सत्यमेव जयते

Dam Safety Act, 2021

National Committee on Dam Safety

Agenda Papers of 2nd Meeting

2nd June,2023
10:30 hours
209, 2nd Floor Committee Room
Central Water Commission, New Delhi

Ministry of Jal Shakti
Government of India
NDSA Secretariat
New Delhi

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AGENDA FOR 2ND MEETING OF THE NATIONAL COMMITTEE ON DAM SAFETY

DATE: 2nd June, 2023
VENUE: 2nd Floor, Committee Room, Central Water Commission, New Delhi
TIME: 10:30 Hrs.

Agenda Point 2.0: Confirmation of the minutes of 1st NCDS Meeting

The 1st meeting of the National Committee on Dam Safety (NCDS) was held on 2nd Aug 2022 at CWC, New Delhi. The approved minutes of the 1st meeting were circulated vide letter CWC/DSD-lI/1-33/2022/710-807 dated 23.09.2022. The Committee may confirm the minutes of the 1stmeeting of NCDS.

Agenda Point 2.1: Status of Notification of

iii) State Committees on Dam Safety (SCDS) and
iv) State Dam Safety Organizations (SDSO)

Decision Taken in the 1st NCDS Meeting:

The Chairman advised NDSA to pursue with the Chief Secretary and Principal Secretary (Water Resources) of the States, which have not yet constituted the SCDS or not yet established the SDSO, to comply expeditiously with the relevant provisions of DSA 2021.

Present Status:

i) All 28 States have constituted State Committee on Dam Safety and 3 UTs having specified dams have also constituted UT committee on Dam safety.

ii) All 28 States have established State Dam Safety Organisations and 3 UTs having specified dams have also established UT Dam Safety Organisation.

The State wise details of above are placed at **Annexure I**.

Agenda Point 2.2: Formulation of RULES and REGULATIONS under Section 54 of Dam Safety Act, 2021

Decision Taken in the 1st NCDS Meeting:

A roadmap was agreed to by the NCDS, wherein Regulations and Rules Sub-Committee will prepare on top priority the Regulations on 7 matters out of the 19 listed in Section 54 (2) of DSA, 2021, namely items:

(c) the details and form pertaining to the maintenance of log books or database under sub-section (1) of section 18;

(d) the qualifications, experience and training of the individuals responsible for safety of specified dams under section 23;

(e) the employment of competent engineers and their qualifications and experience for the purpose of investigation, design and construction of specified dams under sub-section (3) of section 26;

(g) the level of competent engineers for the dam safety units under section 30;

(h) the guidelines and check-lists for inspection of specified dams under clause (a) of sub-section (3) of section 31;

(o) time interval for updating the emergency action plan under clause (b) of sub-section (1) of section 36;

(q) the mandatory review of design flood of existing specified dams under clause (b) of sub-section (2) of section 38;

Present Status:

There are 19 subjects under Section 54(2) of the Dam Safety Act, for which regulations are to be framed

by the NDSA. As decided in the NCDS meeting, NDSA has prepared the 7 prioritized draft regulations (c,d,e,g,h,o,q) which are placed at **Annexure II**. These draft regulations have been shared with expert members of NCDS i.e Prof. C.V.R. Murty and Sh. D.K. Sharma for comments vide email dated 13.12.2022. These 7 draft regulations have also been shared with Members of NCDS vide email dated 09.01.2023 and State/UT WRD Secretaries for their comments vide email dated 25.01.2023. A reminder was sent to NCDS members and State/UT WRD Secretaries vide email dated 21.03.2023. Comments have been received from SDSOs of Tamil Nadu, Karnataka, Maharashtra and IMD; which are placed at **Annexure III**. These 7 draft regulations shall be placed before NCDS for finalization.

In addition, draft regulations on 6 other subjects have also been prepared which are as under:

1. *(i) the minimum number of set of instrumentations in the specified dams and the manner of their installation under sub-section (1) of section 32;*
2. *(j) the form, manner and time interval for forwarding the analysis of readings to the State Dam Safety Organization under sub-section (2) of section 32;*
3. *(k) the data requirements of hydro-meteorological stations in the vicinity of specified dams under sub-section (1) of section 33;*
4. *(l) the data requirements of seismological stations in the vicinity of specified dams under sub-section (1) of section 34;*
5. *(m) the suitable location and manner of collection, compliance, process and storage of data under sub-section (2) of section 34;*
6. *(r) the mandatory site-specific seismic parameter studies of existing specified dams under clause (c) of sub-section (2) of section 38;*

These are likely to be circulated shortly after firming up the same.

The remaining 6 regulations shall be taken up by NDSA in due course, which are as under:

1. *(a) the guidelines, standards and other directions for achieving the satisfactory level of dam safety assurance under sub-section (1) of section 16;*
2. *(b) the vulnerability and hazard classification criteria of specified dams under section 17;*
3. *(f) the quality control measures for the purpose of dam construction under sub-section (5) of section 26;*
4. *(s) the measures necessary to ensure dam safety by every owner of dam other than specified dams under section 46;*
5. *(n) the time interval of risk assessment studies to be carried out under sub-section (2) of section 35;*
6. *(p) the time interval for the comprehensive safety evaluation of specified dams under sub-section (1) of section 38;*

Agenda Point 2.3: Dissolution of All National Committees related to Dam Safety and other Inter-State Sub-Committees existing prior to enactment of The Dam Safety Act, 2021

Decision Taken in the 1st NCDS Meeting:

NCDS approved recommending the dissolution of the National Committee of Dam Safety and all other Inter-State Sub-Committees related to Dam Safety, which were formed prior to the enactment of the DSA 2021.

Present Status:

The earlier formed committee at national level and all its three sub-committees (Parambikulam Aliyar Project (PAP) System, Mahanadi River System, Subarnarekha River System) prior to enactment of the Dam Safety Act, 2021 have been dissolved vide MoJS letter No. R-24011/21/2021-Pen Riv Section-MOWR dated 19-12-2022. The copy of the same is placed at **Annexure-IV**.

Agenda Point 2.4: Technical Documentation – National Registry of Specified Dams

Decision Taken in the 1st NCDS Meeting:

The NCDS advised NDSA to establish a comprehensive database of all the specified dams in the country. Also, the NDSA shall obtain and compile from the State Governments and Dam Owners a detailed record of all failures and distresses, if any, in the said dams. Further, it was emphasized that the state-of-the-art technology be leveraged for this technical documentation, with a dynamic module that will be continually updated by the NDSA, SDSOs and Dam Owners.

It was suggested that to expedite the matter and to avoid the duplicity of cost & works, DHARMA, a web-based tool, developed by CWC may be got updated & modified to meet the requirements of NDSA, for maintaining data repository of Dams.

The Chairman also requested NDSA to prepare a list of all dams where NDSA is required to perform the role of Dam Safety Organisation

Present Status:

The comprehensive database of all the specified dams is under preparation in CWC/NDSA. The list of such specified dams has been sought from all SDSOs in NRLD format and excel files latest by 15.05.2023. A clarification regarding height of specified dams has been issued vide letter dated 31.03.2023 & circulated to all SDSOs. The same is attached as **Annexure V**. As on 27.04.23, 7162 specified dams (including both completed and under construction dams) have been reported by the states. The State wise details of specified dams as on 27.04.2023 are attached as **Annexure VI**.

The Salient Information of specified dams and detailed record of all failures and distresses has been sought from all SDSOs vide letter dated 16.11.2022. A copy of letter is placed at **Annexure VII**. The SDSOs have also been regularly reminded regarding the same in NDSA meetings held on 27.12.2022, 18.01.2023, 15.03.2023 and 11.04.2023.

The SDSOs of Maharashtra, Rajasthan, Karnataka, Madhya Pradesh, Uttar Pradesh, Uttarakhand have given partial information in this regard. However, comprehensive information from SDSOs is still awaited. Regular follow up with stake holders are being done by NDSA.

The work for renovation of DHARMA portal has been awarded to M/s Velocis Systems P Ltd. The work has started in Feb-2023. Work is being done as per the suggestions of committee formed for the purpose of monitoring the work. The beta version of the software is expected to be available by 15th June 2023.

List of 65 dams where NDSA is required to perform the role of State Dam Safety Organisation as per section 24 of DSA, 2021 were circulated to SDSO on 21 March 2023 for confirmation. The list of these dams are attached as **Annexure VIII**.

Agenda Point 2.5: Comprehensive Dam Safety Evaluation Procedures

Decision Taken in the 1st NCDS Meeting:

The Chairman stated that many guidelines have been prepared under the DRIP scheme. But, these guidelines need to be examined and updated by the scientific Sub-Committees. Until such time these guidelines are revised suitably and the associated Regulations and Rules are in place, the State Governments

and CPSUs shall utilize the existing guidelines and begin comprehensive Evaluation of the dams under their jurisdiction.

The NCDS sought each State Governments and CPSUs to submit to NDSA a detailed road map on the proposed strategy and methodology that they propose to adopt for undertaking the comprehensive Dam Safety Evaluation of Dams in their jurisdiction. The document shall list the proposed experts, organizations, institutes, agencies, etc., to be engaged for such studies, along with their past experience in the subject. The State Governments and CPSUs shall submit these documents through their respective SDSOs and SCDSs. All matters related to dam safety, but not limited to those listed in the Agenda Item, shall be addressed in the said document. NDSA shall place the documents before the NCDS for consideration, after due discussion on the said documents.

Present Status:

All the SCDS and SDSOs have been requested to comply with the above direction of NCDS and submit necessary confirmation to NDSA vide letter dated 09.11.2022. A copy of the letter is placed at **Annexure IX**.

Regular follow up being done by NDSA for the same.

Agenda Point 2.6: Emergency Action Plan and Disaster Management Initiatives

Decision Taken in the 1st NCDS Meeting:

The Chairman, NCDS directed States to ensure that all Dam Owners, based on the Dam Break Analysis, shall prepare an Emergency Action Plan for each dam after due consultation with all stakeholders in compliance to Section 36(1) of the Act

(a) Prepare Emergency Action Plan before allowing the initial filling of the reservoir and thereafter update such plans at regular intervals; and

(b) in respect of the dam which is constructed and filled before the commencement of this Act, prepare Emergency Action Plan within five years from the date of commencement of this Act and thereafter update such plans at regular intervals as may be specified by the regulations.

Present Status:

NDSA has written letter dated 31.10.2022 regarding preparation of Emergency Action plan to all SCDS and SDSO.The copy of the letters is placed at **Annexure X**.

Emergency Action Plan has been received in respect of Panchet Dam and Maithan Dam from Office of Chief Engineer (Civil), Damodar Valley Corporation, Maithan vide email dated 10.04.2023.

Regular follow up being done by NDSA for the same.

States present may inform action taken in this regard.

Agenda Point 2.7: Operation and Maintenance

Decision Taken in the 1st NCDS Meeting:

The Chairman, NCDS directed States to ensure in compliance to provisions of Section 28 of the Act, that:

(1) Every owner of the specified dam shall provide operation and maintenance establishment for the specified dam, and shall ensure that sufficient number of trained operation and maintenance engineers or technical persons is posted at each such dam.

(2) Every owner of the specified dam shall ensure that a well-documented Operation & Maintenance (O&M) Manual is kept at each of the specified dams and are followed at all times. O&M Manual shall include reservoir operation rule curves.

Present Status:

All the SCDS and SDSOs have been requested to comply with the above direction of NCDS and submit necessary confirmation to NDSA vide letter dated 09.11.2022.A copy of the letter is placed at **Annexure IX**.

Regular follow up being done by NDSA for the same.

States present may inform action taken in this regard.

Agenda Point 2.8: Reports of Safety related to specific dams submitted by SCDS

Decision Taken in the 1st NCDS Meeting:

Chairman, NCDS directed States to ensure that, the owner for each specified dam, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers in compliance to relevant provisions of the Act.

Present Status:

The following draft regulations related to above have been prepared by NDSA:

- *the qualifications, experience and training of the individuals responsible for safety of specified dams under section 23;*
- *the employment of competent engineers and their qualifications and experience for the purpose of investigation, design and construction of specified dams under sub-section (3) of section 26;*
- *the level of competent engineers for the dam safety units under section 30;*

The directions regarding competent level of engineers in the dam safety units of the specified dams will be issued after such regulations are finalized by NCDS.

Agenda Point 2.9: Establishment of Dam Safety Unit

Decision Taken in the 1st NCDS Meeting:

Chairman, NCDS directed States to ensure that, the owner for each specified dam, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers in compliance to relevant provisions of the Act.

Present Status:

All the SCDS and SDSOs have been requested to comply with the above direction of NCDS and submit necessary confirmation to NDSA vide letter dated 09.11.2022. A copy of the letter is placed at **Annexure IX**. The details of Dam Safety Units have been received from Karnataka, Maharashtra, Odisha & Tamil Nadu. The same is placed as Annexure **XI.**

Regular follow up being done by NDSA for the same.

States present may inform action taken in this regard.

Agenda Point 2.10: Pre and Post-Monsoon Inspection of Dams

Decision Taken in the 1st NCDS Meeting:

The Chairman, NCDS directed the States to ensure that every owner of a specified dam shall undertake every year, through their dam safety unit, a pre-monsoon and post-monsoon inspections in respect of each such dam.

The Chairman, NCDS directed that pre and post monsoon inspections of the dams shall be carried out in a time bound manner and reports submitted to NDSA. As the regulations /guidelines for carrying the inspections are under formulation by NDSA, till such time the existing format/check list issued by CWC may be followed for inspections.

Present Status:

It has been reported that pre monsoon inspection of 3919 dams were carried out during 2022 and post-monsoon inspections for about 5021 dams have been carried out till now. Further, pre-monsoon inspections of about 172 dams have been carried out as on 04.05.2023.

Based upon the inspection reports, the dams have been categorized under I, II or III by the respective SDSOs. As reported, the details of Category I with action taken and the list of Category II dams as per post monsoon inspection 2022-23 is placed as **Annexure XII.** NDSA has asked the concerned states to take necessary remedial measures for these dams.

The status of pre and post monsoon inspections as on 27.04.2023 is placed at **Annexure XIII**.

The category wise details of post monsoon inspection of 65 dams where NDSA is required to perform the role of State Dam Safety Organization as per section 24 of DSA, 2021 is attached as **Annexure XIV**.

There is shortfall in inspections as well as submission of reports in respect of Maharashtra, Madhya Pradesh and Chhattisgarh. Further, there is shortfall in submission of reports in respect of many states.

Therefore, status in this regard may be informed by States present in the meeting.

Agenda Point 2.11: Instrumentation of Dams, establishment of hydro-meteorological Station & Installation of seismological stations

Decision Taken in the 1st NCDS Meeting:

The Chairman, NCDS directed States ensure that every owner of a specified dam shall have a minimum number of such instruments at each specified dam, and installed in such manner as may be specified by the regulations for monitoring the performance of such dam.

Present Status:

NDSA has sent letter dated 03.04.2023 to all SCDS and SDSOs seeking information over following subjects:

i) Maintenance of Log Books (Section 18 of DSA, 2021)
ii) Instrumentation to be installed in every specified Dam (Section 32 of DSA, 2021)
iii) Hydro-meteorological Station (Section 33 of DSA, 2021)
iv) Seismological Station (Section 34 of DSA, 2021)
v) Initial filling of reservoirs (Section 27 of DSA, 2021)
vi) Operation & Maintenance (Section 28 of DSA, 2021)
vii) Dam Safety Unit (Section 30 of DSA, 2021)

A copy of the letter is placed at **Annexure XV**.

Regular follow up being done by NDSA for the same.

States present may inform action taken in this regard.

Agenda Point 2.12: Formation of Sub-Committees

Decision Taken in the 1st NCDS Meeting:

It was decided that **nine** Sub-Committees of the National Committee on Dam Safety shall be formed. These nine sub-committees are:

1. *Dam Safety Management*
2. *Hydraulic safety*
3. *Hydrological safety*
4. *Structural engineering and earthquake safety*
5. *Geological, Geophysical and Geotechnical Safety*

6. *Hydro-Mechanical and Electrical Systems Safety*
7. *Monitoring and Instrumentation*
8. *R&D and Standards development*
9. *Capacity development*

Present Status:

An advertisement for empanelment of experts has been published on the CWC website (https://cwc.gov.in/vacancies). As empanelment of experts is a continuous process and same should be continued to get comprehensive list of experts. NDSA also directed SDSOs to upload the Detailed Advertisement and Application link on their website also so as to give wide publicity. As on 27.04.23, 59 experts have applied for empanelment on the link and about 40 nominations have been received from Rajasthan, Karnataka, Gujarat and Odisha.

NDSA has also requested IITs, SDSOs, CPSUs for recommendation of domain experts for constitution of sub-committees in various domains for NCDS vide letter dated 16.01.2023. A copy of the letter is placed at **Annexure XVI.** Till date, 61 nominations have been received from IITs, SDSOs, CPSUs.

