSO) gave the status of implementation of DSARP. He informed that the performance of implementation of the Central and State components of the DSARP was reviewed by the World Bank Supervisory Mission comprising Messers William Price, Senior Irrigation Engineer of the Headquarter, Washington and J.R.Malhotra, Irrigation Engineer, Delhi Office during 12-21 December 1995. The Mission carried out field visits from 12-17 December 1995 of Vidur and Sathanur dams (Tamil Nadu, Parbati dam (Rajasathan) and Pagara, Pillowa, Kotwal and Tigra dams (Madhya Pradesh). Chief Engineer (DSO) and Director (DSM), CWC accompanied the Supervisory Mission throughout the field visits and participated in detailed on-site discussions. From 18-19 December 1995, the Mission reviewed the progress of various activities, viz. institutional strengthening and upgrading flood forecasting facilities in the inter-State river basins of Chambal and Mahanadi rivers under Central Components and institutional strengthening, basic dam safety facilities and remedial works under the States components with the officers of CWC and the four participating States. The revised implementation schedule indicating the physical and financial programme for completion of the period was chalked out and finalized. The World Bank in their Supervisory Mission Report expressed satisfaction on the overall performance of the project and appreciated the role played by

DSO, CWC in coordination and monitoring of the project activities and imparting training of State officials. As per revised implementation schedule, the total estimated cost of the project is Rs.4591 million against SAR provision of Rs.4559 million. The amount of Rs.3076 million (67%) would be utilized by scheduled project date of September 1997.

- 15.2.2 The wrap-up meeting was taken by Secretary to the Government of India, MoWR on 21 December 1995. Chairman informed that while the Secretary, MoWR supported the request of participating States for extension of the project beyond September 1997, he made it quite clear that this would be subject to review in June 1996. Chairman expressed his concern at the very slow progress on remedial measures and reimbursement position. He desired that the participating States step up their progress to achieve their targets as per revised implementation schedule.

### **15.3.0 Review of National Scenario.**

- 15.3.1 The States were requested to intimate fresh cases of distress in dams, structural and operational deficiencies noted during the monsoon and failure cases, if any, since the last meeting.
- 15.3.2 Maharashtra informed that they have already submitted a note on the repairs to the radial gates of Kolkewadi dam. This has been achieved by lifting radial gates one by one for about 0.6 m above the sill level. The day-to-day water levels at an interval of one hour were maintained. The main difficulties experienced during repairs were matching the thickness of rubber seal from 12 mm to 18 mm, coping with the existing size of the side rubber seal plate, re-using the old equalizer plates; and making water-tight side corner junctions of side rubber seal and bottom rubber seal.
- 15.3.3 Chief Engineer, Tamil Nadu informed about distress in two dams, namely, Siddamalli and Willingdon dams. Siddamalli dam is about 25 years old and heavy erosion has been noticed on the downstream spillway. Sinking has been noticed in the embankment dam of 60 years old Willington dam. Both these dams have been included under Category II of World Bank assisted DSAR Project for providing remedial measures.
- 15.3.4 Director (DS), Madhya Pradesh informed that remedial measures for Maniyari dam have been identified, estimates have been prepared and the work is under progress. It was also informed that the inspection of Bargi dam, in accordance with the stipulated

guidelines, have been carried out and the inspection report will be submitted shortly to DSO, CWC.

#### **15.4.0 Progress of implementation of recommendations of the "Report on Dam Safety Procedures."**

15.4.1 The States were requested to implement the recommendations contained in the chapters of "Report on Dam Safety Procedures" circulated during 1987 and send a consolidated report indicating achievements on various issues and to highlight those recommendations, if found difficult to implement.

15.4.2 DSO, Maharashtra informed that, out of 750 large dams, inspection of 260 dams have been completed. In order to complete the work by schedule date, Regional Dam Safety Review Committees under the regional Chief Engineers have been constituted for this purpose. Chairman suggested that the States may consider utilizing the services of engineers recently retired for this purpose.

