

## **Minutes of the fourteenth National Committee on Dam Safety meeting held on 24.1.1995 at Central Water Commission, New Delhi.**

The fourteenth meeting of the National Committee on Dam Safety (NCDS) was held on 18.7.1995 in CWC, New Delhi under the Chairmanship of Shri A.B.Joshi, 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 and reiterated that there is hardly any improvement in the implementation of the recommendations contained in the "Report on Dam Safety Procedures." He stressed that if the States find any difficulty in the implementation of these recommendations, the same may be brought to the notice of the committee so that the Government is apprised of accordingly. Thereafter the items of agenda of the meeting were taken up for discussions. Shri T.D.Sundarababu, Chief Engineer (DSO) and Member Secretary, NCDS welcomed the Chairman, members of NCDS and officers of the States.

### **14.1.0 Confirmation of the minutes of the thirteenth meeting of NCDS.**

14.1.1 The minutes of 13<sup>th</sup> meeting circulated vide CWC Letter No.3/19/NCDS/93-DS/341-74 dated 21.3.1995 were confirmed.

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

14.2.1 Before taking up this item, Chairman invited Chief Engineer (HSO), CWC to introduce policy technical guidelines for hazard assessment and emergency preparedness plan needed in the corrective action package for rehabilitation of dams. Chief Engineer (HSO) informed that these guidelines have already been prepared and sent to DSO for circulation to all the members of NCDS.

He explained that, by definition, PMF is a flood that may be attained but not exceeded, and as such is a concept. Routing studies through reservoir and dam are to be done with respect to various percentages of PMF hydrograph impinging on the reservoir. FRL-MWL combinations can be worked out; study can thus identify a critical flood value that can cause a failure situation and the corresponding percentage PMF will be Threshold Flood (TF). Studying the valley, its topography, demographic distribution, etc., a critical flood can be estimated that would cause an extreme loss and is known as "Base Safety Condition." Beyond this, Base Safety Condition and related flood, there would be no incremental addition

to risk to life, etc., and emergency preparedness plan is to be worked out so that the present flood preparedness plan is to be worked out so that the present flood preparedness activities get extended and would become effective in an emergent situation.

The Chairman requested all the members and other participants from States / Organizations to react on these guidelines and offer their comments without waiting for the next meeting.

Thereafter, Chief Engineer (DSO) informed in brief the status of implementation of DSARP being implemented in the four States of Madhya Pradesh, Orissa, Rajasthan & Tamil Nadu. He also informed that the overall progress under this project in Tamil Nadu, Orissa and Rajasthan has been reviewed by CWC officers who also assisted them in finalizing a realistic programme of implementation. Chief Engineer (DSO) informed that the identification report of Uttar Pradesh has already been forwarded to the World Bank by the Department of Economic Affairs. However, the World Bank has not so far agreed with the reports but has emphasized to step up performance in the existing 4 States. Reports received from Gujarat and Karnataka are under process. KSEB have also submitted a revised report for upgrading safety status of dams under their control.

#### **14.3.0 Review of National Scenario.**

- 14.3.1 The States were required to intimate the NCDS fresh cases of distress in dams, structural and operational deficiencies noted during the monsoon and failure cases, if any, since the last meeting.
- 14.3.2 No fresh cases were reported by any States / Organizations. However, some problem cases referred to CWC by the States were brought to the notice of NCDS. These are distress in Bargi Project & Maniyari Dam (Madhya Pradesh), Dimma Reservoir (Bihar), Jalaput Dam (Machkund H.E. Project) (Andhra Pradesh) & (Orissa), Shivsagar Dam (Maharashtra).
- 14.3.3 A joint inspection by CEA, Power Finance Corporation, Andhra Pradesh State Electricity Board (APSEB), Orissa State Electricity Board (OSEB) is proposed for Machkund Dam. It was decided that DSO, Irrigation Department, Andhra Pradesh may take initiative to arrange safety inspection at the earliest. Madhya Pradesh reported that remedial measures of Maniyari Dam were in progress as per the recommendations of DSARP. Chief Engineer (BODHI), Madhya Pradesh informed that the SDSO had inspected Bargi dam and the

report would be submitted shortly. Superintending Engineer, DSO, Maharashtra informed that a request has also been received from Chief Engineer (Navy), Bombay for inspection of Shivsagar dam.

Inspection report of Dimma Reservoir is awaited from Bihar.