NDSA is in the process to finalize the constitution of two sub-committees namely, *"Structural Engineering & Earthquake Safety of Dams"*, and *"Capacity Development"*. The proposed composition of these Sub-committees is as under:

1. Structural Engineering and Earthquake Safety of Dams

1	Prof C.V.R. Murty, Professor, Civil Engineering, IIT Madras	Chairman
2	Dr I D Gupta, Former Director, CWPRS, Pune	Member
3	Prof Yogendra Singh, Professor, Deptt of EQ Engg., IIT Roorkee	Member
4	Sh Sankhdip Chaudhary, GeneralManager, NHPC Limited, Delhi	Member
5	Prof D Srinagesh, Professor of Practice, Department of Civil, Engineering, IIT Madras	Member
6	Sh Sanjay Belsare, Director General, Maharashtra Engineering Research Institute, Nashik, WRD Maharashtra	Member
7	Director, FE&SA, CWC, New Delhi	Member Secretary

2. Capacity Development

1	Sh D.K. Sharma, Chairman, HP Electricity Regulatory Commission, ShimIa	Chairman
2	Sh Ananth Ramaswamy, Professor & Course Co-ordinator M.Tech	Member
3	Sh N K Goel, Professor & Course Co-ordinator M.Tech Program under DRIP, lIT Roorkee	Member
4	Sh C P Singh, Chief Engineer, Bhakra Beas Management Board, Nangal, Punjab	Member
5	Chief Engineer, NWA, CWC, Pune	Member
6	Director, Training, CWC, New Delhi	Member Secretary

A meeting was held to finalise the above said sub-committees on 06.04.2023 and email sent to the proposed

members of sub-committees for willingness on 10.04.2023. The willingness from all concerned has been received. The draft Terms of References (ToR) for above two Sub-committees of NCDS has been shared with all the Members for comments vide email dated 24.04.2023 which are as follows:

1. ToR of Sub-Committee on **'***Structural Engineering and Earthquake Safety of Dams'*

a) Preparation of Guidelines/Manuals on:

i. Seismic Analysis of dams (Concrete & Embankment) and assessment criteria
ii. Assessment of Structural and Seismic Safety of dams
iii. Vulnerability Assessment of dams
iv. Dam Safety Evaluation including Seismic & Risk Assessment
v. Proposed rehabilitation & retrofitting of dams
vi. Any other aspect related to Structural Engineering and Earthquake Safety of Dams

b) Preparation of Draft regulations as per section 54(2) of the Dam Safety Act-2021 on the following:

i. The vulnerability and hazard classification criteria of specified dams under section 17
ii. The data requirements of seismological stations in the vicinity of specified dams under sub-section (1) of section 34
iii. The time interval of risk assessment studies to be carried out under sub-section (2) of section 35
iv. The time interval for the comprehensive safety evaluation of specified dams in respect of Structural and Seismic Safety under sub-section (1) of section 38
v. The mandatory site-specific seismic parameter studies of existing specified dams under clause (c) of sub-section (2) of section 38

c) Render technical advice on any other related matter as & when referred by NCDS.

2. ToR of Sub-Committee on ***'Capacity Development'***

a) Identify the areas, resource persons/institutes for capacity development in the field of Dam Safety

b) Prepare the course content for Short and Long Term Courses on dam safety

c) Prepare a road map for capacity building of States in the area of dam safety

d) Any other aspect related to Capacity Development

e) Render technical advice on any other related matter as & when referred by NCDS.

3. The comments on sub-committee on *"Structural Engineering & Earthquake Safety of Dams"* have been received and placed at **Annexure XVII.** The suggested ToR by the proposed sub-committee is as under:

(a) Finalize Draft Guidelines and Manuals on:

(1) Earthquake Analysis of Dams (Concrete and Embankment),
(2) Structural and Earthquake Vulnerability Assessment of Dams,
(3) Earthquake Risk Assessment of Dams,
(4) Structural Rehabilitation and Retrofitting of Dams, and
(5) Any other aspect related to Structural Engineering and Earthquake Safety of Dams.

(b) Finalize Draft Regulations as per Section 54(2) of the Dam Safety Act-2021 on:

(1) Criteria for Risk Classification of Specified Dams as per Section 17,
(2) Data Requirements of Seismological Stations in the vicinity of Specified Dams as per Section 34(1),
(3) Time interval for carrying out Risk Assessments of Specified Dams as per Section 35(2),
(4) Time interval for carrying out Comprehensive Safety Evaluations of Specified Dams in respect of Structural and Earthquake Safety as per Section 38(1), and
(5) Mandatory Site-Specific Earthquake Studies of Specified Dams to be undertaken as per Section 38(2)(c).

(c) Render Technical Advice on:

Any other related matter to Structural Engineering and Earthquake Safety of Dams, as and when referred by NCDS.

Views of the members on above may be given by all members.

Agenda Point 2.13: Activities performed by NDSA

To sensitise all the Central/State Governments, CPSUs, local authority, company who own, control, operate or maintain a specified dam, a National Workshop on Dam Safety Act, 2021 for dam safety governance in India was organized on 16thJune 2022 by CWC, DoWR, RD & GR, Ministry of Jal Shakti.

NDSA has organized meeting-cum workshop in all the four Regions in the country to sensitize and stress upon the states to implement the provisions of DSA, 2021 wherein the officers from State SCDS & SDSO and Central/State PSUs in the respective region participated in the meeting. The region-wise meeting details are as follows:

1. Southern Region at Coimbatore on 3rd September 2022
2. Northern Region at Chandigarh on 10th September 2022
3. Western Region at Pune on 11th November 2022
4. Eastern & North Eastern Region at Guwahati on 19th November 2022

The meetings of NDSA were held on 27.12.2022 and 18.01.2023 with SDSOs of seven states (Maharashtra, Madhya Pradesh, Odisha, Rajasthan, Gujarat, Chhattisgarh and Karnataka) having the maximum number of specified dams (more than 200 in each state) and the concerned Regional Directors of NDSA on the virtual platform under the chairmanship of Chairman, NDSA.

NDSA also conducted meetings on 15.03.2023 and 11.04.2023 with SDSOs of eleven states (Maharashtra, Madhya Pradesh, Odisha, Rajasthan, Gujarat, Chhattisgarh and Karnataka, Andhra Pradesh, Tamil Nadu, Telangana, Uttar Pradesh) having the number of specified dams more than 100 in each state and the concerned Regional Directors of NDSA on the virtual platform under the chairmanship of Chairman, NDSA& Member (D&R), CWC.

The meeting of NDSA under the chairmanship of Chairman, NDSA and Member (D&R), CWC was held with Members of NDSA to discuss various issues of NDSA on 19.05.2022, 25.08.2022, 28.10.2022, and 24.04.2023.

NDSA has organised outreach program at the iconic dam sites across the Country with community participation under “Azadi Ka Amrit Mahotsav (AKAM) for promoting Dam Tourism.So far, the outreach program has been organized on 4 dams which are as under:

1. Tungabhadra Dam (Karnataka) on 24.03.2023
2. Sardar Sarovar Dam (Gujarat) on 25.03.2023
3. Maithon Dam (Jharkhand) on 28.03.2023
4. Idduki Dam (Kerala) on 30.03.2023

Agenda Point 2.14: Others

Decision Taken in the 1st NCDS Meeting:

The Chairman desired that NDSA to host its own website and to form a logo at the earliest.

Present Status:

Static website of NDSA is active on the link *http://ndsa.mowr.gov.in*. The proposal for development of dynamic website of NDSA is under finalization.

For designing a distinct logo for NDSA, it has been decided that a competition should be held on "MY

GOV" inviting entries from the general public, organizations etc. with suitable prize money to the winner. The entries so received shall be evaluated through the committee and the recommendation of the committee shall be placed for the approval of competent authority.

Agenda Point 2.15: Any other Agenda with the Permission of Chair

सत्यमेव जयते

Dam Safety Act, 2021

National Committee on Dam Safety

Annexures of Agenda for 2nd Meeting

2nd June, 2023
10:30 – 17:00 hours
209, 2nd Floor Committee Room
Central Water Commission, New Delhi

Ministry of Jal Shakti
Government of India
NDSA Secretariat
New Delhi

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Annexure I

Status of Constitution of SDSO and SCDS by the States & UTs as per the Dam Safety Act, 2021

Sl. No.	State	Creation of SDSO		Creation of SCDS	
		Status	Notified on	Status	Notified on
1	Andhra Pradesh	Yes	30.06.2022	Yes	30.06.2022
2	Arunachal Pradesh	Yes	27.06.2022	Yes	27.06.2022
3	Assam	Yes	06.12.2022	Yes	10.06.2022
4	Bihar	Yes	13.06.2022	Yes	13.06.2022
5	Chhattisgarh	Yes	14.11.2022	Yes	07.07.2022
6	Goa	Yes	24.06.2022	Yes	24.06.2022
7	Gujarat	Yes	09.06.2022	Yes	09.06.2022
8	Haryana	Yes	04.07.2022	Yes	04.07.2022
9	Himachal Pradesh	Yes	24.05.2022	Yes	24.05.2022
10	Jharkhand	Yes	26.08.2022	Yes	26.08.2022
11	Karnataka	Yes	13.04.2022	Yes	29.06.2022
12	Kerala	Yes	07.11.2022	Yes	07.11.2022
13	Madhya Pradesh	Yes	15.06.2022	Yes	15.06.2022
14	Maharashtra	Yes	22.06.2022	Yes	15.06.2022
15	Manipur	Yes	20.05.2022	Yes	20.05.2022
16	Meghalaya	Yes	29.06.2022	Yes	29.06.2022
17	Mizoram	Yes	09.09.2022	Yes	10.06.2022
18	Nagaland	Yes	30.06.2022	Yes	26.05.2022
19	Odisha	Yes	27.06.2022	Yes	27.06.2022
20	Punjab	Yes	13.06.2022	Yes	13.05.2022
21	Rajasthan	Yes	27.06.2022	Yes	17.06.2022
22	Sikkim	Yes	14.10.2022	Yes	17.08.2022
23	Tamil Nadu	Yes	30.06.2022	Yes	30.06.2022
24	Telangana	Yes	15.06.2022	Yes	15.06.2022
25	Tripura	Yes	14.06.2022	Yes	14.06.2022
26	Uttarakhand	Yes	02.05.2022	Yes	02.05.2022
27	Uttar Pradesh	Yes	06.05.2022	Yes	26.04.2022
28	West Bengal	Yes	29.09.2022	Yes	27.06.2022
29	A & N Island (UT)	Yes	13.12.2022	Yes	13.12.2022
30	Jammu and Kashmir (UT)	Yes	26.07.2022	Yes	26.07.2022
31	Ladakh (UT)	Yes	17.10.2022	Yes	17.10.2022
Total		**31**		**31**	

Annexure II

Draft Regulations under Section 54 of Dam Safety Act, 2021

1.0 Regulation on "*the details and form pertaining to the maintenance of log books or database under sub-section (1) of section 18*";

Sub-section (1) of section 18: Every State Dam Safety Organisation shall maintain a log book or database for each specified dam under their jurisdiction recording therein all activities related to the surveillance and inspection and all important events related to dam safety and with such details and in such form as may be specified by the regulations

Proposed Draft:

Format of Log Book for Dam data recording purpose in digital form:

1 Cover Page

- Name of the Dam
- Name, Phone number and Email-id of Officer In-Charge

2 Salient Features of the Dam

3 (a) Record of data as per Performa below:

Name of Dam:		Date:
S.No.	Item	(to be recorded at 8am on daily basis)
1	Reservoir Water Level (m)	
2	Reservoir Inflow (cumec)	
3	Discharge (cumec)	
4	Seepage (lpm or cumec)	
5	Rainfall (mm) in the catchment Area Details of Rain gauge Stations i. Station 1 (Lat/Long/ Elev) ii. Station 2 (Lat/Long/ Elev)	

3 (b) Detail of maintenance works to be recorded with date:

1	Details of any repairs/modifications/ rehabilitation/addition work being carried out	
2	*Description in brief about the incidents/ failures/unusual events	

	(*i*) any structural damage to the dam and the appurtenant structure; (*ii*) any unusual reading of any instrument in the dam; (*iii*) any unusual seepage or leakage through the dam body; (*iv*) any unusual change in the seepage or leakage regime; (*v*) any boiling or artesian condition noticed below the dam; (*vi*) any sudden stoppage or unusual reduction in seepage or leakage from the foundation or body of the dam or any of its galleries; (*vii*) any malfunction or inappropriate operation of gates; (*viii*) occurrence of flood, the peak of which exceeds the available flood discharge capacity of the dam or seventy per cent. of the approved design flood; (*ix*) occurrence of flood, which resulted in encroachment on the available freeboard, or the approved design freeboard; (*x*) any unusual erosion in the near vicinity up to five hundred metres downstream of the spillway or waste-weir; (xi) any unusual seismic event; and (*xii*) any other occurrence which a prudent dam engineer may relate to	

4 Brief details of inspections:

S. No.	Item	Description/Remarks
1	Date of inspection	
2	Details of Team members who inspected	
3	Observations of Inspection Team	
4	Remedial measures suggested by Team	
5	Timelines within which the work is to be completed	
6	Review of past rehabilitation works suggested, executed within time frame assigned mentioning the status/quality of works	
7	Date of next inspection	

2.0 Regulation on*"the qualifications, experience and training of individuals responsible for safety of dams under section 23".*

<u>Section 23:</u> Every individual responsible for safety of specified dams and all activities related thereto shall possess such qualifications and experience and shall undergo such training as may be specified by the regulations.

<u>Proposed Draft:</u>

Qualifications, experience and training of individuals responsible for safety of dams

S.No.	Designation	Qualification	Experience	Training
1	Chief Engineer	Graduation in Civil/Mechanical Engineering from a recognized University/Institution	Minimum 5 years of experience in Dam Engineering/ Dam Safety aspects/ Hydro-mechanical/related works.	In the areas of Operation & Maintenance Protocols, inspection procedures of Embankment/Concrete/Masonry dams and appurtenant structures, and Emergency Action Plan.
2 a	Superintending Engineer Civil	Graduation in Civil Engineering from a recognized University/Institution	Minimum 4 years of experience in Dam Engineering/ Dam Safety aspects/ related works.	
2 b	Superintending Engineer Mechanical	Graduation in Mechanical Engineering from a recognized University/Institution	Minimum 4 years of experience in dealing with operation and maintenance of gates and Hydro-mechanical equipment/ related works.	
2 c	Superintending Engineer Electrical (wherever applicable)	Graduation in Electrical Engineering from a recognized University/Institution	Minimum 4 years of experience in dealing with Electro-mechanical equipment/ related works.	
3 a	Executive Engineer Civil	Graduation in Civil Engineering from a recognized University/Institution	Minimum 3 years of experience in dealing with Dam Engineering/ Dam Safety aspects/related works.	In the areas of Operation & Maintenance Protocols, inspection procedures of Embankment/ Concrete/ Masonry dams and appurtenant structures, and Emergency Action Plan.
3 b	Executive Engineer Mechanical	Graduation in Mechanical Engineering from a recognized University/Institution	Minimum 3 years of experience in dealing with operation and maintenance of gates and Hydromechanical equipment/related works.	
3 c	Executive Engineer	Graduation in Electrical Engineering	Minimum 3 years of experience in dealing with	

	Electrical	from a recognized University/Institution	Electro-mechanical equipment/ related works.	
4 a	Asst. Executive Engineer/Assistant Engineer Civil	Graduation in Civil Engineering from a recognized University/Institution	Minimum 2 years of experience in dealing with Dam Engineering/ Dam Safety aspects/related works.	In the areas of Operation & Maintenance Protocols, inspection procedures of Embankment/ Concrete/ Masonry dams and appurtenant structures
4 b	Asst. Executive Engineer/Assistant Engineer Mechanical	Graduation in Mechanical Engineering from a recognized University/Institution	Minimum 2 years of experience in dealing with operation and maintenance of gates and Hydromechanical equipment/ related works.	
4 c	Asst. Executive Engineer/Assistant Engineer Electrical	Graduation in Electrical Engineering from a recognized University/Institution	Minimum 2 years of experience in dealing with Electro-mechanical equipment/ related works.	
5 a	Junior Engineer Civil	Diploma in Civil Engineering from a recognized University/Institution	Minimum 2 years of experience in dealing with Dam Engineering/ Dam Safety aspects/ related works.	Operation & Maintenance Protocols, inspection procedures of Embankment/ Concrete/ Masonry dams and appurtenant structures
5 b	Junior Engineer Mechanical	Diploma in Mechanical Engineering from a recognized University/Institution	Minimum 2 years of experience in dealing operation and maintenance of gates and Hydromechanical equipment/ related works.	
5 c	Junior Engineer Electrical	Diploma in Electrical Engineering from a recognized University/Institution	Minimum 2 years of experience in dealing with Electromechanical equipment/ related works.	

Note:

1. Relaxation in experience may be considered for officers recruited after enactment of the Act i.e., 30.12.2021. In such cases, adequate training has to be provided before posting.

3.0 Regulation on *"the employment of competent engineers and their qualifications and experience for the purpose of investigation, design and construction of specified dams under sub-section (3) of section 26;"*

Sub-section (3) of section 26: Every agency referred to in sub-section (1) shall for the purpose of investigation, design and construction employ such qualified, experienced and competent engineers, as may be specified by the regulations.

(Sub-section (1) of section 26: Any construction or alteration of a specified dam shall be undertaken subject to investigation, design and construction being done by such agencies as may be accredited by the Authority or the State Government)

Proposed Draft:

Qualifications & Experience of competent Engineers employed by the agency should be as follows:

S. No.	Designation	Qualification and Experience
1.	Survey / Investigation expert	Graduation in Civil Engineering/Geology/Material Science from a recognized University/Institution; Minimum 8 years experience should be in survey investigation of Water Resource Projects.
2.	Dam Specialist (Concrete/ Masonry/ Earth/ Rockfill Dam) as the case may be	Graduation in Civil Engineering from a recognized University/Institution. Preference may be given to post graduates in Structural/ Geotechnical/ Earthquake Engineering or related areas; Minimum 8 years experience in Designs/ construction/rehabilitation of Concrete/ Masonry/ Earth/ Rockfill Dam as the case may be.
3.	Geologist	Graduation in Geology from a recognized University/Institution; Preference may be given to post graduates/ doctorates in Geology. Minimum 8 years of field experience in Geological investigations of Concrete/ Masonry/ Earth/ Rockfill Dam as the case may be.
4.	Hydrologist	Graduation in Civil Engineering from a recognized University/Institution, Preference may be given to post graduates in Hydrology/Water Resources Engineering; Minimum 8 years experience in Hydrology related areas
5.	Hydro Mechanical Expert	Graduation in Civil/Mechanical Engineering from a recognized University/Institution; Minimum 8 years experience in design/execution of Hydromechanical works in Water Resources projects.
6.	Material /Quality control Expert	Graduation in Civil Engineering from a recognized University/Institution; Minimum 8 years experience in Quality control aspects of Concrete/ Masonry/ Earth/ Rockfill Dams, selection of quarry/ Material etc.

