

Agenda for the 39th meeting of National Committee on Dam Safety(NCDS)

DATE: 12 February 2019
VENUE: Hotel Trident, Nayapalli, Bhuvneshwar, Odisha
TIME: 10:00 Hrs.

39.1 Confirmation of the minutes of 38th meeting

Minutes of the 38th meeting of NCDS were circulated vide letter No.3/19/NCDS/DSM//38th meeting/2018/145-183 dated 03rd March, 2018 to all the members of NCDS. No comments on the minutes have been received so far from the members of the Committee. The Committee may confirm the minutes of the 38th meeting of NCDS.

39.2 Pre & Post Monsoon inspection of Dams

Pre & post monsoon inspection of large dams is conducted by dam owners and consolidated report is sent to NCDS Secretariat. In the last meeting, NCDS members were requested to analyse, based on these inspections, their dams for vulnerability. These inspection reports normally cover the observations of inspection team and suggested remedial measures. But the reports are generally silent on action taken on previous reports/recommendations. Most of the inspection reports are not as per CWC guidelines available on CWC website. The Committee members are requested to inform the NCDS the status of these inspections and also reason(s) for not doing the inspections of all large dams along with the reason for not adhering to guideline/Performa issued by CWC in this regard. The status of pre & post monsoon inspection of dams subsequent to last NCDS meeting of January 2018 is enclosed as **Annexure-I**.

Also during the last meeting, all the states were requested to start using at least two modules in DHARMA portal i.e. engineering features module and module on uploading inspection reports. DSO, CWC after pursuing the matter with the states issued license ID & password to almost all states for use of DHARMA. But as of now the progress in this regard has been almost negligible. The Committee may discuss the steps needed to popularise the use of this application. Further, as decided in the 38th meeting, CWC is conducting detailed training on DHARMA portal. Training has already been imparted to the states of Gujarat, Maharashtra and Rajasthan. Other members are also requested to please convey the training time slot for this training program. The proforma for summary of pre & post monsoon report is available at **Annexure-IA**.

Response: All States/ DSOs

39.3 Preparation of Emergency Action Plan (EAP) and Reservoir Operation

In the last NCDS meeting, it was informed that the EAP of Hirakud Dam can be downloaded from www.damsafety.in by registered user and the same can be considered as model EAP for preparation of EAP for any Dam. All States/DSOs may apprise the committee about the latest status of preparation of EAP. For Dam Break Analysis, an essential part of the EAP, Director, NIH Roorkee had even offered to help the states. Any progress on this aspect may be appraised to this committee. In the last NCDS meeting, Chairman sought definite time line for preparation of EAP and CWC pursued the matter with states through correspondence. The status regarding preparation of EAPs as received from States/DSOs is at **Annexure-II**.

Response: All States/ DSOs

39.4 Dam Safety Bill

Dam Safety Bill with nation-wide applicability was discussed in previous NCDS meetings. The Cabinet has approved the proposal for enactment the Dam Safety Bill 2018 and Ministry of Water Resource, RD&GR has placed the bill in Lok Sabha on 12 Dec 2018.

Response: Sr. Joint Commissioner (BM), MOWR, RD&GR

39.5 Instrumentation of Dams

39.5.1 Strengthening of seismic instrumentation as per the decision of National Committee on Seismic Design Parameter (NCSDP)

Seismic instrumentation in the dams situated in seismic zone IV and Seismic Zone V is to be strengthened as per revised guidelines available on CWC website and www.damsafety.in. Member states who desire to join DRIP-II may have to mandatorily include the instrumentation plan in their proposals for implementation on preferential basis. As advised by Chairman, NCDS and recorded in the minutes of 38th NCDS meeting, Govt of Uttarakhand had to take up the issue of Instrumentation of dams located in Uttarakhand and operated and maintained by Govt. of U.P. Representatives of Uttarakhand and Uttar Pradesh are requested to apprise the committee about the status of the same.

Response: All States/ DSOs

39.5.2 Strengthening of other instrumentations of large dams:

It was discussed in earlier NCDS meetings that all the States/ DSO's are required to submit separate detailed report on performance of existing instruments installed in the dam body and foundation including analysis of data with permissible limits of instruments in prescribed format to the Director, Instrumentation Directorate, CWC on yearly basis.

In the last NCDS meeting, Chairman, NCDS, expressed his concern over non submission of instrumentation data to CWC. The State Governments/ DSOs are again advised to ensure proper functioning of instruments at least the basic instruments, i.e. plumb line, V-notch & survey settlement point etc. are in working order.

The instruments measuring the parameters pertaining to the serious maintenance issues / problems faced by the dams need to be installed in old dams e.g. extra survey points (for deformation), crack meters (cracks), Joint meter (differential settlement), instruments for measuring uplift pressure & pore pressure, plumb line etc. The status of instrumentation of dams across country as reported by dam owners is at **Annexure-III**

Response: All States/ DSOs

39.6 Dams of National importance needing attention

Dams having height 100 metre and above or having gross storage capacity of 1 billion cubic metre and above are considered as the dams of national importance. As per the NRLD, there are 65 completed and 11 under construction large dams in the country classified as dams of national importance. The State Govts/ Project Authorities have pointed out issues of dam safety in respect of following large dams only.

39.6.1 Bhakra Dam (Punjab)

The issues and the discussion of previous meetings are summarized at **Annexure-IV**. Since the last NCDS meeting, a team of consultant and CWC officers visited the project in April, 2018 and reviewed the progress. A team of members involving CWC, BBMB, NCCBM and Dassault System is formed to carry out the numerical modelling of the dam in order to understand the unusual behaviour. So far, the interim model analysis has been completed and some suggestions as proposed by review committee to incorporate in analysis are in process.

Response: BBMB

39.6.2 Srisailem Dam (Andhra Pradesh)

In the last meeting, Srisailem Authority informed that design flood review of the dam has not been completed as yet and matter was referred to panel of experts under the chairmanship of Shri AB Pandya, former Chairman of CWC. They further informed that plunge pool erosion opposite to block nos. 6 & 8 is progressive and technical solution provided till date has not been able to arrest the erosion and needs relook. During the 38th meeting it was informed that the work of preparation of Dam Break Analysis (DBA) along with inundation maps and EAP was entrusted to NIH, Roorkee. Representative of AP may apprise the Committee about the status of the same. The issues and discussion of previous meetings are summarized at **Annexure-V**.

Response: Andhra Pradesh

39.6.3 Ranjeet Sagar Dam (Punjab)

In the 38th meeting, it was decided to include the Ranjeet Sagar Dam under dams of national importance needing attention. DSO, CWC requested Punjab irrigation Dept to provide the issue concerning the dam. However, the issue concerning this dam was not elaborated upon by the representatives of the state of Punjab. Hence, representative of Punjab irrigation is requested to brief the issues related to Ranjeet Sagar and send the report of the same to NCDS secretariat i.e. DSO, CWC, so that appropriate action could be planned.