14.3.4 All the members were requested to intimate NCDS unusual incidents and distress problems immediately on their occurrence.

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

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

14.4.2 States of Bihar, Kerala and West Bengal & NHPC have not submitted reports. Andhra Pradesh submitted a report during the 12<sup>th</sup> meeting. As requested, a copy of the "Report on Dam Safety Procedures" was given to NHPC during the meeting.

14.4.3 Though 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, all the States were requested to send a consolidated report highlighting the achievements on the implementation of the recommendations of the "Report on Dam Safety Procedures."

**14.5.0 Dam Safety Legislation**

14.5.1 During the meeting, the Chairman once again stressed the importance and the need to give a fresh look to Dam Safety Legislation, particularly in the present scenario when more and more private agencies are entering in the field of water resources sector to own and operate large dams for various uses. He informed that enactment of such a legislation will bring awareness in the country for proper inspection and creating awareness in the country for improving the safety status of existing dams.

14.5.2 The status has not much changed since the last meeting. The following States have communicated their concurrence:

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

- 14.5.3 Maharashtra has also sent their concurrence on the draft bill. However, they suggested the following major amendments which were brought to the notice of all the members:
- (a) the legislation may apply to all dams irrespective of their heights / sizes;
  - (b) in addition to the Central legislation, there is a necessity of bringing out a separate State legislation, as water is a State subject under the Constitution;
  - (c) under the draft Act, State DSO has been made responsible for all the functions. As such, SDSO would need minimum three additional divisions with present staffing pattern;
  - (d) with large number of dams in the country, it is difficult to shoulder the responsibility alone by the SDSO. The primary responsibility of safety of dam may rest with the owners & incharge of dams and State DSO may overview periodical inspection of dams to be carried out by owners. Similarly, work of preparation of basic documents and ensuring safety of life and property on downstream may rest with the dam owners. Hence, the DSO will render advice and guidance in preparing such documents.
- 14.5.4 Chairman requested the representative from Uttar Pradesh to reconsider their earlier decision.
- 14.5.5 Though Karnataka have reiterated that such a legislation is not essential, they were again requested to reconsider their decision.
- 14.5.6 Madhya Pradesh and West Bengal, though expressed their views in favour of such a legislation, have not sent their formal concurrence so far. BBMB had pointed out that since the draft act does not cover joint ventures of different States and Statutory Bodies like BBMB, for functioning under Central Government draft act may require suitable amendments. As requested, a copy of the draft bill was handed over to NHPC during the meeting.
- 14.5.7 Bihar has not so far communicated their concurrence.

14.5.8 Keeping in view the concern of the country, the States were requested to give a serious thought in bringing out such a legislation without any further delay for improving the safety status of large number of existing dams in the country. Chairman indicated that the Central Legislation may be enacted first, followed by individual State Legislations, if the States so desire.

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

14.6.1 A decision for preparation of Emergency Action Plan for downstream areas of dams of National Importance by all the States was taken during the earlier meetings of NCDS. 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) should take up preparation of Emergency Action Plans for the 33 identified dams posed for rehabilitation in the first phase and remaining may be taken up later on.

14.6.2 It was informed by the States that preparation of Emergency Action Plans for Ghodahada dam in Orissa, Kangsabati dam in West Bengal, Sathanur and Kodaganar in Tamil Nadu are under progress. Latest progress was not reported by any State.

14.6.3 DSO, Gujarat informed that necessary directions had been given to the field officers for preparation of Emergency Action Plans and inundation maps for Kadana, Karjan, Ukai and Machu II dams. Karnataka has completed demarcation of flood zone of Linganamukhi dam. Dam Break Study of 9 dams in Maharashtra was reported to be under progress. For this purpose a simplified software has been prepared and it was assured that a sample copy would be sent to CWC. Rajasthan had prepared Emergency Action Plan for Matrikundia dam which had also been approved by the State DSRP. Report on Emergency Action Plan and inundation maps of Matatila dam prepared by Uttar Pradesh was stated to be under modification and for another 21 dams the concerned Chief Engineers have been requested to take up the work. NHPC informed that EAP for Salal dam has been completed, but for Chamara it is yet to be taken up.

14.6.4 Information regarding action taken is awaited from Bihar and Kerala Irrigation Department. However, KSEB informed during the last meeting that Dam Break Studies for Idukki dam in Kerala are under progress. Punjab had not intimated any progress in the case

of downstream areas of projects which are under the control of BBMB.