7.	Instrumentation Expert	Graduation in Civil/ Mechanical/ Electrical/ Electronics & Instrumentation Engineering from a recognized University/Institution; Minimum 8 years experience in Instrumentation planning, technical specification of instruments and analysis of instrumentation data of Concrete/ Masonry/ Earth/ Rockfill Dams.
8.	Specialist on Dam Break Analysis and Emergency Action Plan	Graduation in Civil Engineering from a recognized University/Institution; Minimum 8 years experience in hydrological and hydraulic modeling using relevant advance modeling tools, Dam Break Analysis, Flood Routing, Inundation Mapping, preparation of Emergency Action Plan etc.

Note: All the key personnel shall be well versed with the provisions of relevant Indian standard codes and guidelines of the Central Government or the State Government of dam design as per, as the case may be.

4.0 Regulation on*"the level of competent engineers for the dam safety units under section 30";*

Section 30:*For each specified dam, the owner shall, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers as may be specified by the regulations.*

Proposed Draft:

Level of competent engineers for the dam safety units

S. No.	Height of dam from lowest foundation to the top of dam	Competent engineers for the dam safety units	Reviewing Level	Remarks
1	Height >= 60m	**Chief Engineer (Head)** Superintending Engineer Executive Engineer Assistant Executive Engineer/ Assistant Engineer	Head of Department, Water Resources Department	To be headed by senior most officer within the O&M establishment as the case may be.
2	Height >= 30m &< 60m	**Superintending Engineer (Head)** Executive Engineer Assistant Executive Engineer/ Assistant Engineer	Chief Engineer	
3	Height >= 15m &< 30m	**Executive Engineer (Head)** Assistant Executive Engineer/ Assistant Engineer	Superintending Engineer	
4	Height < 15m	**Assistant Executive Engineer/ Assistant Engineer (Head)** Junior Engineer	Executive Engineer	

5.0 Regulation on*"the guidelines and check-lists for inspection of specified dams under clause (a) of sub-section (3) of section 31";*

Section 31

(1) Every owner of a specified dam shall undertake every year, through their dam safety unit, a pre-monsoon and post-monsoon inspections in respect of each such dam.

(2) Without prejudice to sub-section (1), every owner of a specified dam shall inspect or cause to be inspected every specified dam by the dam safety unit, during and after every flood, earthquake or any other natural or man-made calamities, or if any sign of distress or unusual behaviour is noticed in the dam.

(3) Every owner of a specified dam shall,—

(a) carry out all inspections referred to in sub-section (1) and sub-section (2) in accordance with the guidelines and check-lists as may be specified by the regulations;

Proposed Draft:

Dam safety inspection is mandatory for every dam as per the schedule and conditions specified in the Act which are as given below.

1.1 Types of Dam Inspections

i. **Scheduled inspections** - Scheduled inspections should include the following steps:
   a) file review of past inspection reports, monitoring data, photographs, maintenance records, or other pertinent data as may be required;
   b) on site examination of the dam and its appurtenant works;
   c) preparation of inspection report as per the schedule dam safety inspection form and checklist.

ii. **Special (unscheduled) inspections** - Special inspections should focus on the following elements:
   a) review of relevant files or data,
   b) visual inspection, and
   c) preparation of inspection report as per the dam safety inspection form and checklist.
   d) More detailed site investigations may be required if the special inspection reveals deteriorating dam conditions.

2 Preparing for an Inspection

2.1 Scheduled and Special Inspection Team

A Scheduled Inspection (pre or post-monsoon inspection) and Special Inspection shall be performed by the officials of dam safety units at each dam, which are working for the operation or maintenance of the dam and its appurtenant works.

An Inspection Team is normally composed of civil engineers, mechanical engineers, geologists and instrumentation experts well versed with the inspection procedure, operation and maintenance of dams.

2.2 Review of Project Records

A complete dam project file should contain four kinds of information:

a) background information,
b) design information,
c) construction records

d) operation performance records.

Record of all previous inspections, recommendations and remedial actions taken in chronological order should be available on the project site and reviewed by the inspection team.

2.2.1 Recommended Information Database for Project Files

The project files created over the years are essential for a periodic inspection program. These records provide data that form a basis for making engineering safety and decisions and help familiarize and orient an inspector of Dam Safety Unit. The project files may also be needed for reference during emergency situations. Knowledgeable personnel familiar with a dam may be available during a crisis, so the information in the archives may be required to help resolve problems.

Project files should be compiled in a systematic format. A standardized, orderly, predetermined arrangement will facilitate the use of the records and accommodate future additions more readily. Generally, the project files will grow with time as new and additional information is added. In any case, the project files should contain a complete information database for the dam in question.

2.3 Types of File Review

Two types of file review are to be performed mainly as part of a dam safety inspection: (1) preliminary file review, and (2) comprehensive file review. The type of review will depend on the kind of inspection and an inspector's familiarity with the dam.

2.3.1 Preliminary File Review

A preliminary file review is an initial review of general information about the dam that will be inspected.

2.3.2 Comprehensive File Review

The goals of a comprehensive file review include

a) reveal potential dam safety deficiencies that may not be visible during the field examination, and note potential dam failure modes,
b) interpret conditions that may be seen onsite,
c) develop an inspection plan that will ensure a thorough onsite dam safety inspection, and
d) status/performance of previous repairs/rehabilitation works carried out

2.4 Background Information

Background information includes salient features, regional seismic and earthquake history (IMD data), soil surveys and land use, aerial and site photographs etc.

2.5 Operational Performance Records

All available operation, maintenance, inspection and instrumentation records maintained by an owner, regulatory agency, or another entity should be reviewed by inspection team. Records may be examined before, during, or after the inspection, depending on availability and the field inspection findings

Data collected from instrumentation and monitoring systems should be stored in the files in the prescribed format and form as per given regulations. Available monitoring records should be checked for location, the type of instrumentation, the method and period of data collected.

2.6 Information from other sources

Apart from data available at dam site, Newspaper accounts, Interviews with people associated with the project during its construction and operation, if available may be obtained.

3.0 Inspection Field Kit

A list of general equipment, specialized equipment, and safety equipment and protective clothing which may be useful to the inspection team is given in **Appendix-A**.

4.0 Inspector Personal Safety

Inspection team shall be aware about potentially hazardous sites at a dam site, which include steep or wet embankment slopes, spillways with high sidewalls or flowing water, spillway conduits, confined spaces, riprap areas with large stones, outlet structures holding water, shorelines with riprap and deep water, concrete embankments, sinkholes, outlet banks, foundation gallery without elevators and high grass/bushes.

The whirlpools, hydraulic jumps, and eddies created from the discharging water are extremely dangerous to boaters and swimmers.

5.0 Documenting an Inspection

It is important for the dam owner/operator to keep records throughout the entire life of the dam. Accurate records can better illustrate the dynamic nature of the structure and will help to identify the problems. The dam owner should create a permanent file in which inspection records, including documentation of actions taken to correct conditions found in the inspections may be kept.

5.1 Inspection Checklist

The inspection observation shall be recorded directly onto an inspection checklist. A detailed checklist for Dam Inspection is appended as **Appendix-B**.

5.2 Field Sketches

Apart from the standard inspection Performa as per the **Appendix-B**, it is a good practice to draw a field sketch of observed conditions.

5.3 Photographs

High resolution photographs (with date and location) must be taken during all kind of inspections especially for the parts which are having some specific safety issues.

5.4 Monitoring Data

Monitoring Data may include measurement of seepage review of spillway discharge rates, upstream and downstream water levels, readings from instruments such as piezometers. It is important that this data to be compiled in a systematic manner and placed in a permanent file.

5.5 Notebooks

An inspector may also keep a field notebook to document all the observations and findings in addition to a checklist.

5.6 Voice Recorders

Tape recorders, especially the micro- recorders, may be used when it is difficult to write during inspection of field conditions.

5.7 Online Entry in the Check List

The online entry of dam safety inspection to be done in the appropriate format and online available web tool **Global Positioning Sensors (GPS)**

Hand-held GPS units (included with most smart phones) may be used to record coordinates (location), elevation and other physical features such as seepage areas, cracks, sloughing and erosion.

5.8 Inspection Notes

Inspection should include recording the observations in written and digital forms.

5.9 Visual Inspection Documentation

The three types of visual records used during a dam safety inspection are 1) high resolution photographs, 2) video recordings and 3) annotated drawings and sketches.

(Appendix-A and Appendix-B have been attached separately)

6.0 Regulation on *"the time interval for updating the emergency action plan under clause (b) of sub-section (1) of section 36"*

Clause (b) of sub-section (1) of section 36:*In respect of the dam which is constructed and filled before the commencement of this Act, prepare emergency action plan within five years from the date of commencement of this Act and thereafter update such plans at regular intervals as may be specified by the regulations.*

Proposed Draft:

- The EAP should be updated every **10 years or, whenever any emergency situation arises;** whichever is earlier, with respect to the following:
  i. identification of the type of emergencies which are likely to occur in the operation of any reservoir;
  ii. identification of the likely catastrophic flood in the event of any failure of the dam and identification of probable inundation areas, population, structures and installations likely to be adversely affected due to such flood water released from the reservoir;
  iii. warning procedures, inundation maps and advance preparations for handling efficiently and in the best possible manner the likely adverse situations, especially to avoid loss of human life; should be in place not only for floods caused by dam failure but also for different flood release scenario.

iii. such other matters which may having regard to the geographical condition, size of the dam and other relevant factors as may be necessary.

iv. (An emergency situation in terms of Dam operation is defined as a condition which develops unexpectedly, endangers the structural integrity of the Dam and /or safety of lives and properties at the Dam site as well as in the areas downstream of the dam, and requires immediate action)

- The EAP should be updated immediately to incorporate any changes pertaining to officers/staff concerned, address and their contact details etc. This continuous exercise should be conducted together with local Govt. officials.

7.0 Regulation on " ***the mandatory review of design flood of existing specified dams under clause (b) of sub-section (2) of section 38"***

Clause (b) of sub-section (2) of section 38: *general assessment of hydrologic and hydraulic conditions with mandatory review of design floods as specified by the regulations;*

Proposed Draft:

Rational design of hydraulic structures must take into account the risk of flooding and consequent downstream flooding, on one hand, and economy of design, on other hand. The criteria for fixing spillway capacity of storage dams, as prevalent in India are covered in IS: 11223 – 1985, "Guidelines for fixing spillway capacity". As per the code, the inflow design flood for the safety of the dam can be 100 year flood, Standard Project Flood (SPF) or Probable Maximum Flood (PMF) based on dam size by using the static head and the gross storage behind the dam. The design flood is estimated using either Flood Frequency Approach or Hydro-meteorological approach. Since design flood estimation is based upon historical records of storms/flows, therefore, design flood review is a dynamic process.

Hence, Mandatory review of design flood should be carried out on:

(a) occurrence of any extreme event due to which flood has been equaled or exceeded the design flood, or;
(b) 10 years period; *whichever is earlier*.

******

Annexure III

Comments on draft regulations from Tamil Nadu, Karnataka, Maharashtra & IMD

Sr. No.	Regulation	Comments			
		Tamil Nadu	**Karnataka**	**Maharashtra**	**IMD**
1	Regulation on "*the details and form pertaining to the maintenance of log books or database under sub-section (1) of section 18*";	In the State of Tamil Nadu, the dam Engineers are maintaining a separate register for recording Seepage details, Water level, Inflow & outflow details, Storage capacity and rainfall details of the dam. The digitized format furnished now recording all the 4 details will be followed in future by the SDSO for maintaining the log book as per Section 18 of the Dam Safety Act, 2021. Hence, the proposed draft is accepted	Regular periodical maintenance and replacement of spares with date and next probable maintenance date of spillway/sluice gates should be added under section 3(b).	1. In addition to the details sought in the proposed draft Designation & Period of service shall be added. 2. For uniformity Standard Proforma of Salient Features is must 3. For 3(a). Sr. No.1,2, 3 & 5, recording this data for all dams is practically not possible. Hence, following criteria is proposed. Gated-Daily Basis Ungated-Weekly Basis Barrages-Weekly Basis K. T. Weir-Weekly Basis Particularly in Maharashtra, Rainfall is monitored by Hydrology Wing & published in public domain in PRAVAAH on WRD Portal. For Sr. No. 4, to maintain uniformity in information single unit of seepage is requested, preferably LPM	No comments
2	Regulation on*"the qualifications, experience and training of individuals responsible for safety of dams under section 23".*	In the State of Tamil Nadu, the rank of Chief Engineer/Superintending Engineer/Executive Engineer/Asst. Executive Engineer is based on only promotion from the level of Junior Engineer/Assistant Engineer. Individuals having experience in dams and dam safety related aspects are being preferred and followed for the level of Chief Engineer /Superintending Engineer / Executive Engineer Asst. Executive Engineer Assistant Engineer in State Dam Safety Organisation and the promotions will be decided by the State Government. The State of Tamil Nadu will follow the provisions of the Dam Safety Act, 2021, but, the draft shall be modified as per the State related Policy or decision.	1. Chief Engineer-Minimum of 3 years of experience irrespective of cadre (AE/AEE/EE/SE /CE) in Dam Engineering/ Dam Safety aspects/ Hydromechanical related works. 2.Superintending Engineer Civil & mechanical-Minimum of 3 years of experience irrespective of cadre (AE/AEE/EE/SE) in Dam Safety aspects related works 3.Executive Engineer Civil & Mechanical-Minimum of 3 years of experience irrespective of cadre (AE/AEE/EE) in dealing with Dam Engineering/ Dam Safety aspects/ related works. 4. Assistant Executive Engineer Civil & mechanical-Minimum of 2 years of experience irrespective of cadre (AE/AEE) in dealing with Dam Engineering/Dam Safety aspects/ relatedworks. 5. Junior Engineer	1. Executive engineer Civil, Mechanical & Electrical-As promotion of Executive Engineer is based on quota system for AEE, AE-1, SDE (All 3 Cadres of Graduates) & SDO (Cadre of Diploma). Hence, in qualification column Word *Graduation shall be replaced by "Graduation/ Diploma." 2. Asst. Executive Engineer/Assistant Engineer Civil, Mechanical & Electrical- Direct recruit cadres i.e., AEE & AE-1 are posted directly and they do not have prior experience as mentioned in Column of Experience" So this condition need to be relaxed for such cadres. Also, promotion of Deputy Engineer is based on quota system for AE-2 (Cadre of Graduates), JE (Cadre of Diploma). Hence, in qualification column Word *Graduation shall be replaced by "Graduation/ Diploma." 3. Junior Engineer Civil & Mechanical, Electrical-As JE post has direct recruitment quota for AE-2 (Cadre of Graduates) & JE (Cadre of diploma) in qualification column word *Diploma shall be replaced by "Graduation/ Diploma." Being first posting considering acute need of posts, No experience shall be necessary as they are working under experienced Chief Engineer to Deputy Engineer.	