Response: State of Punjab

39.7 Other Dams

39.7.1 Gararda Dam (Rajasthan)

The issues and discussion of previous meetings are summarized at **Annexure-VI**. Representative of Rajasthan Govt and Director Embt (N&W), CWC are requested to apprise the committee about the status of work and third party quality control mechanism as suggested in the last NCDS meeting.

Response: State of Rajasthan

39.7.2 Temghar Dam (Maharashtra)

Chairman NCDS desired a brief report on rehabilitation work of dam in last meeting. Meanwhile in June, 2018, 4th meeting of the Panel of Experts (PoE) to review the progress of rehabilitation work took place in Pune. The PoE has since submitted its report wherein it has indicated that there is about 30 % reduction in the leakage from the dam due to measures taken by the project authorities. However, the representative from Maharashtra may like to apprise the committee about the latest status of the works and

further improvements, if any. The issues and discussions of previous meetings are summarized at **Annexure-VII**.

Response: Member of PoE from CWC and State of Maharashtra.

39.7.3 Maudha Dam (Uttar Pradesh)

In the last meeting, Chairman NCDS advised Uttar Pradesh representative to take up the rehabilitation works and issue of fund with state Govt immediately as the dam was in critical condition. State representative may apprise the committee about the current status. The issues and the discussion of previous meetings are summarized at **Annexure-VIII**.

Response: State of Uttar Pradesh.

39.7.4 Durgawati Dam(Bihar)

During 38th NCDS meeting, Director, dam safety, Bihar had informed that the seepage from the dam was in stable condition since last 4 years. As per the advice of the Chairman, NCDS, a team comprising officers from CWC & CSMRS was formed which visited the dam site to assess the feasibility of increasing storage level from 121.0 m. After the visit, the team submitted its report. The observation, analysis of observation and recommendations are placed at **Annexure-IXA** and shared with state govt. Present status of the works, further improvements, if any may be shared with the Committee. The issues and the discussions of previous meetings are summarized at **Annexure-IX**.

Response: State Bihar.

39.8 Comprehensive Dam Safety Review by an expert panel

The dam owners are requested to conduct comprehensive safety review of large dams under their jurisdiction by an independent panel of experts' i.e Dam Safety Review Panel (DSRP) once in 10 years as per CWC guidelines on Dam Safety. The report of DSRP needs to be sent to Dam Safety Organization (DSO) in CWC. It is noted that many states have not constituted DSEP for the inspection of Dams in their states. In this regard, a D.O. letter was also sent by Chairman, CWC emphasizing the need of constitution of DSRP's and inspection of Dams. The status of formation of DSRP by various dam owners is summarized at **Annexure-X**.

It is further to bring to the notice of the committee that CWC has been receiving large number of Parliamentary Questions (PQs) and RTI applications in relation to the safety of old dams, specially for such dams which are more than 100 years old. Hence, the dam owners are requested to pay special attention to the safety of these dams and get these dams inspected by the DSRPs formed for the purpose on priority. It is further proposed that the report of the DSRPs in respect of dams from each state or its main findings and recommendations be presented by the respective dam owner in the upcoming meetings of the NCDS. Dam owners are further requested to send the regular status to DSO, CWC so that the Committee could be apprised regularly in this regard. Apart from safety, security of the dams also needs to be taken very seriously. The dam owners are requested to boost up requisite security & surveillance at their dams in the form of manpower, equipments and infrastructural facilities.

Response: All States/ DSOs

39.9 National Register of Large Dams -Updation as per new format

As the members are aware that definition of large dam in our country is based on the definition adopted by the International Commission on Large Dams (ICOLD). The DSO, CWC maintains an inventory of large dams based on information provided by the dam owners in their respective states in National Register of Large Dams (NRLD). The definition of large dams has since been revised by the ICOLD and is reproduced as under,

« A dam with a height of 15 meters or greater from lowest foundation to crest or dam between 5 meters and 15 meters impounding more than 3 million cubicmeters »

The members are requested to revise their list of dams according to this new definition and communicate this office for updating the existing data in NRLD. Further, all the states/ dam owners were requested in the last meeting to start using DHARMA portal to fill the data online to have information bank on the health status of all large dams in the country. In this regard DSO, CWC has already provided License to all the dam owners whoever requested for the same. However, if any of the state/ dam owners have not got the License ID & password may please send the requisition in the prescribed format. DSO, CWC has also given training in DHARMA to some of the states as requested by them. However, it is observed that states are still not using this portal regularly. Hence, it is requested that each state/ dam owner may start using this portal. CWC has already got all the static data as available in the NRLD transferred to DHARMA. State representatives/ dam owners are requested to verify the data and let DSO, CWC know of any discrepancy, if any for updation.

Response: All States/ DSOs

39.10 Dam Rehabilitation & Improvement Project (DRIP)

The Dam Rehabilitation & Improvement Project (DRIP) is being executed with the World Bank assistance in Kerala, Madhya Pradesh, Orissa, Tamil Nadu, Karnataka, Jharkhand (DVC) and Uttarakhand (UJVNL).

Initially DRIP was a six year project scheduled to be completed by 30th June 2018. The project has been granted two years extension and now scheduled date of completion is 30th June 2020. Based on revised cost Proposal from implementing agencies (IAs), the revised cost of the project is Rs. 3466.00crore. The Director, DRIP may like to elaborate upon following issues:

- (i) Latest status of project implementation.
- (ii) Need for new similar schemes for inclusion of other dams/states.
- (iii) Approach for maximizing the benefits of lessons learnt from DRIP.
- (iv) Status of the various guidelines on dam being prepared under the DRIP
- (v) Status of Proposal for Phase-II of the DRIP

Response: Director, DSR, CWC

39.11 Record of Dam Failures and Major Dam Incidents and their Technical Reports

The record of the dam failures in the country as per information received from State Govts /DSOs is enclosed at **Annexure-X**. Technical details of dam failures mentioned in the aforesaid list are being compiled in DSM Dte., CWC for creating a record and knowledge base. However, out of 36 Dam failures; detailed technical reports have been received for only 8 such failures as mentioned in Annexure-XI. Technical details for remaining dam failures in Madhya Pradesh (10), Rajasthan(11), Uttarakhand (1), Uttar Pradesh (1) and Gujarat (5) as per Annexure-XI needs to be provided. Rajasthan representative is requested to brief the committee about the recent failure on 31.03.2018 of a dam of Kumbharam Arya project in Jhunjhnu district. Representative from the Rajasthan may like to share the technical aspects of the failure of

the dam. Similarly, the representative of Kerala may also share information about overtopping of Poringalkuttu dam during last monsoon. The states are also requested to update the list of dam failures in their respective states and share the same with DSO, CWC

Response: All States/ DSOs

39.12 Upkeep and archival of records - Data Book and O&M Manual etc.

The project authorities are required to maintain the operation & maintenance (O&M) manuals and data books along with complete set of designs and drawings as per CWC guidelines on standardized data book format available at (http://www.cwc.gov.in/Dam_safety.html) for all the projects. Further, all records, drawings etc need to be preserved and digitized for archival by State Govts./ DSOs as these are highly valuable source documents for diagnostics and remedial suggestions. The status of data book and O&M manual prepared by different States/DSOs as available with CWC is at **Annexure-XII**. States/ dam owners may update the same.