15.4.3 The key issues, namely, preparation of "Data Books" on large dams, Dam Safety Legislation, review of hydrology on existing dams, preparation of completion reports and Operation & Maintenance Manuals of large dams, etc., were taken up as separate items during the preceding meetings, but all the States were again requested to send a consolidated report highlighting the achievements on the implementation of the recommendations of the "Report on Dam Safety Procedures."

#### **15.5.0 Dam Safety Legislation**

15.5.1 Chairman informed that enactment of Dam Safety Legislation is most essential for safety inspection and evaluation of large dams in India, which are mostly owned by Government agencies. He desired that letters may again be addressed to those States who have not agreed for bringing out such a legislation and, if they do not agree to any legislation, they may come out at least with their recommendations. They may also consider whether any guidelines could be formulated till enactment of Dam Safety Legislation. The following States have communicated their concurrence:

1. Andhra Pradesh
2. Gujarat
3. Kerala
4. Maharashtra
5. Orissa
6. Rajasthan
7. Tamil Nadu

Comments offered by Maharashtra will be considered at the time of finalizing the legislation.

**15.6.0 Preparation of Emergency Action Plans and inundation maps for d/s area.**

- 15.6.1 Decisions for preparation of Emergency Action Plan for downstream areas of dams of National Importance by all the States were taken during the earlier meetings. It was also decided that the four participating States – Madhya Pradesh, Orissa, Rajasthan & Tamil Nadu – under the World Bank assisted Dam Safety Assurance and Rehabilitation Project (DSARP) would take up preparation of Emergency Action Plans for the 54 identified dams posed for rehabilitation in the first phase and remaining dams can be taken up thereafter.
- 15.6.2 Progress of Emergency Action Plan, reported by the States, was reviewed. Chairman desired that, in view of very large number of dams, the States may adopt a criteria for prioritization of dams for this purpose. Chief Engineer (HSO), CWC informed that the dams under priority can be identified on the basis of review of pre- and post-monsoon inspection reports. Chairman suggested that wherever reports of such a systematic inspection are not available, the dams can be identified on the basis of collective knowledge. In view of large number of existing dams in the country, he once again stressed that the States may consider engaging retired and experienced engineer to complete this job expeditiously.
- 15.6.3 It was informed by Tamil Nadu that data for preparation of Emergency Action Plans for Sathanur and Kodaganar have been collected and sent to CWC. Gujarat has issued necessary directions to their field officers for preparing Emergency Action Plans. Karnataka has completed demarcation of flood zone of Linganamakhi dam. Uttar Pradesh has identified 21 dams and concerned Chief Engineers have been requested to take up the work. Rajasthan has prepared Emergency Action Plan for Matrikundia dam. NHPC informed that Emergency Action Plan for Salal dam has been completed. Dam Break Studies in Maharashtra were reported to be in progress and they have developed a simplified software for preparation of Emergency Action Plans for 9 dams.
- 15.6.4 Information in respect of Bihar, Kerala and Punjab is still awaited.

## **15.7.0      Compilation of "Data Books."**

- 15.7.1      As per the decision taken in the 4<sup>th</sup> meeting, "Data Books" for dams of National Importance are to be prepared by the States and sent to DSO, CWC for record. Critical geological features of the dams are to be highlighted in this report.
- 15.7.2      Andhra Pradesh, Bihar, Gujarat, Karnataka and Tamil Nadu and also BBMB have submitted "Data Books" for dams of National Importance. NHPC has submitted "Data Book" for Salal HE project and Chamera project. Maharashtra has submitted "Data Book" only for Paithan dam out of 5 dams; Madhya Pradesh informed that "Data Books" of Tawa, Minimata (Bango), Gandhi Sagar were under scrutiny by the State DSO.
- 15.7.3      Orissa and West Bengal have not furnished any information so far.