<table>
<tr><th>Sr. No.</th><th>Regulation</th><th colspan="3">Comments</th><th></th></tr>
<tr><th></th><th></th><th>Tamil Nadu</th><th>Karnataka</th><th>Maharashtra</th><th>IMD</th></tr>
<tr><td></td><td></td><td></td><td>Civil &Mechanical-Minimum of 2 years of experience irrespective of cadre (JE) in dealing operation and maintenance of gates and Hydromechanical equipment/ related works.</td><td></td><td></td></tr>
<tr><td>3</td><td>Regulation on “the employment of competent engineers and their qualifications and experience for the purpose of investigation, design and construction of specified dams under sub-section (3) of section 26”</td><td>In the State of Tamil Nadu, the investigation and design of specified dams will be carried out by the concerned Field Engineers and Departmental Engineers of WRD. Only the construction or alteration of specified dams will be given to the private agency for carrying out the works. Hence, the proposed draft shall be modified accordingly.</td><td>No comments</td><td>No comments</td><td></td></tr>
<tr><td>4</td><td>Regulation on“the level of competent engineers for the dam safety units under section 30”;</td><td>The Proposed Draft furnished for the Level of competent engineers for the dam safety units are already being followed in the State of Tamil Nadu and also it is informed that, Dam Safety Unit for all the 128 dams (90 WRD+38TANGEDCO) in the State of Tamil Nadu have already been formed. Hence, the proposed draft is accepted.</td><td>It is recommended to introduce Chief Engineeras the accepting level officer for all types of dam irrespective of height of dam for effective functioning.</td><td>
<table>
<tr><th>Height of dam from lowest foundation to the top of dam</th><th>Competent engineers for the dam safety units</th><th>Reviewing Level</th></tr>
<tr><td>Height >= 60m & Gated dam having height >= 30m 1)</td><td>Superintending Engineer (Civil) Executive Engineer (Civil) Executive Engineer(Mech) Deputy Engineer(Civil)</td><td>Chief Engineer</td></tr>
<tr><td>Height >= 30m & < 60m and Gated dam having height >= 15m</td><td>Superintending Engineer (Civil) Executive Engineer (Civil) Executive / Deputy Engineer (Mech) Deputy Engineer. (Civil)</td><td>Chief Engineer</td></tr>
<tr><td>Height >= 15m & < 30m and Gated dam having height < 15m</td><td>Executive Engineer (Civil) Deputy Engineer (Mech) Deputy Engineer. (Civil)</td><td>Superintending Engineer</td></tr>
</table>
</td><td></td></tr>
</table>

Sr. No.	Regulation	Comments			
		Tamil Nadu	**Karnataka**	**Maharashtra**	**IMD**
				Height < 15m & Ungated | Deputy Engineer (Civil) *Junior Engineer (Civil)* | *Executive Engineer*	
5	Regulation on *"the guidelines and check-lists for inspection of specified dams under clause (a) of sub-section (3) of section 31"*	In the State of Tamil Nadu, all the following 4 periodical monsoon inspections namely Pre-Monsoon, Monsoon-I, Monsoon-l and Post-Monsoon as tabulated below for all the 128 specified dams (90VWRD + 38 TANGEDCO) are being carried out by the respective Inspecting Dam Engineers. Pre-Monsoon 10t April to 14 June Monsoon-I-15th Jun 15Aug Monsoon II- 16th Aug-14th Nov Post Monsoon 15th November-9th April of succeeding year. Also, the Scheduled Dam in the Guidelines safety Inspection, Instructions and Forms for Safety Inspection of Dams published by CWC during January 2018 are also being followed for the inspection of specified dams by the Inspecting Dam Engineers. Now the proposed draft for dam safety inspection (new addition) as per the schedule and conditions specified in the Act furnished now will be communicated to the dam Engineers and will be followed in future. Hence, the proposed draft is accepted.	Sub para 2.3.3 writing History reports have not been written for most of the dams. Only project reports are available. By employing retired engineers, who were involved in the project during construction time, or by outsourcing. History report can be got written. The documents maintained under Para 2.2, 2.2.1, 2.3, 2.3.1, & 2.3.2 can be compiled to write the History report.	Using single checklist for all specified dams irrespective of type of dam otherwise it will increase unnecessary burden of paper work on field staff and SDSO. Separate checklist for Gated dams, Ungated dams, Barrages and K.T. Weir is requested to make inspection procedure simple.	
6	Regulation on *"the time interval for updating the emergency action plan under clause (b) of sub-section (1) of section 36"*	The Proposed Draft furnished for the "time interval for updating the Emergency Action Plan" is accepted.	No comments	No comments	

Sr. No.	Regulation	Comments			
		Tamil Nadu	**Karnataka**	**Maharashtra**	**IMD**
7	Regulation on "*the mandatory review of design flood of existing specified dams under clause (b) of sub-section (2) of section 38"*	The Proposed draft furnished for the review of design flood of existing specified dams is accepted.	No comments	No comments	

Annexure IV

OM Dated 19.12.2022

R-15012/1/2022-Pen Riv Section-MOWR

I/78708/2022

No. R-24011/21/2021-Pen Riv Section-MOWR
Government of India
Ministry of Jal Shakti
Department of Water Resources, RD&GR
(Peninsular Rivers Wing)
****

Room No. 353, C-Wing
Krishi Bhawan, New Delhi
Dated: 19-12-2022

To

Chairman,
National Dam Safety Authority,
Central Water Commission,
R K Puram, New Delhi 110066

Subject: - Dissolution of National Committee on Dam Safety (NCDS) and its Sub-Committees existing prior to enactment of the Dam Safety Act, 2021.

Sir,

I am directed to refer to NDSA's letter no. CWC/DSD-II/1-33/2022/1139-1142 dated 07.12.2022 on the subject above and to communicate that consequent to the enactment of Dam Safety Act , 2021 and constitution of the National Committee on Dam Safety under this Act; it is stated that the earlier formed Committee at the national level and all its three sub-committees prior to the enactment of the Dam Safety Act, 2021 are hereby dissolved. Accordingly, it is requested to take necessary forthwith actions in the matter.

Yours faithfully,
Signed by Abhiram Kumar
Date: 20-12-2022 17:40:56

(Abhiram Kumar)
Under Secretary to the Govt. of India
Tel: - 011-23383059
Email- uspenriv-mowr@nic.in

Annexure V

NDSA Height Clarification letter

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
National Dam Safety Authority
O/o Member (Regulation)

Letter no. NDSA/MRG/GEN/2022/ 1 – 6 Date: 31.03.2023

To,

Member (Technical),
NDSA, New Delhi

Sub: Height of Specified Dam under DSA, 2021 - regarding.

This is with reference to the subject matter regarding the clarification on the height of specified Dam under DSA, 2021.

In this regard, finalized note regarding dam height in respect of Concrete Dam, Embankment Dam and Barrages (with approval of Chairman, NDSA) is attached herewith for circulation to all SDSOs and concerned authorities.

Yours sincerely,

Encl: Note on height of specified dam

31.3.23

S. K. Sharma,
Director,
O/o Member (Regulation)

Copy for kind information to :

1. Chairman, NDSA, New Delhi and Member (D&R), CWC.
2. Members of NDSA

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Explanatory Note on
Height of Specified Dam under DSA, 2021

As per Dam Safety Act, 2021, a specified Dam is defined as

(x) "specified dam" means a dam constructed before or after the commencement of this Act, which is,—

(i) above fifteen metres in height, measured from the lowest portion of the general foundation area to the top of dam; or

(ii) between ten metres to fifteen metres in height and satisfies at least one of the following, namely:—

(A) the length of crest is not less than five hundred metres; or

(B) the capacity of the reservoir formed by the dam is not less than one million cubic metres; or

(C) the maximum flood discharge dealt with by the dam is not less than two thousand cubic metres per second; or

(D) the dam has specially difficult foundation problems; or

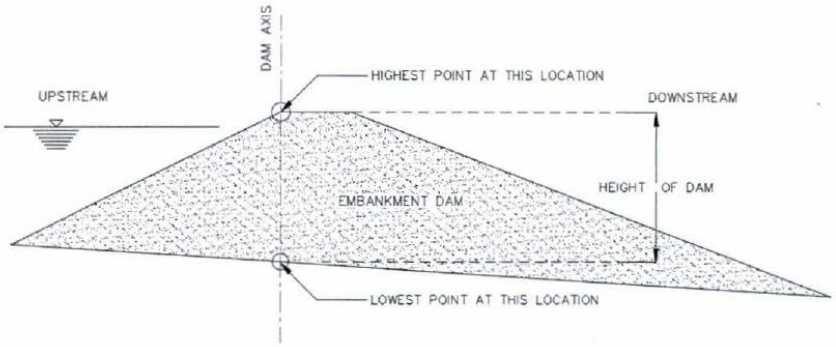
(E) the dam is of unusual design;

Since a specified Dam (which also includes Barrages as per Cl 4(e) of DSA, 2021) is a three dimensional object with unique layout, there has been a need to specify at which location "Top of Dam" and "Lowest portion of General Foundation Area" are to be considered.

In this regard, the following clarifications are proposed:

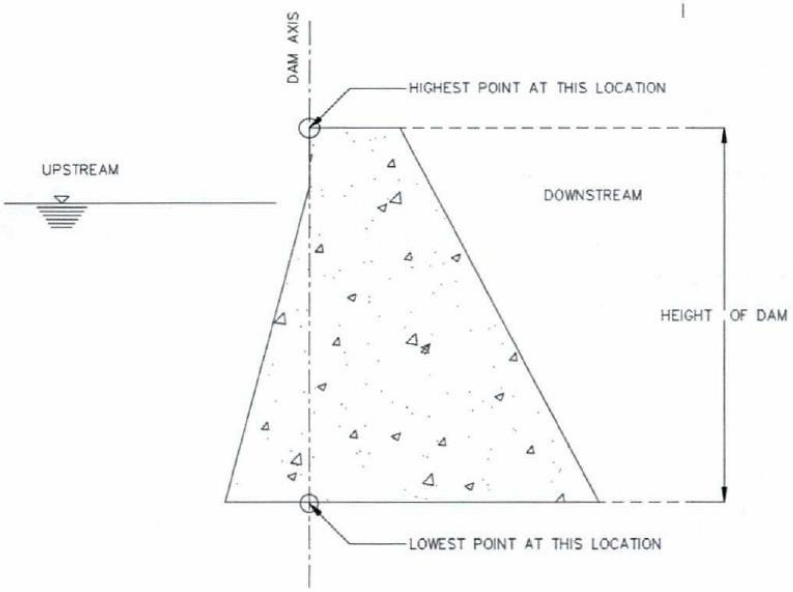
1. **Concrete and Embankment Dams**

   "Top of Dam" and "Lowest portion of General Foundation Area" in case of Dams (Embankment or Solid Gravity including Earthen embankment, Rockfill, Masonry, Concrete, CFRD, RCC etc.) shall be considered at Dam axis (i.e. A vertical plane passing through Upstream edge of Dam crest) (Figure 1 & 2)



EMBANKMENT DAM

Figure 1



CONCRETE GRAVITY DAM

Figure 2

A. Top of Dam (Figure 1 & 2)

i. While determining highest point of Dam, any parapet or railing shall be neglected.

ii. Highest point of Dam shall not be lower than FRL + corresponding Freeboard or MWL + corresponding freeboard.

B. Lowest portion of general foundation area of Dam:

a) For concrete dams (Figure 2):

The lowest foundation level at which Dam axis (as defined above) meets the foundation level. However, any local dental excavation for preparing the dam foundation as well as cut off trench (if any provided) shall be neglected.

b) For Embankment Dams (Figure 1):

The lowest foundation level at which Dam axis (as defined above) meets the river bed level. However, any local dental excavation for preparing the dam foundation as well as cut off trench (if any provided) shall be neglected.

2. Barrages

In case of Barrages, the top level shall be taken as a level higher of the following:

i) Pond Level + Provided Freeboard limited to 2.0 m

ii) High Flood Level + Provided Freeboard limited to1.50 m

For determining lowest portion of General foundation area, a vertical plane passing through upstream edge of Service Gate Seal shall be considered. (Figure 3)

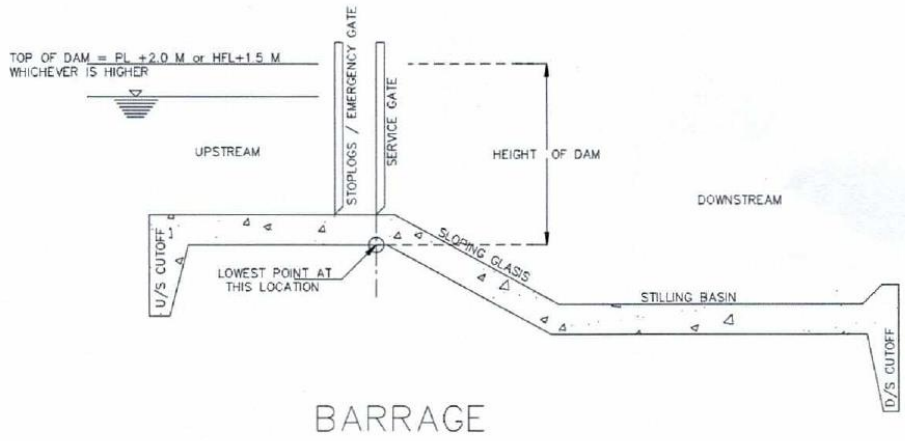


Figure 3

Annexure-VI

State wise details of specified dams as on 27.04.2023

S.N.	State	Specifed Dams* Reported so far (under updation)
1	Andaman & Nicobar Island	2
2	Andhra Pradesh	166
3	Arunachal Pradesh	4
4	Assam	5
5	Bihar	26
6	Chhattisgarh	258
7	Goa	5
8	Gujarat	632
9	Haryana	1
10	Himachal Pradesh	29
11	Jammu & Kashmir	15
12	Jharkhand	79
13	Karnataka	232
14	Kerala	61
15	Ladakh	2
16	Madhya Pradesh	1409
17	Maharashtra	3153
18	Manipur	4
19	Meghalaya	9
20	Mizoram	1
21	Nagaland	1
22	Odisha	204
23	Punjab	16
24	Rajasthan	325
25	Sikkim	2
26	Tamil Nadu	128
27	Telangana	184
28	Tripura	1
29	Uttar Pradesh	147
30	Uttarakhand	25
31	West Bengal	36
	Total	**7162**

NDSA letter regarding salient information of dams and detailed record failure to all SDSO dated 16.11.2022

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन नदी विकास एवं गंगा संरक्षण विभाग
सदस्य (तकनीकी), राष्ट्रीय बाँध सुरक्षा प्राधिकरण

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Dept. of Water Resources, RD&GR
Member(T), National Dam Safety Authority

F. No. 3/1/2022/NDSA/M(T)/ 16.11.2022

Sub: Furnishing information on a detailed list of all specified dams, a detailed record of all failures and distresses of the said dams

Dear,

The Dam Safety Act (DSA), 2021 has become effective from 30th Dec 2021. **Section 22** of this Act states that *"Every owner of the specified dam shall equip its organisation with the state-of-the-art information technology tools to store, retrieve, and distribute the data related to the dam safety and dam performance".*

Further, the Act also states that "Every owner of the specified dam shall furnish all such information to the State Dam Safety Organisation and the Authority as and when required by them".

Given the above, it is proposed that every State Dam Safety Organization shall prepare an *Emergency Action Plan* for each dam and a *Record of Dam Failures and Distresses, if any,* and share the same with the NDSA through SCDS.

It is requested that compliance with the above actions as per DSA, 2021 may be undertaken on top priority.

Yours Sincerely

16/11/2022

S.K. Sibal
(Member, Technical, NDSA)

To: As per the list attached

आठवां तल(दक्षिण), सेवा भवन
राम कृष्ण पुरम, नई दिल्ली -110066
दूरभाष: 011-29583413,
ई मेल: memt-ndsa@gov.in
♦जल संरक्षण-सुरक्षित भविष्य♦

8th Floor (South),Sewa Bhawan,
R.K. Puram, New Delhi-110066
Tel: 011-29583413,
E-mail: memt-ndsa@gov.in
♦Conserve Water- Save Life♦

(A) Copy necessary action to:

I) Regional Directors. They may pursue the matter with respective authorities for timely action:

1) **Sh Bhupesh Kumar,** SE(C), IBO & Regional Director NR, NDSA, Block 4, 6th Floor, Kendriya Sadan, Sector 9A Chandigarh, e-mail: [secochandigarh-cwc@nic.in]
2) **Sh R. Thangmani,** Director (Mon) CSRO & Regional Director, SR, NDSA, Neervalam, R-81, TNHB Colony, West Velacherry, Chennai. E-mail: [dirmoncoimbatore-cwc@nic. in]
3) **Sh Sudhir Kumar,** Director (M&A), BBO & Regional Director, E&NE R, NDSA, CWC Complex, 2nd Floor, P.O.- Guwahati University, Guwahati. E-mail: [dirrnaguwahati-cwc@nic.in]
4) **Sh Umbarje Harish Girish,** Director (M&A), MCO & Regional Director, WR, NDSA, NINA, Sinhagad Road, Khadakwasla, Pune. E-mail: [dirmapune-cwc@nic.in]

II) Shri Sarbjit Singh Bakshi, Director, NDSA Secretariat, New Delhi.