As per instructions of Chairman NCDS in the last meeting, DSM Dte of CWC had written to BBMB and NHPC for providing one set of O&M manual and data book. NHPC has shared their O&M manual with DSO, CWC which have further been shared with members via email dated 14/12/2018. However, BBMB has informed that their O&M manuals and data book are priced and can be purchased from them.

Response: All States/ DSOs

39.13 Setting up Hydrology units and Design Floods Review

In the last meeting, Chairman NCDS expressed the need of prioritizing design flood review of large dams by the dam owners. New hydrological units headed by a Director/ Superintending Engineer needs to be setup in the states depending on the numbers of large dams. The status of hydrological review carried out for large dams as per information received from States/DSOs has been compiled and is enclosed at **Annexure – XIII**. DSM, CWC has also requested all the states/ dam owners to create Hydrology unit as stressed upon by the Chairman, NCDS during the 38th NCDS meeting. All the members/dam owners are requested to share the status of forming Hydrological units in their states.

Response: All States/ DSOs

39.14 Monitoring of safety aspects of inter-State Dams by Sub-Committees

The National Committee on Dam Safety in consultation with the concerned State Governments has set up Sub-Committees to monitor the safety aspects of selected inter-State dams.

(a) Parambikulam Aliyar Project (PAP) System:

In the last meeting, Joint Secretary (RD&PP), MoWR RD&GR advised Tamil Nadu to have a uniform stand on the issue of dam safety of both the Mullaperiyar dam and PAP projects. The representative of Tamil Nadu stated that they would convey the issue to the State Government and inform the decision to the NCDS. Hence, the representative from Tamil Nadu is requested to inform the committee about the stand of their Govt on PAP.

Response: State of Tamil Nadu

(b) Mahanadi River System Sub-Committee (MRSS)

The Sub-Committee for Mahanadi River System was constituted comprising of following members:

1. Chief Engineer, Dam Safety, Odisha (Member Secretary & Convener)
2. Chief Engineer, Mahanadi Project, Raipur, Chhattisgarh
3. Chief Engineer & Manager, Upper Mahanadi Basin, Sambalpur, Odisha
4. Chief Engineer, Minimata Bango Project, Bilaspur, Chhattisgarh.

9th meeting of the sub-committee was held on 22-05-2017. *Chief Engineer, Dam Safety, Odisha, Member Secretary, MRSS may apprise the NCDS on the latest status of the activity of the sub-committee.*

(c) Subarnarekha River System Sub-Committee (SRSS):

The Sub-Committee for Subarnarekha River System was constituted comprising representatives of West Bengal, Bihar & Odisha (Member Convener). Last meeting of the sub-committee was held in 2016 at Jamshedpur.

Chief Engineer, Dam Safety, Odisha, Member Secretary, SRSS may apprise the committee on the latest status of the activity of the sub-committee.

39.15 Any other item with the permission of the Chair

Status of Pre& Post Monsoon Inspection Reports/Consolidated Health Status Reports received from States/DSOs

Sl. No.	State / DSO's / NCDS Members	No. of completed large dams as per NRLD	Inspection Reports received for nos.of dams			
			Post Monsoon 2017-18	Uploaded on DHARMA	Pre Monsoon 2018-19	Uploaded on DHARMA
1	Andhra Pradesh	142			Report Awaited	
2	Bihar	24	21		Report Awaited	
3	Chattisgarh	248			Report Awaited	
4	Gujarat	620			Report Awaited	
5	Himachal Pradesh	19			Report Awaited	
6	Jharkhand	50			Report Awaited	
7	Karnataka	230			Report Awaited	
8	Kerala (Irrigation Dept)	28			Report Awaited	
9	Madhya Pradesh	899	220		Report Awaited	
10	Maharashtra	2069			Report Awaited	
11	Odisha	199	198		Report Awaited	
12	Punjab	14			Report Awaited	
13	Rajasthan	209			Report Awaited	
14	Tamil Nadu	116	120		Report Awaited	
15	Telangana	163			Report Awaited	
16	Uttar Pradesh	115	25		Report Awaited	
17	Uttarakhand	16			Report Awaited	
18	West Bengal	29			Report Awaited	
19	Bhakra Beas Management Board (BBMB)	3	3		3	
20	Damodar Valley Corp.(DVC)	4			Report Awaited	
21	Kerala State Electricity Board (KSEB)	33			Report Awaited	
22	Meghalaya Power Generation Corporation Limited (MePGCL)	8	4		Report Awaited	
23	National Hydro Power Corp.(NHPC)	19	19		19	

Note:- Very few reports as tabulated above are submitted as per CWC guidelines and proforma and State govts in every NCDS meeting are requested to follow these guidelines and proforma available on CWC website.

Summary Performa of Pre and Post Monsoon Inspections Report

Sl. No.	State	No. of Dams as per NRLD	No. of Dams Inspected (Pre-monsoon)	Category of Inspected Dams			No. of Dams for which action has been taken on the remedial measures suggested during Inspections.	% of	
				I	II	III		Dams inspected	Action taken

Note: Category-I: Dams with major deficiency which may lead to dam failure.
 Category-II: Dams with rectifiable deficiency needing immediate attention.
 Category-III: Dams with minor or no deficiency.