- 14.6.5 During the meeting, the Chairman also suggested that the basic input data (downstream cross sections) required for the Dam Break Study may be taken up immediately. Chief Engineer (DSO) informed that DSO, CWC has acquired Danish MIKE 11 model for Dam Break Studies and if the States require any assistance, the same can be offered to them.

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

- 14.7.1 As per the decision taken in the 4<sup>th</sup> meeting of NCDS, "Data Books" for dams of National Importance were to be prepared by the States and sent to DSO, CWC for record. Critical geological features of every dam are to be highlighted instead of giving a detailed geological report.

- 14.7.2 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 Chamara project. Maharashtra has submitted "Data Book" for one dam out of five dams. Madhya Pradesh intimated that "Data Book" of Tawa, Minimata (Bango), Gandhi Sagar was under scrutiny by the State DSO; Legible copies of "Data Books" from Rajasthan as requested are still awaited; Uttar Pradesh submitted "Data Book" of Ichari dam but not in the required proforma. KSEB reported to have completed "Data Book" of Idukki dam.

- 14.7.3 Kerala (Irrigation) and Orissa have not furnished any information so far. West Bengal intimated the status in this regard.

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

- 14.8.1 Completion reports of all large dams were to be prepared by the respective States giving priority in the first phase to dams of National Importance. Original geological reports were also to form part of the completion reports.

- 14.8.2 Maharashtra had completed reports of 10 dams; Karnataka, has prepared history reports of 19 dams and the same would be submitted after scrutiny by State DSO. In Andhra Pradesh, Bihar, Rajasthan and West Bengal, the field Chief Engineers have been requested by the State DSO to finalise the completion report of dams under their control. Uttar Pradesh intimated that completion reports in respect of Matatila, Rihand, Obra, Ramganga, Lalitpur

and Shahjad had been framed. Report of Idukki dam would be submitted by KSEB shortly. Tamil Nadu proposed to complete the work by engaging consultants. Kerala (Irrigation) and Orissa have not given any information so far.

- 14.8.3 Completion reports are to be prepared for all the existing large dams. During the meeting, the Chairman once again suggested that if the work cannot be taken up through their existing set ups, the possibility of engaging consultants, preferably experienced retired officers of the States may be considered for this job.

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

- 14.9.1 The Chairman emphasized that Operation & Maintenance Manual is an important document for operation and maintenance of the dams and this Manual should be available before commissioning of the project. As O&M Manuals have not prepared for most of the dams, this needs to be taken up without further delay and completed expeditiously.

- 14.9.2 BBMB and Uttar Pradesh have already completed O&M Manuals for the dams under them. Andhra Pradesh, Bihar, Gujarat, Maharashtra, Rajasthan and West Bengal have initiated the work and have completed the Manuals for some dams. 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. Karnataka, has conducted a workshop on preparation of O&M Manual. Kerala and Orissa have not furnished any information so far. Manuals in respect of Salal and Chamera dams under NHPC were reported to be under finalization. Tamil Nadu reported that they had prepared compendium of rules and regulations for flood regulation for each large dam in the State. A copy need to be supplied to CWC. KSEB informed that O&M Manuals for all gated dams have been prepared.

- 14.9.3 The States were once again requested to take up the work of O&M Manuals and to complete expeditiously for all large dams.

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

- 14.10.1 The States / Organizations were 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.

14.10.2 Gujarat, Madhya Pradesh and Maharashtra & BBMB have been submitting yearly consolidated report regularly. Orissa had submitted a consolidated report during the 11<sup>th</sup> meeting but no report received afterwards; NHPC submitted latest report for Salal, Chamera and Loktak H.E. Project; Rajasthan is submitting only for periodical inspection reports; Kerala and West Bengal are not submitting periodical reports in the prescribed proforma; Andhra Pradesh has submitted the report upto May 1995; Maharashtra has submitted the report 1992-93 for identified dams and for 1993-94 the report is still awaited; and the consolidated report on status of dams from NHPC is awaited. Uttar Pradesh submitted a report during the 13<sup>th</sup> NCDS meeting. Tamil Nadu reported that status report upto November 1994 has already been submitted. However, they are requested to submit one more copy. The latest report is stated to be under finalization in Karnataka.

14.10.3 All the States / Organizations were requested to send the yearly consolidated report on health status and dam safety activities to DSO, CWC regularly.