(B) Copy for information to:

1) Secretary, DoWR, RD &GR, MoJS, New Delhi
2) Chairman NCDS & Chairman CWC, MoJS, New Delhi
3) Chairman NDSA & Member (D&R), MoJS, New Delhi

To,

1. Chief Engineer, SDSO & Hydrology, Water Resources Department, Vijayawada, Andhra Pradesh, [Email: ce_hydrology@ap.gov.in]
2. Superintending Engineer (S&I), Itanagar, Arunachal Pradesh [Email: samanronrang@gmail.com]
3. Chief Engineer, Central Design, Research & Quality Control, W.R.D., Patna, Bihar [Email: sdsobihar@gmail.com]
4. Superintending Engineer Circle IV, WRD, Gogal, Margao, Goa [Email: ankush.gaunker@gmail.com]
5. Chief Engineer (North Gujarat) & Additional Secretary, Narmada, Water Resources, Water Supply and Kalpsar Department, Gujarat [Email: ce-ng-nwrws@Gujarat. gov.in]
6. Superintending Engineer, YWS(S), I&WRD), Delhi, (SDSO Hariyana) [Email: mahadev395@gmail.com]
7. Dy. Chief Engineer, Directorate of Energy, GoHP, Shimla, Himachal Pradesh Email: djjayin@gmail.com]
8. Sr General Manager, Civil, Jammu Kashmir Power Development Corp. [Email:babbisharma803@gmail.com]
9. Chief Engineer, Design, Master Planning and Hydrology, WRD, Ranchi, Jharkhand [Email: cedesign-wrd-jhr@nic.in]
10. Chief Engineer, DSO, A R Circle, Bangalore, Karnataka [Email: cedsobengaluru@gmail.com]
11. Chief Engineer, Dam Safety Organization, WRD, Bhopal, Madhya Pradesh [Email: sdso_bhopal@yahoo.co.in, encwrbpl@mp.nic.in]
12. Chief Engineer, Hydrology & Dam Safety, Nashik, Maharashtra [Email: cehpswnasik@gmail.com]
13. Superintending Engineer, Irrigation Circle No-II, WRD, Imphal, Manipur [Email: drip.manipur@gmail.com]
14. Addl. Chief Engineer (C), Hydro Planning, MePGCL, Shillong, Meghalaya [Email: bloomingwahlang@gmail.com]
15. SE, Urban Cell, O/o E-In–C, Public Health Engineering Department, Aizawl, Mizoram, [Email: chhetryanup@gmail.com]
16. Addl. Chief Engineer (Civil), Department of Power, Kohima, Nagaland [Email: addlcec.kohima@gmail.com]
17. Chief Engineer, Dam Safety, Bhubaneswar, Odisha [Email: cedamsafety.odisha@gmail.com]
18. Chief Engineer, SDSO, WRD, Punjab [Email: cesdsopb@gmail.com]
19. Chief Engineer, SDSO, Water Resources Department, Jaipur, Rajasthan [Email: ceswrpd.wr@rajasthan.gov.in]
20. Chief Engineer, SDSO, Water Resources Department, Chennai, Tamil Nadu [Email: ceomwro@gmail.com]
21. Chief Engineer, Central Designs Organisation, I&CAD Department, Hyderabad, Telangana, [Email: sdsotelangana2022@gmail.com]

22. Managing Director, Tripura Power Generation Ltd., Banamalipur, Agartala, Tripura [Email: managing.director@tsecl.in]
23. Chief Engineer, Dam Safety, I&WR Department, Lucknow, Uttar Pradesh [Email: cedesigniduplu-up@nic.in]
24. Chief Engineer, State Dam Safety Organization. Irrigation Dept, Dehradun, Uttarakhand, [Email: ce.ddn.id@gmail.com]
25. Chief Engineer (Design & Research), Irrigation & Waterways Directorate, Govt. of West Bengal. Kolkata [Email: ce-dr@wbiwd.gov.in]
26. Chief Engineer, Office of the Chief Engineer, PHE I&FC, Head Quartered at Kargil, Government of Ladakh-194103. [Email: cepheifcladakh@gmail.com]

Annexure-VIII

65 dams where NDSA is required to perform the role of State Dam Safety Organisation

A) Dams owned by CPSUs

NHPC(20)				
Sl. No.	**Name of Dam**	**O&M by**	**Located in**	**Year of completion**
1	Bairasiul Dam	NHPC	Himachal Pradesh	1981
2	Chamera-I Dam	NHPC	Himachal Pradesh	1994
3	Chamera-II Dam	NHPC	Himachal Pradesh	2003
4	Chamera-III Dam	NHPC	Himachal Pradesh	2012
5	Chutak barrage	NHPC	Jammu & Kashmir	2012
6	Dhauliganga Dam	NHPC	Uttarakhand	2005
7	Dulhasti Dam	NHPC	Jammu & Kashmir	2007
8	Kishanganga Dam	NHPC	Jammu & Kashmir	2018
9	Nimoobazgo Dam	NHPC	Jammu & Kashmir	2013
10	Parbati-III rock fill Dam	NHPC	Himachal Pradesh	2014
11	Rangit dam	NHPC	Sikkim	1999
12	SALAL (concrete Dam)	NHPC	Jammu & Kashmir	1987
13	SALAL(rock fill Dam)	NHPC	Jammu & Kashmir	1987
14	Sewa-II dam	NHPC	Jammu & Kashmir	2010
15	Tanakpur barrage	NHPC	Uttarakhand	1992
16	Teesta low Dam-III barrage	NHPC	West Bengal	2013
17	Teesta low Dam-IV	NHPC	West Bengal	2016
18	Teesta-V Dam	NHPC	Sikkim	2007
19	Uri-I barrage	NHPC	Jammu & Kashmir	1997
20	Uri-II Dam	NHPC	Jammu & Kashmir	2013
Narmada Hydro Development Corporation(NHDC)(2)				
21	Indirasagar	NHDC	Madhya Pradesh	2006
22	Omkareshwar	NHDC	Madhya Pradesh	2007
NTPC(1)				
23	Kol Dam	NTPC	HimachalPradesh	2015

BBMB(4)				
24	Bhakra Dam	BBMB	Himachal Pradesh	1963
25	Nangal	BBMB	Punjab	1963
26	Pandoh	BBMB	Himachal Pradesh	1977
27	Pong (Beas Dam)	BBMB	Himachal Pradesh	1974

Damodar Valley Corporation(DVC)-(4)				
28	Tilaiya	DVC	Jharkhand	1953
29	Konar	DVC	Jharkhand	1955
30	Maithon	DVC	Jharkhand	1957
31	Panchethill	DVC	Jharkhand	1959
NEEPCO-(8)				
32	Bichom Dam	NEEPCO	Arunachal Pradesh	2018
33	Doyang Rockfill impervious Dam	NEEPCO	Nagaland	2000
34	Khandong Dam	NEEPCO	Assam	1984
35	Pare Dam	NEEPCO	Arunachal Pradesh	2018
36	Ranganadi Dam (Panyor lower dam)	NEEPCO	Arunachal Pradesh	2002
37	Tenga Dam	NEEPCO	Arunachal Pradesh	2018
38	Tuirial Dam	NEEPCO	Mizoram	2017
39	Umrong Dam (Kopili Power Station)	NEEPCO	Assam	1988
SJVNL-(1)				
40	Napthajhakri	SJVNL	Himachal Pradesh	2004
Tehri Hydro Development Corporation Limited-(2)				
41	Koteshwar HEP	THDCIL	Uttarakhand	2011
42	Tehri HPP	THDCIL	Uttarakhand	2006
Kudremukh Iron Ore Company Limited-(1)				
43	MundawadTank	KIOCL	Karnataka	1994
Steel Authority of India Limited Rourkela (1)				
44*	Mandira	SAIL Rourkela	Odisha	#

B) Dams owned by one state and located in another state/inter-state dams

Sl. No.	Name of Dam	O&M by	Located in	Year of completion
45	Batane	Govt. of Bihar &Govt.ofJharkhand.	Jharkhand	1990
46	Baigul	UttarPradesh	Uttarakhand	1968
47	Mullaperiyar Dam	TamilNadu WRD	Kerala	1895
48	Nagarjuna Sagar Project	Common to both Andhra Pradesh &Telangana states	Andhra Pradesh & Telangana	1955
49	NanakSagar	Uttar Pradesh	Uttarakhand	1962
50	Parambikulam	TamilNadu WRD	Kerala	1967
51	Peruvarippallam	TamilNadu WRD	Kerala	1971
52	Rajghat	Betwa River Board	Madhya Pradesh & Uttar Pradesh	2000
53	Ram Ganga Saddle	UttarPradesh	Uttarakhand	1974
54	Ram Ganga	UttarPradesh	Uttarakhand	1974
55	Srisailam Project	common to both Andhra Pradesh & Telangana states	Andhra Pradesh & Telangana	1982
56	Thunakkadavu	TamilNadu WRD	Kerala	1965
57	Tungabhadra Dam	Tungabhadra Board	Andhra Pradesh &Karnataka	1953
58	Massanjore Dam (Mayurakshi Reservoir Project)	I&WD ,W.B	Jharkhand	1955
59*	Jalaput	Odisha&Andhra Pradesh	Andhra Pradesh	#
60*	Dhora	UPI&WRD	Uttrakhand	1960
61*	Gangau Weir	UPI&WRD	Madhya Pradesh	1915
62*	Rangawan	UPI&WRD	Madhya Pradesh	1957
63*	Bariyarpur Weir	UPI&WRD	Madhya Pradesh	1906
64*	Bhimgoda	UPI&WRD	Uttrakhand	#
65*	Bambasa Barrage	UP I&WRD	Uttrakhand	#

*These Dams have been added in the list based on information received from states.
States are requested to furnish the information.

NDSA Letter dated 09.11.2022

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
National Dam Safety Authority
O/o Member (Regulation)

Letter no. NDSA/MRG/GEN/2022/111-150 Date: 09.11.2022

To,

SDSOs of all concerned States and UTs/ All CPSUs/ Dam Owners (As per List Attached)

Sub: Implementation of Provisions of Dam Safety Act (DSA) 2021 - regarding.
Ref: NCDS Minutes issued vide letter no. CWC/DSD-II/1-33/2022/710-807 dated 23.09.22

Sir,

Dam Safety Act (DSA) 2021 has been enacted by the Parliament of India and it has come into force with effect from 30th December, 2021. This act provides for surveillance, inspection, operation and maintenance of the specified dams for prevention of dam failure related disasters and to provide for institutional mechanism to ensure their safe functioning and for matters connected therewith or incidental thereto.

The first meeting of National Committee on Dam Safety (NCDS) established as per provisions of DSA, 2021 was held on 2nd August 2022 at New Delhi and the minutes of meeting were issued vide letter dated 23.09.22 cited above. Vide above mentioned minutes, concerned authorities such as State Governments, SDSOs etc. were directed to take certain steps / action. Some of such steps / action pertaining to Regulation aspect of specified Dams, are as follows:

1. **Comprehensive Dam Safety Evaluation (CDSE) Procedure (Chapter IX of Dam Safety Act (DSA)):**

Vide Para 1.2.2 of Minutes: *"The NCDS sought each State Government and CPSUs to submit to NDSA a detailed road map on the proposed strategy and methodology that they propose to adopt for undertaking the comprehensive Dam Safety Evaluation of Dams in their jurisdiction. The document shall list the proposed experts, organizations, institutes, agencies, etc., to be engaged for such studies, along with their past experience in the subject. The State Governments and CPSUs shall submit these documents through their respective SDSOs and SCDSs. All matters related to dam safety, but not limited to those listed in the Agenda Item, shall be addressed in the said document."*

All SDSOs/ CPSUs/ SCDSs are requested to urgently prepare the Detailed Road Map on Strategy and Methodology to undertake CDSE along with proposed experts, organizations, institutes, agencies etc. and submit to NDSA so that after due discussion on the said document, it may be placed before NCDS for consideration

2. **Operation & Maintenance (Section 28 of DSA):**

Vide para 1.2.4 of minutes: *The Chairman, NCDS directed States to ensure the compliance to provisions of section 28 of the Act, that ,*

.....P.T.O.

सातवां तल (द), सेवा भवन
आर. के. पुरम, नई दिल्ली- 66
फ़ोन - 011-29583608
ई-मेल - cedesene@nic.in

9th Floor (S), Sewa Bhawan
R.K.Puram, New Delhi 66
Tel. 011-29583608
Email : cedesene@nic.in

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
National Dam Safety Authority
O/o Member (Regulation)

.....from prepage...

(1) Every owner of the specified dam shall provide operation and maintenance establishment for the specified dam, and shall ensure that sufficient number of trained operation and maintenance engineers or technical persons is posted at each such dam.

(2) Every owner of the specified dam shall ensure that a well-documented Operation & Maintenance (O&M) Manual is kept at each of the specified dams and are followed at all times. O&M Manual shall include reservoir operation rule curves.

All SDSOs/ CPSUs are requested to urgently ensure compliance to the above direction of NCDS and submit necessary confirmation to NDSA

3. **Establishment of Dam Safety Unit (Section 30 of DSA) :**

Vide para 1.3.1: *Chairman, NCDS directed States to ensure that, the owner for each specified dam, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers in compliance to relevant provisions of the Act.*

All SDSOs/ CPSUs are requested to urgently ensure provision of Dam Safety Unit and submit necessary confirmation to NDSA

Yours sincerely,

Tripathi

Vivek Tripathi,
Member (Regulation)

Copy for kind information to :

1. Secretary, DoWR, RD & GR, Ministry of Jal Shakti, New Delhi.
2. Chairman, NCDS & Chairman, CWC
3. Chairman, NDSA, New Delhi and Member (D&R), CWC.
4. The Additional Chief Secretary/ Principal Secretary/ Secretary (WRD/ Irrigation/ Energy/ Power) of all States/ UTs
5. Member (Policy & Research), NDSA, New Delhi
6. Member (Technical), NDSA, New Delhi
7. Member (Disaster & Resilience), NDSA, New Delhi
8. All Regional Directors of NDSA

सातवां तल (द), सेवा भवन
आर. के. पुरम, नई दिल्ली- 66
फोन - 011-29583608
ई-मेल - cedesene@nic.in

9th Floor (S), Sewa Bhawan
R.K.Puram, New Delhi 66
Tel. 011-29583608
Email : cedesene@nic.in

Annexure X

NDSA Letter dated 31.10.2022

File No.T-75075/87/2022-GATES DESIGN(NWS) 8 I/112156/2022

Government of India
Ministry of Jal Shakti
National Dam Safety Authority
Disaster and Resilience Wing
* * * * * * *

602 (S), 6th Floor, SewaBhawan,
R.K. Puram, New Delhi-110066
Tel: 011-29583490,
E-mail: gdnwsdte@nic.in

To,

All SDSO & SCDS as per list I & II

विषय: Preparation of Emergency Action Plan and Annual report – reg

संदर्भ: DoWR, RD & GR OM No. N-52011/2/2021-BM/PR dated 25.04.2014

The Parliament of India has enacted the Dam Safety Act, 2021, which has come into force with effect from 30th December, 2021. The Act provides for surveillance, inspection, operation and maintenance of the specified dam for prevention of dam failure related disasters and to provide for institutional mechanism to ensure their safe functioning and for matters connected therewith or incidental thereto.

Various activities are to be undertaken under the Dam Safety Act, 2021 by the State/UT Governments/dam owners for safety of dams falling under their jurisdiction. At this juncture, kind attention of all SDSO and SDSC is invited on following two very important activities are to be taken by all SDSO and SDSC:-

1 ANNUAL REPORT:-

All the SDSO's shall prepare and submit the annual report containing the documentation of activities in relation to Dam Safety as per relevant sections of the Act which is to be laid by the State Government in the house of State Legislature. A copy of the same shall be forwarded to the Member (Disaster & Resilience) as well as to NDSA Secretariat, New Delhi. NDSA shall be preparing a Consolidated Annual

Report for the entire country.

2 EMERGENCY ACTION PLAN (EAP):-

All the SDSO's shall prepare an Emergency Action Plan (EAP) of all the specified dams under their jurisdiction as per section 36 (1) of the Dam Safety Act, 2021 and the same shall be updated at the regular intervals as per the provisions of the act.

In view of the above, all the SDSOs and dam owners are directed to take the necessary steps to fulfill the above statutory provisions of Dam Safety Act, 2021 to ensure overall safety of the existing and under construction/new dams and send all the necessary documents to NDSA with in time for record and further necessary action.

This issues with the approval of Member-Disaster & Resilience, NDSA.

Signed by Saket Kumar
Date: 31-10-2022 17:35:28
Reason: Approved

To,

1. **List-I, State committee on Dam Safety**
2. **List-II, State Dam Safety Organisation**

Copy for Information to,

1. **Chairman, NDSA, New Delhi.**
2. **NDSA Secretariat, New Delhi.**

Details of Dam Safety Unit

PROCEEDINGS OF GOVERNMENT OF KARNATAKA
(Water Resources Department)

SUB: PROVIDING DAM SAFETY UNITS FOR THE SAFETY OF SPECIFIED DAMS OF THE STATE WATER RESOURCES DEPARTMENT–REG.,

READ: 1) Dam Safety Act, 2021.
2) Government Order E No:WRD 34 DSP 2022, Bangalore, dtd:29.06.2022.
3) Minutes of National Dam Safety Committee(NCDS) meeting held at New Delhi on 02.08.2022.
4) The Proceedings of the National Dam Safety Authority Southern Regional States Meeting held at Coimbatore on 03.09.2022.
5) C.E., DSO, Bangalore Letter No: 3475-85, dtd: 17.10.2022
6) Member(Regulation), NDSA, DoWR, RD&GR, MoJS, GoI, New Delhi, Letter No: NDSA/MRG/GEN/2022/111-150, dated: 09.11.2022.

24/4
M (DAR)
H. Qtrs to all NDSA tech members.
25/04
Dir @ DSD-II

Preamble:

1. According to the National Register of Large Dams (NRLD), 2019 published and maintained by the Central Water Commission, New Delhi, currently there are 231 large (specified) Dams inspiration in the State of Karnataka. Among these specified dams, 73 dams come under the purview of Water Resources Department (Major and Medium), 134 dams under Minor Irrigation Department and 24 dams under Energy, Urban Development and other Departments.

2. The Dam Safety Act-2021 read at (1) above, has come into force from 30.12.2021. The act provides an institutional mechanism for the surveillance inspection, operation and maintenance of specified dams spread across the country and to prevent disasters related to dam failure, ensure their safe functioning and related matters. Section 30 of Chapter-VII of this Act states that "For each specified dam, the owner shall, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers as may be specified by the regulations". Accordingly providing dam safety units will be essential for the safety of 231 specified dams in the State.

3. To advice, instruct and to discuss about important aspects related to the safety of all 231 specified dams in the State and to take decisions, State Committee on Dam Safety (SCDS) has been constituted under the chairmanship of the Secretary to Government, Water Resources Department as per the provisions of Chapter-IV of the Dam Safety Act-2021,vide the Government Order read at (2) above.

4. The Minutes of the first meeting of the National Committee on Dam Safety(NCDS) read at(3) above, refers to the Dam Safety Units and its functions and the Para 3 of the minutes of National Dam Safety Authority(NDSA) read at (4) above states that "The Head of SDSO

Secretary / Chairman e-office No:33.5959 25/4/2023

shall take up this matter with their respective State/UT Government to ensure that a robust Dam Safety Unit is functional in respect of every specified dam under the Operation and Maintenance Establishment". Also in para 3 of the letter read at (6) above, it is stated that "All SDSOs/CPSUs are requested to urgently ensure provision of Dam Safety Unit and submit necessary confirmation to NDSA".

5. The Chief Engineer, Dam Safety Organisation, Bangalore has submitted a proposal along with zone/dam-wise details of the Operation and maintenance divisions, to the Government with a request to issue an appropriate order for establishment of Dam Safety Units in the State vide the letter read at (5) above.