**Status of Emergency Action Plan (EAP) Preparation
(As per information furnished by States/DSOs)**

Sl. No.	State / DSO's	No. of completed Large Dam	No. of dam for which EAP is prepared	% of EAP completed	Remarks
1	Andhra Pradesh	142	3	2.11	EAP for 6 dams under preparation
2	Bihar	24	20	83.33	All EAPs need to be updated for normal operation conditions as well as extreme flood conditions under SPF/ PMF as well as dam break by state govt.of Bihar.
3	Chhattisgarh	248	57	22.98	
4	Gujarat	619	1	0.20	Field Engineers has been requested by DSO, GERI, Vadodara to prepare the EAPs and conduct mock drill. One EAP is under preparation.
5	Himachal Pradesh	19	19	100.00	
6	Jharkhand	50	-	-	Preparation of EAP proposed for 2 dams during 2015-16
7	Karnataka*	230	5	2.17	5 Nos as per CWC guide lines and for rest of dams, field Chief Engineers advised by the state to review and finalise the EAPs prepared keeping in view of CWC guide lines
8	Kerala (Irrigation)*	24	-	-	Steps initiated for preparation of EAP of all large dams.
9	Madhya Pradesh*	898	34(32+2)	0.20	32 EAPs under preparation as per CWC guidelines under basin CE's and 2 EAPs are approved.
10	Maharashtra	2069	182	8.8	
11	Odisha*	199	1	0.5	
12	Punjab	14	12	85.71	Proposed for updation of EAP with dam break analysis of 12dams during 2015-16
13	Rajasthan	201	-	-	
14	Tamil Nadu*	116	-	-	Preparations of EAPS for 106 dams are taken under DRIP.
15	Telangana	162	-	-	EAP of NagarjunaSagar Dam is under finalization.
16	Uttar Pradesh	115	2	1.74	
17	Uttarakhand	16	4	25.00	EAPs-2 dams prepared by NHPC &DMP-2dams prepared by THDC India Limited.
18	West Bengal	29	-	-	To expedite submission of information

19	Bhakra Beas Management Board (BBMB)	3	3	100.00	
20	Damodar Valley Corp.(DVC)*	4	-	-	Action being taken in consultation with CWC.(Jharkhand-4) under DRIP
21	Kerala State Electricity Board (KSEB)*	37	-	-	Consultancy contract for preparation of EAP for 3 dams has been awarded.
22.	Meghalaya Power Generation Corp. limited(MeP GCL)	8	-	-	Under process
23.	NHPC	20	20	100.00	EAP: 3EAPs prepared (HP-1&J&K2) DMP: 17DMPs prepared for large dams located in various states i.e (J&K5dams, HP-5dams, Uttarkhand-2dams, Sikkim-2 dams, Manipur-1&West Bengal-1 dam).

Note: Status as per information received from State Govts. / DSOs, further modification/updation, if any may be intimated.

*States under DRIP

Instrumentation Status of Dams across Country as reported by Dam owners

Sl.No.	Name of State/ Dam Owner	Seismic Instrumentation	Other Instrumentation	Remarks
1.	Andhra Pradesh, Water Resources Department	Incomplete reply	Status of instruments received	Data not received in prescribed format
2.	Gujarat Engineering Research Institute	Incomplete reply	Status of instruments not received	Data not received in prescribed format
3.	Bihar, Water Resources Department	Bihar falls in zone-IV. However, Seismic instruments not installed in any dam.	Two dam (Chandan&Durgawati) was instrumented, but all were damaged.	Data not received in prescribed format
4.	Himachal Pradesh, Directorate of Energy	Incomplete reply	7 projects instrumentation status received.	Data not received in prescribed format
5.	Kerala, I &D	Kerala is in seismic zone III	Status of instruments not received	Data not received in prescribed format
6.	Kerala, State Electricity Board Ltd.	Replied "In zone III, hence not needed"	Status report of seven dams received	Data not received in prescribed format
7.	Karnataka, Water Resources Department	14VSAT enabled Permanent Seismic Monitoring station are installed.	Status of instruments not received	Data not received in prescribed format
8.	Maharashtra, Water Resources Department	List of 35 seismological observatory on and near the dam submitted	Status report of 15 dams received	Data not received in prescribed format
9.	Odisha	States that dams are in Zone II or III, hence not needed.	Status of instruments not received	Data not received in prescribed format
10.	Rajasthan, SWRPD (ID&R)	Instrumentation of Dam is under process.	Status of instruments not received	Data not received in prescribed format

11	Tamilnadu, Water Resources Department	Dams in Tamil Nadu lie in seismic zone II and III and no need for seismic instrumentation.	Status of instruments not received	Data not received in prescribed format
12	Telangana, Irrigation & CAD Department	States that dams are in Zone II or III, hence not needed.	Project authorities have been requested for instrumentation strengthening and report is awaited.	
13	Uttar Pradesh, Irrigation Department	Instrumentation of dams yet to be established	Instrumentation of dams yet to be established	Data not received in prescribed format
14	Meghalaya, Meghalaya Power Generation Corporation Limited	Incomplete reply	Status of instruments in dams is received. No instruments are in working order	Data not received in prescribed format
15	BBMB	Modernization of seismic instruments is under process	Status of instruments of two dams are received	Data not received in prescribed format
16	Jaiprakash Power Ventures Limited	Status report of four dams received	Status of instruments of four dams received	Data not received in prescribed format
17	Uttarakhand, Dam Safety Cell	Status report not received	Status of instruments not received	Data not received in prescribed format
18	NHPC Limited	SMAs at all of the power stations have been installed and are in working condition	Status of instruments received	Data not received in prescribed format
19	Kopili HE Plant	Status report received	Status of instruments not received	Data not received in prescribed format

Bhakra Dam (Punjab):

The matter regarding observed maximum deflection at Bhakra Dam showing the increasing trend over the years was brought to notice of CWC in October 2010. But the matter was discussed first time in 31st NCDS meeting July 2012. The chronological order of the discussion on the issue in NCDS is:

NCDS Meeting	Information by Project Authority	Committee's response
38 th Meeting Jan 2018	The MoU has been signed between BBMB and M/s Dassault System for FEM analysis. PMP studies of Bhakra is completed and for Pong and Pandoh dams are under process.	BBMB to provide engineering data to CWC for setting up of FEM modelling of Bhakra Dam. BBMB also to expedite PMP studies of Pong and Pandoh dam with IMD New Delhi.
37 th Meeting Feb 2017	The core sampling work to determine properties of rock and concrete is under process by NCCBM Ballabgarh. In addition, the data related to instrumentation provided by CWC are also under process in BBMB. The PMP studies of Bhakra Dam had been completed and PMP studies of Pong and Pandoh may be expedited with IMD New Delhi.	BBMB to speed up the process of investigation and sampling and submit the core testing data by June 2017. Recently, a MoU has been signed between BBMB and M/s Dassault System for technical assistance in FEM analysis of this dam. Committee request BBMB to immediately provide the detailed engineering data to CWC required for setting up the FEM modelling of this dam.
36 th Meeting Jan 2016	Instrumentation getting procured for Bhakra dam. For Pong and Pandoh dam, the matter is under consideration.	To expedite data submission for FEM analysis.
35 th Meeting September 2015	To supply the necessary data required for the FEM modelling shortly.	To expedite data submission for FEM analysis.
34 th Meeting March 2015	Request for dam safety analysis by CWC. BBMB will submit the data to CWC for FEM studies.	BBMB to submit data for FEM analysis to validate the performance of the Bhakra dam for deflection.
33 rd Meeting September 2014	CWC team visit in August, 2014. Deflection well within the range. Instrumentation under consideration. The PMF studies finalized in consultation with CWC and flood routing to be taken up. CWC may expedite PMF studies for Pandoh and Pong (Beas) dams.	CWC to expedite studies
32 nd Meeting December, 2013	Issues of deflection, instrumentation and revision of PMF.	Set up FEM Model 'Abacus' and simulate the behaviour of dams under extreme stress conditions and the effect of the temperature.
31 st meeting July 2012	The matter was referred to IIT Roorkee for analysis.	Keep NCDS Secretariat updated about the rehabilitation measures.