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

14.11.1 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. It was reiterated that the expert committees may be constituted of the officers from the States who were not connected at any stage with the construction or maintenance of the structures.

14.11.2 In Madhya Pradesh, Rajasthan, Uttar Pradesh and West Bengal constitution of the experts' panel is stated to be under active consideration of their respective Governments. Bihar has also initiated action in this regard. Karnataka informed that constitution of such a panel would be taken up under the World Bank assisted DSARP as and when it is accepted. Tamil Nadu informed that the entire work would be completed by 1997. Orissa informed that they have completed review of 82 out of 137 dams. In the absence of State Dam Safety Panel in Gujarat, the job is being attended to by their SDSC and so far review of 162 dams has been completed. Andhra Pradesh had drawn a programme for the safety review of large dams in the State. Maharashtra informed



that Dam Safety Review Panels (DSRP) under MCIP (III) (R) had carried out review work of 9 dams. Review of 28 dams in the Latur and Osmanabad area is planned to be carried out by the expert committed headed by Shri V.R.Deuskar; and, besides, a standing DSRP has also been proposed for the review of 753 identified large dams in the State. BBMB had already completed the review work for the dams under their control. Information from NHPC is still awaited.

- 14.11.3 The Chairman desired that the States / Organizations that have not yet taken up this activity may make a start by identifying dams and complete the work progressively.

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

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

- 14.12.2 Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh & West Bengal and BBMB have submitted the report for the National Importance dams. Karnataka intimated that M/s Kudramukh Iron Ore Limited (KIOL) has been requested to send the report on Lakhya dam. NHPC has submitted the report for Salal dam. Irrigation Department of Kerala has not sent any information and Kerala State Electricity Board was also requested to send the status report for dams under their control.

- 14.12.3 NHPC and Kerala Irrigation Department & KSEB were also requested to send the report of dams under their control without further delay.

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

- 14.13.1 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.

- 14.13.2 Tamil Nadu has submitted a report on the follow-up action taken on the recommendation of the committee to Kerala State. Kerala Irrigation Department has been requested by DSO, CWC to convene the next meeting without any further delay.

- 14.13.3 Bihar, Orissa and West Bengal were requested to furnish the progress on dams in Subarnarekha River System.
- 14.13.4 Orissa convened the first meeting of the sub-committee for Mahanadi River System on 8.9.93. However, no progress has been reported to DSO, CWC 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. Madhya Pradesh reported that the minutes of the meeting of "Modernisation of inflow forecasting services in Mahanadi and Chambal basin under Dam Safety Evaluation Project" held in CWC on 1.3.1995 would be sent to all the concerned Chief Engineers for further action.
- 14.13.5 During the meeting, the Chairman expressed his concern that not much progress has been achieved on this important item by the three sub-committees and requested all the participating States to intimate the progress and convene meetings of sub-committees regularly. Safety status of inter-State dams and the follow up actions taken on the recommendations of the committees may also be intimated to DSO, CWC.
- 14.14.0 Setting up of hydrological unit in the States for review of hydrology of existing dams.**
- 14.14.1 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 taken up review of hydrology of some of the dams.
- 14.14.2 Gujarat, Madhya Pradesh, Maharashtra and Orissa have completed hydrology review of 154, 31, 35 and 26 dams in their States respectively; BBMB reported that they have already established a separate unit in their organization. Orissa informed that two hydrology review divisions have been created and are functioning under DSO. Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu and Uttar Pradesh informed that action for strengthening of existing hydrology unit has already been initiated. However, review of hydrology some of the dams have also been taken up. Rajasthan informed that the existing hydrology unit under ID&R unit would carry out review of 124 dams in the State. Bihar informed that the review was being done by a separate unit in the State; West Bengal is still awaiting approval from the State Government for strengthening DSOs for taking up this work. NHPC

have created full-fledged hydrology unit and the work is being carried out under it. No information was received from Kerala.

- 14.14.3 The Chairman desired that all the States / Organizations should take up hydrological review and complete expeditiously.

**14.15.0 Instrumentation for dams.**

- 14.15.1 NCDS has decided that 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 upto the 14<sup>th</sup> meeting is as under:

Andhra Pradesh	3 dams
Gujarat	25 dams
Karnataka	1 dam
Kerala	7 dams
Madhya Pradesh	11 dams
Maharashtra	48 dams
Orissa	14 dams
Tamil Nadu	6 dams
BBMB	3 dams

Karnataka informed that the review of instrumentation of 5 dams has been carried out; and report for Supa and Narayanpur dams has been submitted; and for remaining 3 dams it would be submitted shortly. Tamil Nadu informed that micro-earthquake instruments would be installed on Mettur and Vaigai dams. In Uttar Pradesh, micro-earthquake instruments have been installed on Ramganga dam. Madhya Pradesh reported that formation of a Central Instrumentation Cell is under active consideration of the State Government.