## **15.8.0      Preparation of completion report of large dams**

- 15.8.1      Completion reports of all large dams are to be prepared by the respective States giving priority in the first phase to dams of National Importance. Original geological reports are also to form part of the completion reports.
- 15.8.2      Maharashtra has completed reports of 10 dams; Karnataka has prepared history reports of 19 dams. In the States of Andhra Pradesh, Bihar and West Bengal, field Chief Engineers have been requested by the State DSO to finalise the completion report of dams under their control.
- 15.8.3      Chairman desired that for compilation of "Data Books" and preparation of completion report on all the existing large dams, the States have to dig out old records. He suggested that possibility of taking this work through INCID may be explored. BBMB suggested that completion reports of dams under construction should be completed simultaneously, as it is very difficult to locate the records later on. NHPC was also requested to submit the completion report in respect of Salal project. Chairman also suggested engaging experienced officials who were associated with them for doing this job. Tamil Nadu informed that the state has already identified 7 retired officials for preparation of these documents.

### **15.9.0 Preparation of Operation & Maintenance Manuals**

15.9.1 BBMB and Uttar Pradesh have completed O&M Manuals for the dams under them. Andhra Pradesh, Bihar, Gujarat, Maharashtra, Rajasthan and West Bengal have started the work. Madhya Pradesh informed that O&M Manuals for 25 gated dams are being taken up on priority. O&M Manual for Rani Avanti Baisagar has been prepared and approved by the State DSO and for Barna and Ravisankar, are under scrutiny. Manuals in respect of Salal and Chamara dams under NHPC were reported to be under finalization. Tamil Nadu reported that they have prepared compendium of rules and regulations for flood regulation for each large dam in the State. In respect of KSEB, Manuals for all gated dams have been prepared.

15.9.2 Chairman suggested that the States may consider having a gradation for preparation of Operation & Maintenance Manuals, namely, major, medium and small dams. The Manuals for medium and small dams need not be as elaborative as that of major dams. DSO, CWC may assist the States in preparing guidelines. Maharashtra informed that they have already prepared gate operation & reservoir operation manuals.

### **15.10.0 Periodical inspection of dams and the report on dam safety activities in the States.**

15.10.1 The States / Organizations are required to perform periodical inspection of dams in their States and send a consolidated yearly report on the status of dams and dam safety activities under the title "Health Status of Dams and Dam Safety Activities in the States" to DSO, CWC.

15.10.2 Gujarat, Madhya Pradesh and Maharashtra & BBMB have submitted yearly consolidated report regularly. Orissa submitted a consolidated report during the 11<sup>th</sup> meeting but no report thereafter. NHPC submitted latest report for Salal, Chamara and Loktak H.E. Project, but consolidated report is still awaited. Andhra Pradesh has submitted the report upto May 1995; Tamil Nadu submitted the report upto April 1995 and Gujarat upto December 1995. Maharashtra has submitted the report 1992-93 in respect of identified dams. Uttar Pradesh submitted a report during the 13<sup>th</sup> meeting. No consolidated status reports have been received from Bihar, Kerala, Rajasthan and West Bengal so far.

- 15.10.3 Chairman desired that consolidated annual report on the status of dams and dam safety activities should be submitted for each calendar year and DSO, CWC will work out a format and supply to the States for this purpose.

**15.11.0 Safety review of large dams once in ten years.**

- 15.11.1 In accordance with the recommendations contained in the "Report on Dam Safety Procedures", safety review of large dams which are more than 15 m in height or which store 60 million cubic metre or more of water, are to be carried out by an independent panel of experts once in ten years. For this purpose, an Expert Committee may be constituted comprising only those officers from the States who were not connected at any stage with the construction or maintenance of the structures.

- 15.11.2 In view of very large number of dams, progress on this item is very slow in many of the States. It was emphasized that the States may increase the number of inspecting teams / panels to complete the inspection as stipulated.

Maharashtra informed that DSRP, constituted under MCIP (III) (R), has reviewed 9 dams and submitted their reports to the Government. Besides, two more Expert Committees headed by Shri Deuskar, ex-Secretary, Government of Maharashtra have been constituted after the Killari earthquake of 30.9.93 for review of seismic parameters to be adopted, design assumptions and strengthening of 22 major dams lying in seismic prone areas of Maharashtra. The Government has also appointed 6 regional committees under the control of regional Chief Engineers to undertake review of 753 identified large dams in the State.