Srisaillam Dam (Andhra Pradesh):

NCDS Meeting	Information by Project Authority	Committee's response
38 th Meeting Jan. 2018	Design flood review not completed yet and referred to panel of expert under chairmanship of Shri AB Pandya. The erosion of plunge pool before block 6&8 is progressive and needs relook. The EAP and DBA is entrusted to NIH Roorkee. Diversion of water had interstate implication and matter referred to KRMB.	The committee noted the information submitted.
37 th Meeting Feb. 2017	<p>Chief Engineer, Andhra Pradesh informed that protection works opposite to Blocks 6to 8 will be completed within three months. Strengthening works of right flank on downstream is under vetting and proposal to extend approach road from tip of bucket upto apron of the dam is under process.</p> <p>Chief Engineer, Andhra Pradesh informed that for PMP studies, IMD requested certain data which were furnished in June 2016. But IMD New Delhi representative said that there is no pending issue related to Srisaillam Dam. Chief Engineer Andhra Pradesh also informed that preliminary investigation of channel for diversion excess flood from fore shore into Kundu River via Pamulapadu is almost complete.</p>	Member Secretary NCDS asked about the status of design flood review of Srisaillam Dam to increase the spillway capacity in consultation with IMD New Delhi. Director Hydrology (NE) CWC advised Srisaillam Authorities that flood routing studies should be conducted for various flood discharges ranging from 19 lakhs cusecs to 30 lakhs cusecs impinging at FRL. The routing studies should be carried out with all gates open , one gate inoperative and two gates inoperative and with incremental raise of 2 lakhs cusecs. The reservoir operation schedules should be prepared.
36 th Meeting Jan. 2016	D/S protection works adjacent to blocks 5 to 9 approved, tendering under process. A final report of PMF furnished to CWC. CWC recommended review of PMF studies by IMD. IMD, New Delhi was approached accordingly for confirmation/vetting of SPS/PMP values, SRRG Data. IMD requested, CE, AP State Hydrology in February 2015 to furnish the Index Map of the Srisaillam Project in scale 1:1000000 with catchment area delineated along with Longitudes and Latitudes duly marking rain gauges in and outside of catchment area.	Increase the spillway capacity of Srisaillam Dam as per design flood review and issues related to Nagarjuna Sagar dam may also be resolved on similar pattern.
35 th Meeting Sept. 2015	Protection works opposite to Blocks 6& 7 could not be taken up due to tail water conditions due to non receipt of revised administrative approval from A P Government. Preliminary investigation for diversion of flood waters of NSRS Srisaillam Project from 'Pamulapadu' village to Kundu River has been awarded by Government of Andhra Pradesh.	To expedite PMF study and enhancement spillway capacity.
34 th Meeting March 2015	Rehabilitation works to be taken up after receipt of revised administrative approval from government.	Observations of CWC sent regarding calibrating 2009 flood to calculate PMF for increasing the spillway.
33rd Meeting	No further progress in the rehabilitation work due to	CWC to study feasibility of

September 2014	Telangana agitation in the state.	increasing the spillway capacity.
32 nd Meeting December, 2013	Expert committee has been constituted for increasing the spillway capacity.	Take up revision of design flood on priority.
31 st meeting July 2012	Protection work at the toe of the dam foundation against block 5 completed, block number 6 and 7 could not be started due to high tail water level.	Increase the spillway capacity as per design flood review.
30 th Meeting Aug 2010	Srisaïlam received a record flood of 9.8 lakhs cusec in 2009 against design flood of 5.24 lakhs cusec and caused damage to protection works in block 5, 6, 7, 8 and 9 at its toe. Protection work of block 5 is completed and of block number 6 and 7 is under process.	Noted

Gararda Dam (Rajasthan)

The Gararda dam, a zoned earthfill dam was completed in March, 2010 and breached on 15.8.2010 during initial filling of the reservoir. Subsequently, at the request of Rajasthan government, a team of CWC officers led by Chief Engineer (DSO) visited the project site in October, 2011. Thereafter Rajasthan government requested CWC to suggest remedial measures for breached sections and assessment of health of the remaining dam and further measures to improve the same also. Designs (NW&S) Unit subsequently has held several meetings with WRD, Rajasthan since July, 2012. Some rehabilitation measures for Gararda dam in consultation with CSMRS were communicated vide letter dated 2.11.2012. CSMRS conducted field tests on boreholes in breached and unbreached portion of dam and forwarded report to CWC in July, 2015. As per the investigation of CSMRS, the overall health of the remaining portion of the dam was also not found in good condition. CSMRS indicated high permeability of embankment material as soil varied from loose to medium dense. There was no cut off trench, filter zone and proper compaction of dam material was not carried out while laying the dam. There were continuous cracks from upstream to downstream in the foundation of breached portion of the dam. Views of GSI regarding the presence of the similar cracks in the bed rock in other reaches of the existing dam were asked to be obtained. The dam is likely to breach from a different location if the rehabilitation of only breached section is taken up. Earth dam section needs to be re-laid as per specifications. The chronological order of discussion on the issue in NCDS is:

NCDS Meeting	Information by Project Authority	Committee's response
38 th Meeting Jan 2018	Rajasthan informed that the rehabilitation work is under progress as per drawing issued by CWC and will be completed by 2020.	Committee advised third party quality control
37 th Meeting Feb 2017	Director Dams, Rajasthan informed that as per advice of Chief Engineer PAO, CWC, a panel of experts under chairmanship of Shree M. Gopalkrishnan chief Engineer (retd.) CWC and Dr. K. VenkataChalam, Director (retd.) CSMRS New Delhi had inspected the dam and submitted the report to Water Resources Dept Rajasthan. The same report was forwarded by Rajasthan WRD to Chairman CWC.	Commissioner, CAD, MoWR, was of opinion that geological investigations of dam site were not proper, filter material was not observed and any rehabilitation measures would not work. Chief Engineer, Design (N&W) CWC suggested that remaining portion of the Dam may not be stable and needs to revisit the matter before taking final decision. Director, CSMRS agreed with the views of engineers of CWC and MoWR. He emphasised that it would be appropriate to await the completion of all additional investigations suggested by panel of experts. WRD Rajasthan may facilitate visit of CSMRS experts at the earliest with removal of shrubs and grass etc on downstream face of the dam.
36 th Meeting Jan 2016	Not present	Project authorities don't fully endorse CSMRS report. Therefore, on their request, a team of CWC and CSMRS visited the project site again on 01.10.2015 and suggested some additional investigations for profile map of existing dam, more bore log details and testing of soil samples etc. The suggested investigation report is awaited from project authorities.
35 th Meeting Sept. 2015	Only breach portion shall be constructed new.	As per CSMRS report, health of the remaining portion of the dam is also not good, for example, high permeability values of embankment material, compactness of soil varying from loose to medium and there is no clear evidence to the existence of any filter material. Therefore, providing construction drawing by CWC for the breached portion may not serve any purpose, because the dam is likely to be breached from a different location.
34 th Meeting March 2015	Not present	CSMRS completed investigations and report would be submitted by April, 2015.
33 rd Meeting Sept. 2014	Logistics, drilling equipment etc being arranged and CSMRS would be informed. Remedial measures on	CWC issued drawings, details of geological investigation awaited for issue of construction drawings.

	unbreached portion and reconstruction of breached portion of dam likely to be completed in two years.	
32 nd Meeting Dec.2013	Tenders to close breached portion under process.	CSMRS visited Garada Dam but couldn't start investigation. CSMRS to investigate all the remaining portion of the dam before filling up of reservoir.
31 st meeting July 2012	Consultancy work of Garadadam given to CWC.	CWC to submit report shortly.

Temghar Dam (Maharashtra)

Construction of the Temghar dam started in 1997 and completed in May 2010. As informed by the project authority, leakages were observed through the dam body from the time of construction. The amount of leakage increased with the increase in the reservoir storage level and profuse leakage of water was noticed through the dam body. The drainage gallery was partially submerged. On upstream surface of the dam, cavities were observed from Ch. 30 to 528. Vertical porous blocks as well as foundation drainage were observed to be choked. On downstream side of the dam at Ch. 410 to 415m, pitching boulders came off from body of the dam.

NCDS Meeting No.	Information by Project Authority	Committee's response
38 th Meeting Jan 2018	Rehabilitation work is under progress. 15% grouting work completed and 20% leakage reduced.	Noted
37 th Meeting Feb 2017	Representative from Maharashtra informed that Expert committee has submitted its report. Tender for rehabilitation works have been awarded and work will be started within two weeks. The period of rehabilitation work completion is about 24 months.	Commissioner CAD, MoWR, RD&GR requested Maharashtra representative to keep proper sequencing of works such as curtain grouting, upstream and downstream grouting including top grouting. Member Secretary NCDS instructed Maharashtra representative to involve DSRP for proper sequencing and quality of work.
36 th Meeting Jan 2016	The Expert Committee Report would be submitted by January, 2016.	Expedite rehabilitation in one and half years.
35 th Meeting September 2015	The Expert Committee Report is in its final stage and will be submitted to MKVDC by October 2015 and the rehabilitation works would be undertaken in a period of 12 to 18 months.	Noted
34 th Meeting March 2015	MKVDC, Pune has formed an expert committee on 27/08/2014 led by Shri V. M. Ranade for guidance to reduce leakages. Three meetings of the expert committee have been held and final report of Expert Committee would be finalized by June, 2015 remedial measures would be taken up by Project Authorities as per report.	Expedite rehabilitation
33rd Meeting Sept. 2014	Grouting work is to be taken up. The dam is not yet completed and dam safety role has not yet started.	CWC team had visited Dam in July 2014. The dam is structurally complete and filled up and the dam safety issues can therefore be taken up. The water resources dept. may provide and pursue funds for dam maintenance and dam safety activities

Maudha dam (U P)

The issue of Maudha Dam was raised during 24th NCDS meeting held in Jan 2003 along with Obra, Nagwa and Maro Dam. The rehabilitation work of Obra, Nagwa and Maro is completed but Maudha Dam is still pending due to some reasons. The brief summary of the issue from 32nd NCDS meeting is tabulated below:

NCDS Meeting	Information by Project Authority	Committee's response
38 th Meeting Jan 2018	Director Dam Safety Uttar Pradesh informed the non-availability of fund and requested Chairman NCDS to include the dam in DRIP-II.	DRIP-II is under process of approval and noting the condition of Dam, Chairman NCDS advised Uttar Pradesh representative to pursue the issue of fund with UP Govt.
37 th Meeting Feb 2017	Director Dam Safety Uttar Pradesh informed that expert team from CWC has not visited the Dam yet as decided in last meeting.	Director, DSR, CWC informed the committee that visit could be replanned in March 2017 provided water should be removed from inspection gallery and dry condition should be ensured.
36 th Meeting 11 th Jan 2016	Same as above	NIL
35 th Meeting 28 th Sept. 2015	Project engineers along with Dr. B.N. Asthana, Consultant/visiting faculty, IIT Roorkee inspected dam and requested for inspection by Central Expert Team and not to fill up the dam above 147.87 mtrs as a precaution.	Drainage gallery should be drained off by installing pumps and thereafter grouting can be done to arrest the seepage. An expert team consisting of Director (DSR), CWC, Chief Engineer (N&W), CWC and CSMRS would visit the dam site and make necessary recommendations in this regard.
34 th Meeting March 2015	The project report under scrutiny.	Expedite rehabilitation
33 rd Meeting Sept. 2014	No rehabilitation under way	Expedite rehabilitation
32 nd Meeting Dec. 2013	No rehabilitation under way	Expedite rehabilitation

Durgawati Dam (Bihar)