- 14.15.2 All the remaining States / Organizations were requested to expedite submission of information to DSO, CWC.

14.15.3 During the meeting, the Chairman stressed the need for quick analysis of instrumentation data to know the structural behaviour of dam.

**14.16.0 Standardized meteorological and other observations.**

14.16.1 All the States have been 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.

14.16.2 Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh 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 and no progress was reported later on. Meteorological instruments have been installed on 9 dams in Tamil Nadu under DSARP. Uttar Pradesh has reported that most of the meteorological instruments installed are under the control of IMD. The State may furnish details of instruments installed. Rajasthan submitted the information during the meeting. However, this was found not in specific format. Information from NHPC and Kerala State is awaited.

**14.17.0 Data on gated storages.**

14.17.1 NCDS has 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. NHPC has submitted for Salal and Chamara projects. Bihar has not sent any information so far.

**14.18.0 Safety and inspection of barrages.**

14.18.1 During the 7<sup>th</sup> NCDS meeting, it was decided to collect State-wise information in respect of all barrages in a prescribed format and send to DSO, CWC. The information has been received from most of the States except Bihar. Madhya Pradesh has submitted information for 6 barrages out of 7; and Uttar Pradesh has given for 26 barrages out of 27. Bihar is again requested to expedite information. NHPC is also requested to supply data of barrage(s) under their control.

#### **14.19.0 National Register of Large Dams**

- 14.19.1 A publication titled "National Register of Large Dams" (NRLD) brought out by DSO, CWC during April 1990 was circulated to all the States / Organizations for scrutiny and to intimate corrections / modifications / additions, if any, for updating the first edition.
- 14.19.2 The entire data for "National Register of Large Dams" received upto December 1994 from the States / Organizations had 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 is under print and likely to be released shortly. All the States / Organizations were 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.

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

- 14.20.1 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 earthquakes.
- 14.20.2 Reporting in this regard is not very encouraging. After the occurrence of Uttarkashi earthquake in October 1991, reports were received only from BBMB in respect of 3 dams; NHPC for Salal dam and Uttar Pradesh for Ram Ganga dam. All the northern States were expected to conduct a thorough inspection of large dams in their States in accordance with ICOLD Guidelines and report the findings to NCDS. It was learnt that Uttar Pradesh Government came out with a report after Uttarkashi earthquake. They were requested to make available a copy of the report to NCDS.
- 13.7.1 After the occurrence of recent earthquake in the early morning of 30.9.93 in Latur and Osmanabad Districts of Maharashtra, post-earthquake inspection reports were submitted by Andhra Pradesh & Maharashtra and Karnataka reported no damages to large dams located in Gulbarga, Bidar and Bijapur Districts of Karnataka

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

- 14.21.1 All the members of NCDS had 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, during the 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup> and also in 14<sup>th</sup> meeting desired that the States should examine the areas / fields as indicated in the list given earlier and undertake research on a subject of their choice. They should also prepare a project report on the scheme for research and send the same to CWC.

14.21.2 Rajasthan informed that they were proposing to carry out special analysis for the embankment dam and spillway portion of Chandra Prabha dam by using ultra sound, isotopic test and alkali aggregate reacting tests. The detailed report is yet to be prepared.

14.21.3 The Chairman desired that the States / Organizations consider this item actively and to come forward specifying the areas required for research and development of projects and dam safety activities.

Progress made in this regard may be intimated to the Committee.

#### **14.22.0 Any other item with the permission of Chair**

14.22.1 Since the progress of implementation of the recommendations of the "Report on Dam Safety Procedures" was found to be not very encouraging due to various constraints in the States, the NCDS members were of the view that an appreciative type of seminar for the senior level decision makers and also Chairman of DSRPS of the States may be arranged. This would help in sorting out various difficulties being experienced by the States.

In the end, all the members of NCDS and other participants took note of the valuable contributions made by Shri A.B.Joshi, Chairman, NCDS and applauded Shri Joshi who is laying down his office as Chairman, CWC on 31 July 1995 on superannuation.