In Rajasthan, Uttar Pradesh and West Bengal, constitution of expert panel was reported under active consideration of their respective Governments. Tamil Nadu informed that inspection of all dams would be completed by 1997. Gujarat reported that out of 373 large dams, inspection of 185 has been completed upto December 1995.

**15.12.0 Safety status of dams of National Importance.**

- 15.12.1 The States have been requested to prepare safety status of 45 dams of National Importance in the prescribed proforma circulated by DSO, CWC.

- 15.12.2 Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh & West Bengal and BBMB & NHPC have submitted reports for the National Importance dams in their States / under their control. Karnataka has submitted report of Lakhya dam under the control of Kudramukh Iron Ore Limited and NHPC submitted report for Salal and Chamera dams.

Kerala (Irrigation Department) and Kerala State Electricity Board have not submitted any information.

**15.13.0 Monitoring of safety report of inter-State dams by sub-committees.**

- 15.13.1 Three sub-committees were set up during March 1990 to monitor the safety aspects of inter-State dams in the Parambikulam Aliyar System (PAP), Mahanadi River System and Subarnarekha River System.
- 15.13.2 Tamil Nadu has submitted a report on the follow-up action taken on the recommendation of the committee to Kerala State. DSO, CWC has requested Kerala State to convene the next meeting. Response in this regard is still awaited.
- 15.13.3 Bihar, Orissa and West Bengal have not furnished the progress on dams in Subarnarekha River System.
- 15.13.4 Orissa convened the first meeting of the sub-committee for Mahanadi River System on 8.9.93. No progress has been further reported by the participating States. Information on health status and flood releases of the projects upstream of Hirakud in Madhya Pradesh sought by Orissa has not been furnished so far.

**15.14.0 Setting up of hydrological unit in the States for review of hydrology of existing dams.**

- 15.14.1 Hydrology of existing dams is required to be reviewed by setting up or strengthening existing hydrology units in the States. Some States / Organizations have already initiated actions for strengthening / setting up of hydrology units and also taken up review of hydrology of some of the dams.
- 15.14.2 States of Gujarat, Madhya Pradesh, Maharashtra, Orissa and Rajasthan have informed that hydrology review studies have been taken up by the existing hydrology units in their States. BBMB & NHPC informed that they have also established separate units in



under their organizations. Orissa has established two hydrology review divisions under SDSO. Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh and West Bengal have initiated action for strengthening the existing hydrology units / establishing separate units. No information is available from Kerala State.

Chairman desired that letters may be addressed to Kerala and other States who have not complied with these recommendations.

#### **15.15.0 Instrumentation for dams.**

15.15.1 The Committee decided that all the States may take stock of the status of instrumentation installed on all large dams in order to see their performance, mortality, periodicity for analysis of data, referring the analysis to the designers for their suggestions, studies of structural behaviour report and the adequacy or otherwise of the staff engaged on the job. Information reported by some of the States / Organizations is as below:

Andhra Pradesh	3 dams
Gujarat	25 dams
Karnataka	2 dam
Kerala	7 dams
Madhya Pradesh	11 dams
Maharashtra	48 dams
Orissa	14 dams
Tamil Nadu	6 dams
BBMB	3 dams

On the basis of review carried out by Karnataka, out of 5 dams report of only 2 dams have been received and reports of remaining 3 dams are still awaited. Progress of installation of micro-earthquake instruments on Mettur and Vaigai dams has not been reported by Tamil Nadu. In Uttar Pradesh, micro-earthquake instruments have been installed on Ramganga dam. In Madhya Pradesh formation of a Central Instrumentation Cell is under active consideration.

15.15.2 Chairman desired that the States may concentrate on the analysis of instrumentation data and preparation of structural behaviour

reports. Director (Instrumentation), CWC in reply to a query from Chairman, informed that over 20 structural behaviour reports have been received in CWC. All the States / Organizations were again requested to intimate the present status to the Committee.