6. After reviewing the proposal thoroughly, it was decided that out of the 231 specified dams in the State, the Dam Safety Units for 158 specified dams coming under the purview different departments such as Minor Irrigation, Energy, Urban Development etc., will be provided by the concerned departments itself and hence, letters have been addressed to the heads of concerned departments requesting to take appropriate action in this regard and issue orders. And with regard to the 73 specified dams of Water Resources Department (Major and medium), it is decided to name the present operation and maintenance divisions of the concerned dams as Dam Safety Units and these units will carry out the functions related to dam safety along with all the functions which they are already performing. Hence, the following order is issued;

Government Order E No: WRD 74 DSP 2022, Bengaluru, Dated:20-03-2023

I. As explained above, in order to ensure safe functioning and for surveillance, inspection, operation and maintenance of 73 specified dams of Water Resources Department and to prevent disasters related to dam failure, the operation and maintenance units of these dams mentioned against the respective dams in the table below, are hereinafter referred to as Dam Safety Units.

Sl. No	NRLD Sl.No.	Name of Specified Dam	Name of Division currently in operation	Name of Renamed Division
I. Krishna Bhagya Jala Nigam Ltd.,				
1	38	Ramanahalli tank	Executive Engineer, KBJNL, Indi Branch Canal, O & M Division, No- 8, Zalaki, Indi Taluk, Vijayapura.	Executive Engineer, KBJNL, Dam Safety Unit - 1, Zalaki, Indi Taluk, Vijayapura.
2	197	Almatti Dam	Executive Engineer, KBJNL Dam Division Alamatti.	Executive Engineer, KBJNL Dam Safety Unit-2, Alamatti.
3	140	Narayanpura Dam (Basava sagara Reservoir)	Executive Engineer, KBJNL, Dam Division, Narayanpura, Hunasagi Taluk, Yadgir Dist-585219.	Executive Engineer, KBJNL, Dam Safety Unit - 3, Yadgir Dist-585219.

II. Karnataka Neeravari Nigam Ltd.,				
4	56	Bhadra dam	Executive Engineer, KNNL, No. 4, BRLBC Division, Bhadravathi.	Executive Engineer, KNNL, Dam Safety Unit - 4, Bhadravathi.
5	67	Jambadahalla dam		
6	208	Upper Tunga dam	Executive Engineer, KNNL, UTP Division, Shimoga.	Executive Engineer, KNNL, Dam Safety Unit - 5, Shimoga.
7	114	Haihole		
8	49	Ambligola	Executive Engineer, KNNL, Dandavathi Reservoir Project Division, Shikaripura.	Executive Engineer, KNNL, Dam Safety Unit - 6, Shikaripura.
9	21	Anjanapur		
10	214	Sheelavantana-koppa Doddakere		
11	224	Bheemasamudra tank	Executive Engineer, KNNL, No. 5, Bhadra Canal Division, Davanagere.	Executive Engineer, KNNL, Dam Safety Unit - 7, Davanagere.
12	14	Madagamasur tank	Executive Engineer, KNNL, UTP Division, Ranebennur	Executive Engineer, KNNL, Dam Safety Unit - 8, Ranebennur
13	51	Dharma Reservoir		
14	231	Varahi Diversion weir	Executive Engineer, KNNL, No. 2, Varahi Reservoir Project Division, Siddapura, Udupi District.	Executive Engineer, KNNL, Dam Safety Unit - 9, Siddapura, Udupi District.
15	155	Devarabelekere Pickup	Executive Engineer, KNNL, No. 3, Bhadra Canal Division, Malebennur.	Executive Engineer, KNNL, Dam Safety Unit - 10, Malebennur.
16	34	Tungabhadra Dam	Executive Engineer, KNNL, No.1, Tungabhadra Reservoir Division, Munirabad.	Executive Engineer, KNNL, Dam Safety Unit - 11, Munirabad.
17	85	Hagaribommana-halli Dam		
18	135	Narihalla Dam		
19	206	Maskinala Dam	Executive Engineer, KNNL, No. 3, Canal Division, Sindhanur.	Executive Engineer, KNNL, Dam Safety Unit - 12, Sindhanur.
20	101	Kanakanala Dam		
21	205	Hirehalla Dam	Executive Engineer, KNNL, No. 1, Singatalur LIS Division, Mundaragi.	Executive Engineer, KNNL, Dam Safety Unit – 13, Mundaragi.
22	105	Hidkal Dam	Executive Engineer, KNNL, GRBC Division- 2, Hidkal Dam.	Executive Engineer, KNNL, Dam Safety Unit - 14, Hidkal Dam.
23	228	Markandeya Dam		
24	227	Hipparagi Barrage	Executive Engineer, KNNL, HBC Division, Athani.	Executive Engineer, KNNL, Dam Safety Unit - 15, Athani.
25	124	Arebenchi tank	Executive Engineer, KNNL, MLBC Division No-1, Ramdurga.	Executive Engineer, KNNL, Dam Safety Unit - 16, Ram-durga.
26	226	Harinala Dam	Executive Engineer, KNNL, MLBC Dn, No-2, Navilutheertha	Executive Engineer, KNNL, Dam Safety Unit - 17, Navilutheertha
27	87	Malaprabha Dam		
28	196	Amarja dam	Executive Engineer, KNNL, IPC Division	Executive Engineer, KNNL, Dam Safety
29	204	Gandorinala Dam		

30	202	Lower Mullamari Dam	No-1, Kalaburagi	Unit - 18, Kalaburagi
31	89	Chandrampalli Dam	Executive Engineer, KNNL, Bennithora Division, Hebbal.	Executive Engineer, KNNL, Dam Safety Unit - 19, Hebbal.
32	201	Bennithora Dam		
33	91	Hattikuni Dam		
34	164	Soudagarh Dam		
35	225	Bhima LIS	Executive Engineer, KNNL, Bhima LIS Dn, Afzalpur.	Executive Engineer, KNNL, Dam Safety Unit - 20, Afzalpur.
36	151	Upper Mullamari Dam	Executive Engineer, KNNL, KPC Division No – 2, Bhalki.	Executive Engineer, KNNL, Dam Safety Unit - 21, Bhalki.
37	194	Chulkinala Dam		
38	178	Karanja Dam	Executive Engineer, KNNL, KPC Division No - 1, Bidar.	Executive Engineer, KNNL, Dam Safety Unit - 22, Bidar.
III. Cauvery Neeravari Nigam Ltd.,				
39	207	Arkavathy	Executive Engineer, CNNL, Manchanabele Project Division, Bengaluru(R) Dist, Ramanagara.	Executive Engineer, CNNL, Dam Safety Unit - 23, Bengaluru(R) Dist, Ramanagara.
40	193	Iggalur Dam		
41	29	Kanva Dam		
42	190	Manchanabele		
43	32	K. Honnamachanahalli.	Executive Engineer, CNNL, Hemavathy Canal Division, Yediyur.	Executive Engineer, CNNL, Dam Safety Unit - 24, Yediyur.
44	72	Mangala tank		
45	219	Mayasandra tank		
46	80	Muthurayana kere		
47	25	Marconahally		
48	8	Kadaba tank	Executive Engineer, CNNL, Hemavathy Canal Division, Tumkur.	Executive Engineer, CNNL, Dam Safety Unit - 25, Tumkur.
49	11	Nittur tank		
50	160	Theetha Dam		
51	9	Kunigal Doddakere	Executive Engineer, CNNL, Hemavathy Canal Investigation Division, Hebbur.	Executive Engineer, CNNL, Dam Safety Unit - 26, Hebbur.
52	218	Mallaghatta tank	Executive Engineer, CNNL, Hemavathy Canal Division, Turuvekere.	Executive Engineer, CNNL, Dam Safety Unit - 27, Turuvekere.
53	221	Sarigehally tank		
54	223	Turuvekere tank		
55	137	Harangi Dam	Executive Engineer, CNNL, Harangi Rehabilitation Division, Kushalnagar.	Executive Engineer, CNNL, Dam Safety Unit - 28, Kushalnagar.
56	154	Chiklihole Dam		
57	18	Krishnarajasagara Dam	Executive Engineer, CNNL, Division, Mandya Dist, KR Sagara.	Executive Engineer, CNNL, Dam Safety Unit - 29, Mandya Dist, KR Sagara.
58	150	Taraka Dam	Executive Engineer, CNNL, Division, Kabini Colony,	Executive Engineer, CNNL, Dam Safety
59	96	Kabini Dam		

60	57	Hebballa Dam	HD Kote, Kabini Dam, KRS.	Unit - 30, Kabini Colony, HD Kote, Kabini Dam, KRS.
61	39	Nugu Dam	Executive Engineer, CNNL, Kabini Canal Division, Nanjungud.	Executive Engineer, CNNL, Dam Safety Unit - 31, Nanjungud.
62	163	Nallur Amanikere Dam		
63	37	Chikkahole		
64	149	Suvarnavathy Dam		
65	126	Gundal dam	Executive Engineer, CNNL, No.2 Kabini Canal Division, Kollegala.	Executive Engineer, CNNL, Dam Safety Unit - 32, Kollegala.
66	230	Uduthorehalla Dam		
67	86	Karimuddenahalli Tank	Executive Engineer, CNNL, No.2 HRBC Division, Hunsur.	Executive Engineer, CNNL, Dam Safety Unit - 33, Hunsur.
68	1	Thonnur tank	Executive Engineer, CNNL, No.6 HLBC Division, Pandavpura.	Executive Engineer, CNNL, Dam Safety Unit - 34, Pandavpura.
69	203	Yagachi Reservoir	Executive Engineer, CNNL, Yagachi Dam Division, Beluru.	Executive Engineer, CNNL, Dam Safety Unit - 35, Beluru.
70	152	Votehole Reservoir	Executive Engineer, CNNL, Hemavathy Dam Division, Gorur.	Executive Engineer, CNNL, Dam Safety Unit - 36, Gorur.
71	115	Hemavathy Reservoir		
IV. Visveswaraya Jala Nigam Ltd.,				
72	13	Vanivilasa Sagar Dam	Executive Engineer, VJNL, Upper Bhadra Project Division No.7, Hiriyur Camp, Chitradurga.	Executive Engineer, VJNL, Dam Safety Unit - 37, Hiriyur Camp, Chitradurga.
73	48	Gayathri Reservoir		

The above Dam Safety Units will perform the functions related to dam safety as prescribed in the Section 30 & 31 of Chapter VII of the Dam Safety Act-2021 along with all the other functions which they are already performing.

By Order and in the name of the
Governor of Karnataka

(Vanithamani) 20/03/2023
Under Secretary to Government,
Water Resources Department(Tech-4).

Copy:

1 The Accountant General(A&E)/Audit-1/(E&RSSA)/(G&SSA) Karnataka, Bengaluru.
2 The P.S to the Secretary, CWC, GoI, New Delhi.

3 The P.S to to Hon'ble Chief Minister, GOK, Vidhana Soudha, Bengaluru.
4 The P.S to the WRD Minister, GOK, Vidhana Soudha, Bengaluru.
5 The P.S to the Chief Secretary, GOK, Vidhana Soudha, Bengaluru.
6 The Chairman, CWC, New Delhi.
7 The Chief Engineer, DSO, DS & RD, CWC, GoI, 725(A), Seva Bhawan(N), R.K. Puram, New Delhi.
8 The Chairman, National Committee on Dam Safety, New Delhi.
9 The Director, National Dam Safety Authority, New Delhi.
10 The P.S to the Additional Chief Secretary, Urban Development Department, GOK, Vikasa Soudha, Bengaluru.
11 The P.S to the Additional Chief Secretary, Energy Department, GOK, Vikasa Soudha, Bengaluru.
12 Members and Invitees of State Committee on Dam Safety through Member Secretary, SCDS.
13 The Secretary to the Government, Minor Irrigation Department, Bengaluru.
14 The Managing Directors of 4 Nigams of WRD and all CEs & Directors of WRD through Member Secretary, SCDS.
15 The Managing Director, Karnataka Power Corporation Limited, Bengaluru.
16 The Chief Engineer, KUWS & DB(N), Dharwad.
17 The Chief Engineer, KUWS & DB(S), Bengaluru.
18 The Chief Engineer, BWSSB, Bengaluru.
19 The Chief Conservator of Forests, Chamarajnagar Circle, Chamarajnagar.
20 The General Manager, KIOCL, Mangalore.
21 The P.S to the Additional Chief Secretary/Secretary, WRD, Vikasa Soudha, Bengaluru.
22 The P.A to the Deputy Secretary,(KBJN/MMI), WRD, Vikasa Soudha, Bengaluru.
23 Officers on special Duty/Under Secretaries/Technical Assistants of WRD and Minor- Irrigation, Vikasa Soudha, Bengaluru.
24 The Compiler, Karnataka Gazette, Bengaluru.
25 Section guard File/ Extra Copies.

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धरण सुरक्षा कायदा २०२१ मधील तरतूदीनुसार धरण सुरक्षा कक्ष स्थापना करणेबाबत.

महाराष्ट्र शासन
जलसंपदा विभाग
शासन निर्णय क्रमांक : धसुक-२०२२ /(४६४/२०२२) सिंव्य (कामे)
मंत्रालय, मुंबई - ४०० ०३२
दिनांक:- १४ डिसेंबर, २०२२

संदर्भ :-

१) महाराष्ट्र शासन निर्णय क्र.डिएसएस-१०८८/(२९२/८८)-पापवपूनि,दि.२३.०८.१९८८
२) धरण सुरक्षा कायदा-२०२१

प्रस्तावना:-

धरण सुरक्षा कायदा २०२१ संपुर्ण देशात दि. ३०/१२/२०२१ पासुन लागू झाला आहे. सदर कायद्यानुसार निर्दिष्ट धरणांच्या क्षतीग्रस्त होण्यामुळे होणारी जीवित व वित्तीय हानी टाळण्याच्या अनुषंगाने धरणांचे निरिक्षण, तपासणी तसेच देखभाल व दुरुस्ती अनुषंगिक बाबी बंधनकारक करण्यात आल्या आहेत.

धरणांचे सुयोग्य परिचालन करुन धरणफुटीमुळे उद्भवणारी आपत्ती रोखणे व धरणांच्या सुरक्षित परिचालनाची खात्री करणेकरीता आवश्यक संस्थात्मक यंत्रणा उभी करणेच्या उद्देशाने धरण सुरक्षा अनुषंगिक संस्थात्मक बळकटीकरणास कायदेशीर अधिष्ठान देण्यात आले आहे. या कायदयातील तरतूदींच्या अनुषंगाने राष्ट्रीय स्तरावर राष्ट्रीय धरण सुरक्षितता समिती, राष्ट्रीय धरण सुरक्षितता प्राधिकरण, राज्य धरण सुरक्षितता समिती, राज्य धरण सुरक्षितता संघटना व प्रत्येक निर्दिष्ट धरणासाठी धरण सुरक्षा कक्षाची निर्मिती सुनिश्चित केली आहे.

राष्ट्रीय धरण सुरक्षितता समिती (राधसुस) व राष्ट्रीय धरण सुरक्षितता प्राधिकरण (राधसुप्रा) हे भारत सरकारच्या दि.१७/०२/२०२२ च्या अधिसूचने अन्वये अधिसूचित करण्यात आले आहेत.

तसेच, राज्य धरण सुरक्षितता समिती (राधसुस) व राज्य धरण सुरक्षितता संघटना (राधसुसं) हे महाराष्ट्र शासनाच्या अनुक्रमे दि.१५/०६/२०२२ व दि.२२/०६/२०२२ च्या अधिसूचने अन्वये अधिसूचित करण्यात आले आहेत.

धरण सुरक्षा कायदा २०२१ अंतर्गत कलम ३० अन्वये "For each specified dam, the owner shall, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers as may be specified by the regulations" असे नमूद केले आहे.

राष्ट्रीय धरण सुरक्षितता प्राधिकरणामार्फत नियमावली प्रसृत करण्यास काही कालावधी लागणार असल्यामुळे दरम्यानच्या कालावधीसाठी उपरोक्त कायद्याच्या अंमलबजावणीच्या अनुषंगाने राज्यातील प्रत्येक निर्दिष्ट धरणांवर धरण सुरक्षा कक्ष स्थापन करणे शासनाच्या विचाराधीन होते.

शासन निर्णय :-

धरण सुरक्षा कायदा-२०२१ च्या अंमलबजावणीच्या अनुषंगाने राज्यातील सर्व निर्दिष्ट धरणांवर धरण सुरक्षा कक्ष स्थापन करणेबाबत पुढीलप्रमाणे सूचना देण्यात येत आहे.

१) शासन निर्णयाच्या सोबतच्या परिशिष्ट-१ मध्ये धरण सुरक्षा कक्ष स्थापनेचा कार्यालयीन आदेश काढणे करीता सक्षम अधिकारी यांची निश्चिती केली आहे. त्यानुसार परिशिष्ट-२ मधील विहित नमुन्यात धरण सुरक्षा कक्ष स्थापनेबाबत कार्यवाही करण्यात यावी.

२) धरण सुरक्षा कक्ष स्थापनेची कार्यवाही दि.३१.१२.२०२२ पूर्वी पूर्ण करण्यात यावी.

हा शासन निर्णय महाराष्ट्र शासनाच्या www.maharashtra.gov.in या संकेतस्थळावर उपलब्ध करुन देण्यात आला आहे. त्याचा संगणक सांकेतांक २०२२१२१४१७०३१४०३२७ असा असून डिजीटल स्वाक्षरीने साक्षांकीत करुन निर्गमित करण्यात येत आहे.

महाराष्ट्राचे राज्यपाल यांच्या आदेशानुसार व नावाने.