NCDS Meeting No.	Information by Project Authority	Committee's response
38 th Meeting Jan 2018	The rate of seepage is steady since last four years. The works to restore the dam designed section and damaged toe is 90% completed. The curtain grouting of the dam is postponed due to lack of fund.	Chairman desired a visit by CWC team.
37 th Meeting Feb 2017	Director Dam Safety Bihar appraised the committee about the seepage measurement at dam site and informed that maximum discharge (0.259 cusecs) in the month of July. The seepage water is free of silt and sandy material and situation is under control. The designed section restoration work of the dam is underway and monitored by concerned Chief Engineer. He further requested the chair to provide guidance in doing curtain grouting.	The committee suggested that seepage should be measured and linked with reservoir level on a time scale. If time lag is less, there are serious piping issues. The seepage water at toe must be dried up and resectioning should be followed by proper compaction. Chairman CWC and NCDS instructed Bihar representative to send a proposal for the desired guidance for rehabilitation of dam.
36 th Meeting Jan. 2016	After receiving CWC's report, Government of Bihar would process the recommendations within 2-3 months and thereafter complete the rehabilitation measures within 12 months.	CWC team visited and suggested urgent remedial measures. Measure seepage using V-notch at various reservoir levels. Dispersive action of soil may be responsible for the seepage and requires geological investigations for which CSMRS can offer desired guidance and assistance. Drain the affected area.
35 th Meeting Sept.2015	Gates regulation problem, cracks/deep rain cuts appeared on the d/s slope after first filling of the reservoir. Besides, dirty water in front of the right wing wall of the spillway in the upstream, appears with slight whirling action as soon as gate of the spillway is operated.	Matter is to be referred to DSR Dte.

Observations and information received from project officers during site inspection.

1. The water level in the reservoir during the visit was 117.50 m.
2. As could be observed by visual inspection, the upstream face of the dam is free from any defects.
3. No cracks could be observed on the dam top except pot holes which were filled up with water due to recent rains.
4. As reported in previous inspection report, various issues pertaining to the downstream face of the Durgawati dam such as Rain-cuts, gully formations, choked cross drains and damaged drains were visible this time also. The drains on the downstream face were choked with soil and boulders were dumped in the drains.
5. At the downstream of the closure section, clear water emerging out from the relief well could be observed. From the record of the project site it is seen that the discharge is of the order of 0.18 cusecs. It is also observed that the discharge from this pipe is coming out profusely.
6. Seepage water is also observed in the nearby vicinity from the downstream slope discharging into the toe drain.
7. Stagnant water is observed at the downstream toe drain location at many places.
8. It is also informed that at present the maximum level in the dam is restricted up to El. 122.0

Analysis of observations:

1. The project authorities informed that the dam section was brought to the designed section as recommended earlier. The rain cuts and choked drains etc were due to recent storm events.
2. It is also informed by the project authorities that the relief well from which water is flowing out is dug up to 15 mt depths only instead of the recommended 25 mts due to encountering of boiling sand conditions. The section is also provided with curtain grout below COT and upstream clay blanket as per design.
3. From the record of the discharge, it is observed that the rate of discharge is independent of the reservoir level.
4. On observing the nature of discharge, all officials present were of the opinion that piping from dam body appears to be a distant possibility.
5. The foundation geology at the river closure section consists of riverine boulders. As the bed rock is very deep, partial cutoff is provided with the help of curtain grouting up to 0.7 H below COT coupled with upstream clay blanket to reduce seepage pressure.
6. Therefore, it is natural that some discharge is expected through the relief well. Seepage analysis carried out also indicated that some discharge is expected in the relief well.
7. The seepage observed from downstream slope may also be due to charging up of the downstream slope because of recent rains.

Recommendations:

1. No connection between the reservoir level and discharge through the relief well is observed, the reservoir may be filled up to its designed Full Reservoir Level. The building up of water level beyond El. 122.0 shall be as per guidelines provided regarding initial filling of Reservoirs.
2. Discharge measurement needs to be continued.
3. Any abnormal increase in discharge with building up of water level beyond El. 122.0 may be immediately brought to the notice of CWC and reservoir level be brought back to El. 122.0.
4. As there may be a possibility of dislocation of particles due to discharge from relief well under pressure, it is recommended to drill two more relief wells at 3m c/c on either side of the present relief well up to 15mts deep.
5. The need for regular maintenance and cleaning of the clogged drains/pipes during monsoon is once again emphasized.
6. The toe drain shall be constructed with proper longitudinal slope and accumulation of water at downstream toe should be prevented.
7. It is of considered opinion that there is no need for grouting from top of the dam as recommended earlier.

**Status of Constitution of DSRP and details of Comprehensive Dam Safety Reviews/Inspections made
(As per information furnished by States/DSOs)**

Sl.No	State / DSOs	Permanent DSRP Yes / No	No. of Large Dams	No. of Dams Inspected	Percentage of Inspection	Remarks
1	Andhra Pradesh	Yes	142	10+2	8.5	
2	Bihar	Yes	24	20	83.33	
3	Chhattisgarh	Yes	258	258	99.60	
4	Gujarat	No	619	196	31.66	
5	Himachal Pradesh	HP does not own any project so no DSRP. However project owners in HP have been requested to constitute DSRP.				
6	Jharkhand	No	50			
7	Karnataka	Yes	230	138	60.00	
8	Kerala(Irrg.)	Yes	24	16	66.67	
9	Madhya Pradesh	Yes	898	63	7.02	
10	Maharashtra	Yes	2069	61	2.94	
11	Odisha	Yes	199	26	13	
12	Punjab	Yes	14			
13	Rajasthan	Yes	201	1	0.50	
14	Tamil Nadu	Yes	116	112	97	
15	Telangana	Yes	162	15	9.3	
16	Uttar Pradesh	No	115			
17	Uttarakhand	No	16			
18	West Bengal	No	29			
19	Bhakra Beas Management Board (BBMB)	Yes	3	3	100.00	
20	DamodarValleyCorp.(DVC)	Yes	4	4	100.00	
21	Kerala State Electricity Board (KSEB)	Yes	37	37	100.00	
22	Meghalaya Power Generation Corporation limited (MePGL)	No	8			
23	National Hydro Power Corp.(NHPC)	Yes	20	6	30.00	

Reported failure of dams in India (Year wise)

(As per information furnished by States/DSOs)