#### **15.16.0 Standardized meteorological and other observations.**

15.16.1 All the States were requested to supply detailed information in a specified format on the type of meteorological instruments installed in the catchment areas and reservoirs of large dams for meteorological observations.

15.16.2 Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and BBMB have supplied information in respect of few dams. Orissa informed that 15 dams covered under DSARP have been selected for providing meteorological observation units at dam sites. Meteorological instruments have been installed on 9 dams in Tamil Nadu. Rajasthan was requested to submit the information in the specified format. NHPC, Bihar, Kerala and West Bengal may submit the information.

Chairman desired that all the States / Organizations may carry out a drill before the rainy season to see whether the instruments are in working order. The States may prepare a performance report for each project for the calendar years and submit to DSO, CWC.

#### **15.17.0 Data on gated storages.**

15.17.1 The Committee requested all the States / Organizations to furnish data on gated storages of large dams in a specified format. Andhra Pradesh, BBMB, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal have already submitted the information. Rajasthan has supplied information for 25 out of 28 dams and for the remaining dams, information is still awaited. NHPC has submitted information for Salal and Chamera projects. From Bihar there is no information so far.

#### **15.18.0 Safety and inspection of barrages.**

15.18.1 During the 7<sup>th</sup> NCDS meeting, the Committee decided to collect State-wise information in respect of all barrages in a prescribed format and send to DSO, CWC. Except Bihar, information has been received from most of the States. Madhya Pradesh has submitted information for 6 barrages out of 7; and Uttar Pradesh has given for 26 barrages out of 27. Both the States may furnish information

on the remaining barrages. Bihar & NHPC were also requested to supply data of barrage(s) under their control.

Chairman desired that all the States may send aerial view photographs of barrages to DSO, CWC.

#### **15.19.0 National Register of Large Dams**

- 15.19.1 The updated data for "National Register of Large Dams" received upto December 1994 from the States / Organizations has been entered in NIC Computer and the same can be retrieved by the States / Organizations on NICNET System even at the District level throughout the country. The revised / updated / corrected edition of NRLD has also been published and is being circulated.

All the States / Organizations are requested to keep on informing the latest information on large dams so that stored data is updated from time to time for the benefit of users.

#### **15.20.0 Seismic status of dams of National Importance.**

- 15.20.1 DSO, CWC has forwarded a document titled "Guidelines for Inspection of Dams following Earthquake" to all States / Organizations with a request to make use of these guidelines and report to NCDS safety status of dams immediately on occurrence of earthquake.

- 15.20.2 After the occurrence of Uttarkashi earthquake in October 1991, reports were received from BBMB in respect of 3 dams; NHPC for Salal dam and Uttar Pradesh for Ram Ganga dam. After the occurrence of Latur earthquake, with epicenter near Killari on 30.9.93 in Maharashtra, post-earthquake inspection reports were submitted from Andhra Pradesh, Karnataka & Maharashtra.

- 13.7.1 Chairman desired that a copy of the report brought out by GSI on Uttarkashi earthquake may also be submitted to DSO, CWC for information of the Committee.

#### **15.21.0 Problem bank on research & development.**

- 15.21.1 All the members of the Committee have been requested from time to time to suggest areas requiring research for development of projects and gadgets in the field of dam safety and send their suggestions to DSO, CWC. The Chairman desired that the States may examine the areas / fields as indicated in the list given earlier and undertake research on a subject of their choice. They may

also prepare a project report on the scheme for research and send the same to CWC.

**15.22.0 Any other item with the permission of Chair**

- 15.22.1 The Committee decided that Damodar Valley Corporation (DVC) are having major dams, viz. Tilaiya dam, Konar dam, Maithon dam, Panchet dam and Durgapur Barrage under their control and may also be included as a permanent member of this Committee, and DSO, CWC should take action in this regard.

In the end it was decided that the next meeting of the Committee may be held in July / August 1996.

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