NAMITA GAURAV BASER

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DN: c=IN, o=GOVERNMENT OF MAHARASHTRA, ou=WATER RESOURCES DEPARTMENT, 2.5.4.20=8ec2809da7de03ff4644cfa186d623a756ac5d1b94fb5c9de4585a05b5f6b6fb7f, postalCode=400032, st=Maharashtra, serialNumber=69D01EE03D0187C859C3458FEEAF66B1EAE168C67F5CCB127AE66608DE3FA48, cn=NAMITA GAURAV BASER
Date: 2022.12.14 17:06:46 +05'30'

(न. गौ. बसेर)
उप सचिव, महाराष्ट्र शासन

सहपत्र :- परिशिष्ट १ व २

प्रत :

१) अपर मुख्य सचिव, जलसंपदा विभाग, मंत्रालय, मुंबई
२) अपर मुख्य सचिव,नगर विकास विभाग,मंत्रालय,मुंबई
३) अपर मुख्य सचिव,ग्राम विकास विभाग,मंत्रालय,मुंबई
४) अपर मुख्य सचिव,उद्योग विभाग,मंत्रालय,मुंबई
५) प्रधान सचिव,पाणी पुरवठा व स्वच्छता विभाग,मंत्रालय,मुंबई
६) प्रधान सचिव,मृद व जलसंधारण विभाग,मंत्रालय,मुंबई
७) सचिव (जसंव्य व लाक्षेवि), जलसंपदा विभाग, मंत्रालय, मुंबई
८) सचिव (प्रकल्प समन्वय), जलसंपदा विभाग, मंत्रालय, मुंबई
९) महासंचालक, सं.प्र.ज.सं.सु., मेरी वसाहत, नाशिक
१०) कार्यकारी संचालक, महाराष्ट्र कृष्णा खोरे विकास महामंडळ, पुणे
११) कार्यकारी संचालक, विदर्भ पाटबंधारे विकास महामंडळ, नागपूर
१२) कार्यकारी संचालक, गोदावरी मराठवाडा पाटबंधारे विकास महामंडळ, औरंगाबाद
१३) कार्यकारी संचालक, तापी पाटबंधारे विकास महामंडळ, जळगाव
१४) कार्यकारी संचालक, कोकण पाटबंधारे विकास महामंडळ, ठाणे
१५) सर्व सहसचिव तथा मुख्य अभियंता, जलसंपदा विभाग, मंत्रालय, मुंबई
१६) मुख्य अभियंता,जलविज्ञान व धरण सुरक्षितता,नाशिक
१७) सर्व मुख्य अभियंता, जलसंपदा विभाग
१८) सर्व उपसचिव तथा अधीक्षक अभियंता, जलसंपदा विभाग, मंत्रालय, मुंबई
१९) अधीक्षक अभियंता,राज्य धरण सुरक्षितता संघटना,नाशिक
२०) सर्व अधीक्षक अभियंता, जलसंपदा विभाग
२१) सिंव्य कामे संग्रहार्थ.

पृष्ठ **४** पैकी **२**

Annexure 1
Constitution of Dam Safety Unit

Sr. No.	Type of Dam	Height from General Level of deepest Foundation	Impounded Gross Storage capacity up to FRL	Spillway Capacity	Type of Spillway	Structure of Dam Safety Unit	Competent Authority to issue Dam Safety Unit Office order
1	2	3	4	5	6	7	8
1	Class-I	Above 60 m	Above 1000 MCum	Above 10000 Cumecs	Gated Spillway	1) Superintending Engineer (Civil) 2) Executive Engineer (Civil) 3) Executive Engineer (Mech) 4) Deputy Engineer. (Civil)	Chief Engineer
2	Class-I	Above 30 m	Above 60 MCum	Above 3,000 Cumecs	Gated Spillway	1) Superintending Engineer (Civil) 2) Executive Engineer (Civil) 3) Deputy Engineer (Mech) 4) Deputy Engineer. (Civil)	Chief Engineer
3	Class -II	15 m to 30 m	15 MCum upto 60 MCum	2,000 to 3,000 Cumecs	Ungated Spillway	1) Executive Engineer (Civil) 2) Deputy Engineer. (Civil) 3) Junior Engineer (Mech)	Superintending Engineer
4	Class -III	10 m to 15 m	1 MCum upto 15 MCum	2,000 to 3,000 Cumecs	Ungated Spillway	1) Deputy Engineer. (Civil) 2) Junior Engineer (Civil)	Executive Engineer

पृष्ठ ४ पैकी ३

Annexure 2
Standard Proforma of office order of Dam Safety Unit
शासन निर्णय क्रमांक:धसुक-२०२२ /(४६४/२०२२) सिंव्य (कामे)

As per Clause 30 of Dam Safety Act 2021, it is mandatory for every Dam Owner to Constitute a separate Dam Safety Unit for each Specified dam. Hence, in accordance with the GR under reference a Dam Safety Unit is appointed for the Specified dam mentioned below,

A) Details of Project

Sr. No	Details	
1	Name of Project	
2	Name of Specified dam	
3	Class of dam	
4	Tahsil	
5	District	

B) Details of Office

Sr. No	Office		Contact No.
1	Region		
2	Circle		
3	Division		
4	Subdivision		

B) Dam Safety Unit

Sr. No	Designation*
1	Superintending Engineer,_____ Circle, _____
2	Executive Engineer ,_____Division, _____
3	Executive Engineer_____ Division, _____ (Mech)
4	Deputy Engineer _____Sub Division, ____
5	Deputy Engineer,_____Sub Division, ____(Mech)
6	Junior Engineer, _____ Section,_____
7	Junior Engineer,_____ Section,_____(Mech)

*

*Strike out which ever is not applicable as per Annexure 1

Above Dam Safety Unit will come into force immediately to perform duties assigned by relevant Clauses of Dam Safety Act 2021.

-Sd-

No. & Date

_____
_____
(Competent Authority)

Copy to :- Chief Engineer, State Dam Safety Organisation, Nashik for information & record please.

Annexure 2
Standard Proforma of office order of Dam Safety Unit
DAM SAFETY UNIT CONSTITUTION ORDER

Reference: शासन निर्णय क्र. धसुक-२०२२/(४६४/२०२२) सिव्य (कामे) दि. १४/१२/२०२२.

As per Clause 30 of Dam Safety Act 2021, it is mandatory for every Dam Owner to constitute a separate Dam Safety Unit for each Specified dam. Hence, in accordance with the GR under reference a Dam Safety Unit is appointed for the Specified dam mentioned below,

A) Details of Project

Sr. No.	Details	
1	Name of Project	**Pulgaon Barrage**
2	Name of Specified dam	**Pulgaon Barrage**
3	Class of dam	**Class-II**
4	Tahsil	**Deoli**
5	District	**Wardha**

B) Details of Office

Sr. No.	Office		Contact No.
1	Region	Chief Engineer, Gosikhurd Project Water Resources Department, Nagpur.	०७१२-२५६८४१५ ०७१२-२५५०७५४
2	Circle	Nagpur Irrigation Circle, Nagpur.	०७१२-२५६०२३४
3	Division	Lower Wardha Canal Division, Wardha.	०७१५२-२४२६७७
4	Sub-division	Lower Wardha Canal Sub-Division No. 2, Pulgaon.	०७१५२-२४२६७७

C) Dam Safety Unit

Sr. No.	Designation
1	Executive Engineer, Lower Wardha Canal Division, Wardha. (Civil)
2	Deputy Engineer, Lower Wardha Canal Sub-Division No. 2, Pulgaon. (Civil)
3	Junior Engineer, Mechanical Engineering Workshop Sub-Division No. 3, Wardha. (Mechanical)

Above Dam Safety Unit will come into force immediately to perform duties assigned by relevant Clauses of Dam Safety Act 2021.

Office Order No. २४४ **Date:** 28/12/2022 **(O/c Signed by S.E., N.I.C.)** O/C	**Asstt. Superintending Engineer** Nagpur Irrigation Circle, Nagpur.

शासन निर्णय क्र. धसुक-२०२२/(४६४/२०२२) सिव्य (कामे)

Annexure 2

Standard Proforma of office order of Dam Safety Unit

DAM SAFETY UNIT CONSTITUTION ORDER

Reference: शासन निर्णय क्र. धसुक-२०२२/(४६४/२०२२) सिव्य (कामे) दि. १४/१२/२०२२.

As per Clause 30 of Dam Safety Act 2021, it is mandatory for every Dam Owner to constitute a separate Dam Safety Unit for each Specified dam. Hence, in accordance with the GR under reference a Dam Safety Unit is appointed for the Specified dam mentioned below,

A) Details of Project

Sr. No.	Details	
1	Name of Project	**Lower Chulband Barrage**
2	Name of Specified dam	**Lower Chulband Barrage**
3	Class of dam	**Class-II**
4	Tahsil	**Sakoli**
5	District	**Bhandara**

B) Details of Office

Sr. No.	Office		Contact No.
1	Region	Chief Engineer, Gosikhurd Project Water Resources Department, Nagpur.	०७१२-२५६८४१५ ०७१२-२५५०७५४
2	Circle	Nagpur Irrigation Circle, Nagpur.	०७१२-२५६०२३४
3	Division	Medium Project Division, Gondia.	०७१८२-२३४८३२
4	Sub-division	Medium Project Sub-Division, Sakoli.	०७१८२-२३४८३२

C) Dam Safety Unit

Sr. No.	Designation
1	Executive Engineer, Medium Project Division, Gondia. (Civil)
2	Deputy Engineer, Medium Project Sub-Division, Sakoli. (Civil)
3	Junior Engineer, Gate Erection & Repair Sub-Division No. 6, Sakoli. (Mechanical)

Above Dam Safety Unit will come into force immediately to perform duties assigned by relevant Clauses of Dam Safety Act 2021.

Office Order No. २४५ **Date:** 28/12/2022 **(O/c Signed by S.E., N.I.C.)** o/c	**Asstt. Superintending Engineer** Nagpur Irrigation Circle, Nagpur.

Annexure 2
Standard Proforma of office order of Dam Safety Unit
DAM SAFETY UNIT CONSTITUTION ORDER

Reference: शासन निर्णय क्र. धसुक-२०२२/(४६४/२०२२) सिव्य (कामे) दि. १४/१२/२०२२.

As per Clause 30 of Dam Safety Act 2021, it is mandatory for every Dam Owner to constitute a separate Dam Safety Unit for each Specified dam. Hence, in accordance with the GR under reference a Dam Safety Unit is appointed for the Specified dam mentioned below,

A) Details of Project

Sr. No.	Details	
1	Name of Project	**Kar River Medium Project**
2	Name of Specified dam	**Kar Dam**
3	Class of dam	**Class-II**
4	Tahsil	**Karanja**
5	District	**Wardha**

B) Details of Office

Sr. No.	Office		Contact No.
1	Region	Chief Engineer, Gosikhurd Project Water Resources Department, Nagpur.	०७१२-२५६८४१५ ०७१२-२५५०७५४
2	Circle	Nagpur Irrigation Circle, Nagpur.	०७१२-२५६०२३४
3	Division	Minor Irrigation Division, Wardha.	०७१५२-२९५०१०
4	Sub-division	Kar River Project Sub-Division, Karanja (Gh.).	०७१५२-२९५०१०

C) Dam Safety Unit

Sr. No.	Designation
1	Executive Engineer, Minor Irrigation Division, Wardha. (Civil)
2	Deputy Engineer, Kar River Project Sub-Division, Karanja (Gh.). (Civil)
3	Junior Engineer, Mechanical Sub-Division No. 2, Nagpur. (Mechanical)

Above Dam Safety Unit will come into force immediately to perform duties assigned by relevant Clauses of Dam Safety Act 2021.

Office Order No. २४६ **Date:** 28/12/2022 **(O/c Signed by S.E., N.I.C.)** O/c	**Asstt. Superintending Engineer** Nagpur Irrigation Circle, Nagpur.

Annexure 2

Standard Proforma of office order of Dam Safety Unit

DAM SAFETY UNIT CONSTITUTION ORDER

Reference: शासन निर्णय क्र. धसुक-२०२२/(४६४/२०२२) सिव्य (कामे) दि. १४/१२/२०२२.

As per Clause 30 of Dam Safety Act 2021, it is mandatory for every Dam Owner to constitute a separate Dam Safety Unit for each Specified dam. Hence, in accordance with the GR under reference a Dam Safety Unit is appointed for the Specified dam mentioned below,

A) Details of Project

Sr. No.	Details	
1	Name of Project	**Kharda Barrage**
2	Name of Specified dam	**Kharda Barrage**
3	Class of dam	**Class-II**
4	Tahsil	**Deoli**
5	District	**Wardha**

B) Details of Office

Sr. No.	Office		Contact No.
1	Region	Chief Engineer, Gosikhurd Project Water Resources Department, Nagpur.	०७१२-२५६८४१५ ०७१२-२५५०७५४
2	Circle	Nagpur Irrigation Circle, Nagpur.	०७१२-२५६०२३४
3	Division	Lower Wardha Canal Division, Wardha.	०७१५२-२४२६७७
4	Sub-division	Lower Wardha Canal Sub-Division No. 1, Pulgaon.	०७१५२-२४२६७७

C) Dam Safety Unit

Sr. No.	Designation
1	Executive Engineer, Lower Wardha Canal Division, Wardha. (Civil)
2	Deputy Engineer, Lower Wardha Canal Sub-Division No. 1, Pulgaon. (Civil)
3	Junior Engineer, Mechanical Engineering Workshop Sub-Division No. 1, Nagpur. (Mechanical)

Above Dam Safety Unit will come into force immediately to perform duties assigned by relevant Clauses of Dam Safety Act 2021.

Office Order No. २४७ **Date:** 28/12/2022 **(O/c Signed by S.E., N.I.C.)** ok	**Asstt. Superintending Engineer** Nagpur Irrigation Circle, Nagpur.

Copy to:

1. Chief Engineer, State Dam Safety Organization, Nashik for information & record please.
2. Chief Engineer, Gosikhurd Project Water Resources Department, Nagpur for information & record please.
3. Superintending Engineer, State Dam Safety Organization, Nashik for information & record please.
4. Executive Engineer, Lower Wardha Canal Division, Wardha for information & record.

Email **Dam Safety Design II**

Constitution of Dam Safety Unit as per Dam Safety Act,2021

From : cedamsafety odisha <cedamsafety.odisha@gmail.com> Fri, Dec 16, 2022 05:57 PM

Subject : Constitution of Dam Safety Unit as per Dam Safety Act,2021 1 attachment

To : Dam Safety Design II <dsd2dte-cwc@gov.in>, CEDSO <cedams@nic.in>

Sir,

Please find attached the Excel file regarding constitution of Dam Safety Units for all the 204 large Dams of Odisha as desired in the meeting for Eastern & North-Eastern Region of NDSA held at Guwahati.

Regards

for

Chief Engineer,
Dam Safety, Odisha,
Secha Sadan, Unit-V,
Bhubaneswar-751001
Ph - 0674 - 2531935