Sl. No	State	Name of Project	Type	Max. Height (M)	Year of Completion	Year of Failure	Cause of failure
Up to 1950							
1#	Madhya Pradesh	Tigra	Masonry	24.03	1914-17	1917	Overtopping followed by slide.
2	Maharashtra	Ashti	Earth	17.70	1883	1933	Slope failure.
3#	Madhya Pradesh	Pagara	Composite	27.03	1911-27	1943	Overtopping followed by breach.
1951-1960							
4#	Madhya Pradesh	Palakmati	Earth	14.60	1942	1953	Sliding failure.
5#	Rajasthan	Dakhya	Earth	N.A	1953	1953	Breaching.
6##	Uttar Pradesh	Ahrura	Earth	22.80	1953	1953	Breaching.
7#	Rajasthan	Girinanda	Earth	12.20	1954	1955	Overtopping followed by breaching.
8#	Rajasthan	Anwar	Earth	12.50	1956	1957	Breaching.
9#	Rajasthan	Gudah	Earth	28.30	1956	1957	Breached due to bad workmanship.
10#	Rajasthan	Sukri	Earth	N.A	N.A	1958	Breached by leakage through foundation.
11#	Madhya Pradesh	Nawagaon	Earth	16.00	1958	1959	Overtopping leading to breach.
12#	Rajasthan	Dervakheda	Earth	N.A	N.A	1959	Breaching.
13#	Gujarat	Kaila	Earth	23.08	1955	1959	Embankment collapsed due to weak foundation.
1961-1970							
14	Maharashtra	Panshet	Earth	53.80	1961	1961	Piping failure leading to breach.
15	Maharashtra	Khadakwasla	Masonry	60.00	1875	1961	Overtopping.
16#	Rajasthan	Galwania	Earth	N.A	1960	1961	Breaching.
17#	Rajasthan	Nawagaza	Earth	N.A	1955	1961	Breaching.
18#	Madhya Pradesh	Sampna	Earth	21.30	1956	1964	Slope failure on account of inappropriate materials.
19#	Madhya Pradesh	Kedarnala	Earth	20.00	1964	1964	Breaching.
20##	UttaraKhand	Nanaksagar	Earth	16.00	1962	1967	Breached due to foundation piping.
1971-1980							
21#	Gujarat	Dantiwada	Earth	60.96	1965	1973	Breach on account of floods.
22	Tamil Nadu	Kodaganar	Earth	12.75	1977	1977	Breached on account of floods.
23#	Gujarat	Machhu-II	Composite	20.00	1972	1979	Overtopping due to floods.
1981-1990							
24#	Gujarat	Mitti	Earth	16.02	1982	1988	Overtopping leading to breach.
1991- 2000							
25#	Madhya Pradesh	Chandora	Earth	27.30	1986	1991	Breach.
26*	Telangana	Kadam	Composite	22.50	1958	1995	Over topping leading to breach.
27#	Rajasthan	Bhimlot	Masonry	17.00	1958	-	Breached due to inadequate spillway capacity.
2001-2010							

28#	Gujarat	Pratappur	Earth	10.67	1891	2001	Breached on account of floods.
29#	Madhya Pradesh	Jamunia	Earth	15.40	1921	2002	Piping leading to breaching.
30	Orissa	Gurilijoremip	Earth	12.19	1954-55	2004	The abutment structure along with wing and return walls got undermined with foundation scouring.
31	Maharashtra	Nandgavan	Earth	22.51	1998	2005	Excessive rain causing water flow over the waste weir to a depth beyond the design flood lift.
32#	Madhya Pradesh	Piplai	Earth	16.73	1998	2005	Breach
33#	Rajasthan	JaswantSagar	Earth	43.38	1889	2007	Piping leading to breaching.
34	Telagana	Palemvagu dam	Earth	13.00	U/C	2008	Flash flood resulting in overtopping of the earth dam
35#	Madhya Pradesh	Chandiya	Earth	22.50	1926	2008	Breach.
36#	Rajasthan	Gararda	Earth	31.76	2010	2010	Examination for cause of failure by state authorities in progress.

Note:

- * First time dam failure happened in year 1958 due to inadequate spillway capacity and reconstructed in year 1964 that again failed in 1995.
- # Detailed technical report pertaining to reported dam failures awaited.
Madhya Pradesh-10 Dams, Rajasthan -11 Dams and Gujarat-5 dams
- ## Uttar Pradesh -2 Dams (1dam in UP& 1dam, namely Nanaksagar in Uttarakhand).

(As per information furnished by States/DSOs)

Sl. No.	State	Number of O&M Manuals	Status of Data book and O&M manual
1	Andhra Pradesh	1	Bhupathipalem Project.
2	Bihar	20	Data book & O&M manual of 2 large dams under preparation
3	Chhatisgarh	1	MinimataBango Dam. Preparation of O&M manuals have been requested.
4	Gujarat	1	Field offices have been requested for preparation of data book and O&M manuals.
5.	Himachal Pradesh	12&16	12 Nos data books & 16 nos O&M manuals have been received.
6.	Jharkhand	1	
7	Karnataka	9	Data books of 9 Dams completed and 1 under preparation. Preparation of O&M manuals have been requested.
8	Kerala(Irrg.)	-	Field authorities have been requested.
9	Madhya Pradesh	25	
10	Maharashtra	111	172 dams data books & 111 dams O&M received.
11	Odisha	7	96 Data books completed & 6 O&M manuals under progress.
12	Punjab	12	
13	Rajasthan	Data Book & O&M of important dams are under preparation	
14	Tamil Nadu	89	O&M rules for flood regulation of all 89 dams of TNWRD have been prepared.
15	Telangana	-	-
16	Uttar Pradesh	-	Field authorities have been requested for preparation of data book and O&M manuals.
17	Uttarakhand	-	
18	West Bengal	-	

19	BhakraBeasManagement Board(BBMB)	3	Digitization of Drawings is under process
20	Damodar Valley Corp. (DVC)	4	Completed
21	Kerala State Electricity Board (KSEB)	-	
22	Meghalaya Power Generation Corporation limited(MePGL)	-	
23	National Hydro PowerCorp.(NHPC)	18	Data Book & O&M Manuals for 18 dams completed and Teesta low Dam -IV is under preparation.

Note: Status as per information received from State Govts. / DSOs, further modification/updation, if any may be intimated.

(As per information furnished by States/DSOs)

Sl. No.	State	No. of Large Dams Completed	No. of Design Flood Review Completed	Percentage Progress
1	Andhra Pradesh	142	4	
2	Bihar	24		
3	Chhattisgarh	248	Setting up of hydrological unit under consideration	
4	Gujarat	619	159	25.69
5	Himachal Pradesh	19		
6	Jharkhand	50		
7	Karnataka	230	47	20.43
8	Kerala (Irrg.Dept)	24	19	79.12
9	Madhya Pradesh	898	228	25.39
10	Maharashtra	2069	28	1.35
11	Odisha	199	31	15.6
12	Punjab	14		
13	Rajasthan	201		
14	Tamil Nadu	116	106	91.38
15	Telangana	162		
16	Uttar Pradesh	115	Setting up of hydrological unit under consideration	
17	Uttarakhand	16		
18	West Bengal	29		
19	Bhakra Beas Management	3	3	100.00
20	Damodar Valley Corp.(DVC)	4	1	25.00
21.	Kerala State Electricity	37	37	100.00
22	Meghalaya Power Generation	8		
23	National Hydro Power	20	20	100.00

Note: Status as per information received from State Govts. / DSOs, further modification/updation, if any may be intimated.