Dam Safety Unit.xlsx
24 KB

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
Unit - 1	**Baisinga Canal Divisin, Laxmiposi**	Superitending Engineer, Baisinga Canal Divisin, Laxmiposi	Kukudajodi	1
		Assistant Executive Engineer, Baisinga Canal Sub-Division-I, Laxmiposi		
Unit - 2	**Khurda Irrigation Division, Khurda**	Superitending Engineer,Khurda Irrigation Division, Khurda	Salia	1
		Assistant Executive Engineer, Salia Dam Sub division, Banapur		
Unit - 3	**Mayurbhanj Irrigation Division, Baripada**	Superitending Engineer, Mayurbhanj Irrigation Division, Baripada		2
		Assistant Executive Engineer, Kalo Irrigation Sub-Division, Chuinposi	Kalo	
		Assistant Executive Engineer,Sunei Irrigation Sub Division, Udala	Sunei	
Unit - 4	**Nayagarh Irrigation Division**	Superitending Engineer, Nayagarh Irrigation Division		2
		Assistant Executive Engineer,Sarankul Sub Division	Budhabudhiani	
		Assistant Executive Engineer,Kuanria Sub Division	Kuanria	
Unit - 5	**Rairangpur Irrigation Division, Rairangpur**	Superitending Engineer, Rairangpur Irrigation Division, Rairangpur		3
		Assistant Executive Engineer, Khadkhai Irrigation Sub-Division.	Khadakhai	
		Assistant Executive Engineer, Bankbal Irrigtion Sub-Division.	Bankabal	
		Assistant Executive Engineer, Nesa Irrigation Sub- Division .	Nesa	
Unit - 6	**Subarnarekha Irrigation Division.II, Deuli**	Superitending Engineer, Subarnarekha Irrigation Division.II, Deuli	Jambhira	1
		Assistant Executive Engineer, Subarnarekha Irrigation Sub Division.I,		
Unit - 7	**Minor Irrigation Division, Balasore**	Executive Engineer, Minor Irrigation Division, Balasore		2
		Assistant Executive Engineer,Minor Irrigation Sub Division, Nilgiri	Rissia	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Soro	Sindhua	
Unit - 8	**Minor Irrigation Division, Baripada**	Executive Engineer, Minor Irrigation Diviion, Baripada	Arikul	4
		Assistant Executive Engineer,Minor Irrigation Sub Division, Udala	Badjore	
		Assistant Executive Engineer,Minor Irrigation sub Division, Betnoti	Paunsianalla	
			Madhabinalla	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
Unit - 9	**Minor Irrigation Division, Cuttack**	Executive Engineer,Minor Irrigation Division,Cuttack		7
		Assistant Executive Engineer,Minor Irrigation Sub Division, Cuttack	Kusunpur	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Athagarh	Jamunabandha	
			Badabandha	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Banki	Jharianalla	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Badamba	Karada	
			Nareijani	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Narsinghpur	Suhagi	
Unit - 10	**Minor Irrigation Division, Jajpur**	Executive Engineer,Minor Irrigation Division,Jajpur	Kalakala	1
		Assistant Executive Engineer,Minor Irrigation Sub Division, Badachana		
Unit - 11	**Minor Irrigation Division, Jashipur**	Executive Engineer,M.I Division, Jashipur		3
		Assistant Executive Engineer,Jashipur Sub Division	Chhamundia	
			Sanasialinai	
		Assistant Executive Engineer,Rairangpur Sub Division	Pokharia	
Unit - 12	**Minor Irrigation Division,Khurda**	Executive Engineer,Minor Irrigation Division,Khurda		4
		Assistant Executive Engineer, M.I.Sub Division,Tangi	Ashoknalla	
		Assistant Executive Engineer, M.I.Sub Division,Khurda	Hanumantia	
		Assistant Executive Engineer, M.I.Sub Division,Bhubnaeswar	Kumarkhunti	
			Jhumuka	
		Executive Engineer,Minor Irrigation Division, Nayagarh		
		Assistant Executive Engineer,Minor Irrigation Sub Division, Nayagarh	Baghua	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Ranapur	Bhetabar	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
Unit-13	**Minor Irrigation Division, Nayagarh**		Randa	12
		Assistant Executive Engineer,Minor Irrigation Sub Division, Daspalla	Dhulipaunsia	
			Ghagara	
			Haguri	
			Panaskhal	
			Mahisanallah	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Khandapada	Koska	
			Gayapathar	
			Modanalla	
			Sunamuhin	
Unit - 14	**Harabhangi Irrigation Division, Adava**	Superintending Engineer, Harabhangi Irrigation Division, Adava	Harabhangi	2
		Assistant Executive Engineer, Harabhangi Irrigation Sub-Division-I Adava, Gajpatia	Badanala	
		Assistant Executive Engineer, Badanala Canal Sub-Division, Padampur,Rayagada		
Unit - 15	**Bhanjanagar Irrigation Division, Bhanjanagar**	Superintending Engineer, Bhanjanagar Irrigation Division, Bhanjanagar	Bhanjanagara	4
		Assistant Executive Engineer, Bhanjanagar Irrigation Sub-Division, Bhanjanagar	Baghua	
		Assistant Executive Engineer, Baghua Irrigation Sub-Division, Matajhari, Buguda	Daha	
		Assistant Executive Engineer, Daha Irrigation Sub-Division, Bhanjanagar	Soroda	
		Assistant Executive Engineer, Aska Irrigation Sub-Division, Aska		
Unit - 16	**Berhampur Irrigation Division, Berhampur**	Superintending Engineer, Berhampur Irrigation Division, Berhampur	Dhanei	1
		Assistant Executive Engineer, Dhanei Irrigation Sub-Division, Chirikipadasasan		
Unit - 17	**Chikiti Irrigation Division, Berhampur**	Superintending Engineer, Chikiti Irrigation Division, Berhampur	Baghalati	2
		Assistant Executive Engineer, Baghalati Irrigation Sub-Division, Nuagada	Ghodahada	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
	Berhampur	Assistant Executive Engineer, Ghodahada Irrigation Sub-Division, Digapahandi		
Unit - 18	**Upper Kolab Head Works Division, Kolabnagar, Jeypore**	Superintending Engineer, Upper Kolab Head Works Division, Kolabnagar, Jeypore	Upper Kolab	2
		Assistant Executive Engineer, Upper Kolab Irrigation Sub- Division-I, Kolabnagar,Jeypore	Satiguda (UKP)	
		Assistant Executive Engineer, Flood Sub-Division, Kolabnagar, Jeypore		
Unit - 19	**Telengiri Canal Division, Ambaguda**	Superintending Engineer, Telengiri Canal Division, Ambaguda	Telengiri	1
		Assistant Executive Engineer, Telingiri Canal Sub Division-V, Ambaguda		
Unit - 20	**Nawarangapur Irrigation Division, Nawarangapur**	Superintending Engineer, Nawarangapur Irrigation Division, Nawarangapur	Bhaskel	1
		Assistant Executive Engineer, Nawarangapur Irrigation Sub Division-II, Umerkote		
Unit - 21	**Podagada Dam Division, Khatiguda**	Superintending Engineer, Podagada Dam Division, Khatiguda	Kapur	3
		Assistant Executive Engineer, Podagada Dam Sub Division III, Khatiguda	Podagada	
		Assistant Executive Engineer, Podagada Dam Sub Division II, Khatiguda	Upper Indravati	
Unit - 22	**Muran Dam Division, Muran, Nawarangapur**	Superintending Engineer, Muran Dam Division, Muran, Nawarangapur	Muran	1
		Assistant Executive Engineer, Muran Dam Sub-Division-IV, Khatiguda, Nawarangapur		
Unit - 23	**Kandhamal Irrigation Division, Phulbani**	Executive Engineer, Kandhamal Irrigation Division, Phulbani	**Pilasalki**	**1**
		Assistant Executive Engineer, Pilasalki Irrigation Sub Division, Phulbani		
	Nuapada, Irrigation	Superintending Engineer, Nuapada ,Irrigation Division ,Nuapada	Saipala	
		Assistant Executive Engineer, Mandosil Irrigation Sub-Division, Mandosil	Sundar	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
Unit-24	**Irrigation Division, Nuapada**	Assistant Executive Engineer, Sundar Irrigation Sub-Division, Jadamunda, Komna	Upper Jonk	4
		Assistant Executive Engineer, Jonk Irrigation Sub-Division, Nuapada	Dumerbahal	
Unit-25	**Potteru Headworks Division, Chitrakonda**	Superintending Engineer, Potteru Headworks Division,Chitrakonda	Balimela	2
		Assistant Executive Engineer, Earth Dam Sub-Division-I, Chitrakonda	Satiguda (Malkangiri)	
		Assistant Executive Engineer, Earth Dam Sub-Division-III, Satuguda,Malkangiri		
Unit-26	**Lower Indra Dam Division, Khariar**	Superintending Engineer, Lower Indra Dam Division, Khariar	Lower Indra	1
		Assistant Executive Engineer, LI Canal Sub-Division-I, Khariar		
Unit-27	**Ret Dam Division, Katingpadar, Bhawanipatna**	Superintending Engineer, Ret Dam Division, Katingpadar, Bhawanipatna	Ret	1
		Assistant Executive Engineer, Ret Dam Sub-Division, Katingpadar		
Unit-28	**Right Canal Division-I, Junagarh**	Superintending Engineer, Right Canal Division-I, Mukhiguda,Kalahandi	Bhatrajore	1
		Assistant Executive Engineer, Upper Indravati Right Canal Sub-Division-IV, Junagarh		
Unit - 29	**Minor Irrigation Division, Ganjam-I, Berhampur**	Executive Engineer, Minor Irrigation Division, Ganjam-I ,Berhampur	Bhallu Ghai	7
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Chikiti	Narayan Sagar	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Digapahandi	Kanheinala	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Berhampur	Raghunath Sagar	
			Gopalganda	
			Ganianala	
			Ramaguda	
		Executive Engineer, Minor Irrigation Division, Ganjam-II ,Berhampur	Debijhara	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
Unit - 30	**Minor Irrigation Division, Ganjam-II, Berhampur**	Assistant Executive Engineer, Minor Irrigation Sub-Division, Khalikote	Jharanai	4
			Maharani Sagar	
			Jagataghai	
Unit - 31	**Minor Irrigation Division, Bhanjanagar**	Executive Engineer, Minor Irrigation Division, Bhanjanagar	Alikuan	4
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Soroda	Bhitribediguda	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Bhanjanagar	Lankagada	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Jagannathprasad	Chhamunda	
Unit - 32	**Minor Irrigation Division, Kandhamal, Phulbani**	Executive Engineer, Minor Irrigation Division, Kandhamal, Phulbani	Balaskumpa	5
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Phulbani	Kangani Nallah	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, G Udayagiri	Paitagam	
			Kalanaju	
			Burbinaju	
Unit - 33	**Minor Irrigation Division, Boudh**	Executive Engineer, Minor Irrigation Division, Boudh	Domkutch	4
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Purunacuttack	Laigam	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Kantamal	Lakhaparbat	
			Parhal	
Unit - 34	**Minor Irrigation Division, Rayagada**	Executive Engineer, Minor Irrigation Division, Rayagada	Bhagirijhola	5
		Deputy Executive Engineer, Minor Irrigation Sub-Division, Rayagada	Bhaluguda	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Muniguda	Sanamuligaon	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Gunupur	Bishnuguda	
			Siltiguda	
Unit - 35	**Minor Irrigation Division, Jeypore**	Executive Engineer, Minor Irrigation Division, Jeypore	Dasamantapur	6
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Koraput	Kodigam	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Semiliguda	Laxmipur	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Jeypore	Malkanagiri	
			Jagannath Sagar	
			Dunguri	
Unit - 36	**Minor Irrigation Division, Nawarangpur**	Executive Engineer, Minor Irrigation Division, Nawarangpur	Kanheinmunda	2
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Nawarangpur	Kusumijore	
Unit - 37	**Minor Irrigation Division, Kalahndi, Bhawanipatna**	Executive Engineer, Minor Irrigation Division, Kalahndi, Bhawanipatna	Behera	16
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Jaipatna	Benikpur	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Bhawanipatna	Kanteisir	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Dharamgada	Karanjkote	
			Kodabahal	
			Pipalnalla	
			Pratp Pur	
			Pujiladu	
			Tanganakana	
			Tikarapada	
			Turla	
			Chahaka	
			Ghatapada	
			Dalikupa	
			Jamuna Sagar	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
			Karkata	
Unit - 38	**Minor Irrigation Division, Khariar**	Executive Engineer, Minor Irrigation Division, Khariar	Khasbahal	3
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Khariar	Liard	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Sinapali	Pendrawan	
Unit - 39	**Sundergarh Irrigation Division, Sundergarh**	Superitending Engineer,Sundergarh Irrigation Division, Sundergarh	Sarafgarh	2
		Assistant Executive Engineer,Sundergarh Irrigation Sub-Division, Sundergarh	Talsara	
		Assistant Executive Engineer, Talsara Irrigation Sub-division, Talsara		
Unit - 40	**Tel Irrigation Division, Sonepur**	Executive Engineer,Tel Irrigation Division, Sonepur	Hariharjore	1
		Assistant Executive Engineer,Hariharjore Irrigation sub-division, Birmaharajpur		
Unit - 41	**Rourkela Irrigation Division, Rourkela**	Superintending Engineer,Rourkela Irrigation Division, Rourkela	Pitamahal	3
		Assistant Executive Engineer, Pitamahal Irrigation Sub-Division, Kalunga	Kansbahal	
		Assistant Executive Engineer, Rukura Canal Division, Bonai	Rukura	
Unit - 42	**Keonjhar Irrigation Division, Keonjhar**	Executive Engineer, Keonjhar Irrigation Division, Keonjhar	Kanjhari	2
		Assistant Executive Engineer, Kanjhari Irrigation Sub-Division, Keonjhar.	Remal	
		Assistant Executive Engineer, Remal Irrigation Sub-Division, Kesudurapal		
Unit - 43	**Bidyadharapur Canal Division, Bidyadharapur**	Superitending Engineer, Bidyadharapur Canal Division, Bidyadharapur	Salandi	1
		Assistant Executive Engineer, Salandi Dam Sub- Division, Hadagarh		
Unit - 44	**Main Dam Division, Burla**	Superintending Engineer, Main Dam Division, Burla	Hirakud	1
		Assistant Executive Engineer, Main Dam Sub Division, Hirakud		
Unit - 45	**Rourkela Steel Plant, Rourkela**	Steel Authority Of India Limited, Rourkela Steel Plant, Rourkela	Mandira	1
		GM I/c Water Management Department, SAIL, RSP		

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
Unit - 46	**Rengali Dam Division, Rengali Dam Site**	Superintending Engineer, Rengali Dam Division, Rengali Dam Site	Rengali	1
		Assistant Executive Engineer, Rengali Dam Sub-Division-I, Rengali Dam Site		
Unit - 47	**Angul Irrigation Division, Angul**	Superintending Engineer, Angul Irrigation Division, Angul	Derjang	2
		Assistant Executive Engineer, Derjang Aunli Sub Division, Angul	Sapua	
		Assistant Executive Engineer, Sapua Badjore Sub Division, Satmile		
Unit - 48	**Manjore Irrigation Division, Athmallik**	Executive Engineer, Manjore Irrigation Division, Athmallik	Manjore	1
		Assistant Executive Engineer,Manjore Irrigation Sub Division, Athmallik		
Unit - 49	**Bolangir Irrigation Division, Bolangir**	Superintending Engineer, Bolangir Irrigation Division, Bolangir	Upper Suktel	3
		Assistant Executive Engineer, Titilagarh Irrigation Sub Division Salebhata	Gaikhai	
			Titilagarh	
Unit - 50	**Nuapada Irrigation Division, Nuapada**	Superintending Engineer, Nuapada Irrigation Division, Nuapada	Jharabandha	1
		Assistant Executive Engineer, Mandosil Irrigation Sub Division, Mandosil		
Unit - 51	**Deogarh Irrigation Division, Deogarh**	Superintending Engineer, Deogarh Irrigation Division, Deogarh	Gohira	1
		Assistant Executive Engineer, Deogarh Irrigation Sub Division-II, Gohira		
Unit - 52	**R.L.B.C Division, Kamakhyanagar**	Superintending Engineer , R.L.B.C Division, Kamakhyanagar	Dadaraghati	2
		Assistant Executive Engineer, Ramial & Dadaraghati Sub-Division, Kamakhyanagar	Ramiala	
Unit - 53	**Minor Irrigation Division, Keonjhar**	Executive Engineer, Minor Irrigation Division, Keonjhar	Aradei	6
		Deputy Executive Engineer, Minor Irrigation Sub -Division No-I, Keonjhar	Sanamachhakandana	
		Assistant Executive Engineer,Minor Irrigation Sub Division-II, Keonjhar (I/C)	Jagadala	
		Assistant Executive Engineer,Minor Irrigation Sub Division, Telkoi	Hanumantia	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
			Khajuria	
			Tenar	
Unit - 54	**Minor Irrigation Division, Sundargarh**	Executive Engineer, Minor Irrigation Division, Sundargarh	Ghurlijore	8
		Deputy Executive Engineer,Minor Irrigation Sub-Division, Sundargarh	Bargaonmal	
		Assistant Executive Engineer,Minor Irrigation Sub-Division, Hemgir	Chhatenjore	
		Assistant Executive Engineer,Minor Irrigation Sub-Division, Bona	Badjore	
		Assistant Executive Engineer,Minor Irrigation Sub-Division, Subdega	Masinanalla	
		Assistant Executive Engineer,Minor Irrigation Sub-Division, Rourkela	Katanganalla	
			Rungaon	
			Bisrapada	
Unit - 55	**Minor Irrigation Division, Sambalpur**	Executive Engineer, Minor Irrigation Division, Sambalpur	Deojharan	4
		Assistant Executive Engineer, Minor Irrigation Sub Division, Sambalpur	Banksal	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Kuchinda	Tikilipada	
			Sankundeswar	
Unit - 56	**Minor Irrigation Division, Anandapur**	Executive Engineer, Minor Irrigation Division, Anandapur	Sunaghai	10
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Anandapur	Garh	
		Assistant Executive Engineer, Minor Irrigation Sub-Division,Ghatagaon	Sindhei	
		Assistant Executive Engineer, Minor Irrigation Sub-Division, Harichandanpur	Taradia	
			Kureijodi	
			Kalimati	
			Raghubeda	
			Jaunria	
			Sapua	
			Bahutianala	
Unit - 57	**Minor Irrigation Division, Angul**	Executive Engineer, Minor Irrigation Division, Angul	Laupal	5
		Assistant Executive Engineer, Minor Irrigation Sub Division, Athamallik	Jayagarh	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Angul	Raijharan	

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
			Kukurpeta	
			Kansabansa	
Unit - 58	**Minor Irrigation Division, Bolangir**	Executive Engineer, Minor Irrigation Division, Bolangir	Baghjharan	4
		Assistant Executive Engineer, Minor Irrigation Sub Division, Khaprakhol	Ostali	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Patnagarh	Dumberbahal	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Titilagarh	Mathanpala	
Unit - 59	**Minor Irrigation Division, Padampur**	Executive Engineer, Minor Irrigation Division, Padampur	Khandijharan	8
		Assistant Executive Engineer, Minor Irrigation Sub Division, Padampur	Padampurnalla	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Bhatli	Magaranalla	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Gaisilat	Koilijore	
			Kumbho	
			Malkennalla	
			Talkholi	
			Victoriasagar	
Unit - 60	**Minor Irrigation Division, Dhenkanal**	Executive Engineer, Minor Irrigation Division, Dhenkanal	Bedapada	8
		Deputy Executive Engineer, Minor Irrigation Sub Division, Dhenkanal	Gundurposi	
		Deputy Executive Engineer, Minor Irrigation Sub Division, Kamakhyanagar	Jodabadia	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Bhuban	Kalijodi	
			Kankadajhar	
			Panaspal	
			Sarapa	
			Damsal	
Unit - 61	**Minor Irrigation Division, Jharsuguda**	Executive Engineer, Minor Irrigation Division, Jharsuguda	Hatianalla	2
		Assistant Executive Engineer, Minor Irrigation Sub Division, Laikera	Jambonalla	
		Assistant Executive Engineer, Minor Irrigation Sub Division, Lakhanpur		
			Total	**203**

Dam Safety Unit	Name of the Division	Composition of Dam Safety Unit	Name of Specified Dam	Total no. of Dams
1	2	3	4	5
Unit - 62	O&M HE(Joint)Project Circle, APGENCO, Onkadeli, Koraput	Superintending Engineer, O&M HE(Joint)Project Circle,APGENCO,Onkadeli,Koraput-764042	Jalaput	1
			G.Total	**204**

GOVERNMENT OF TAMILNADU
WATER RESOURCES DEPARTMENT

From

Er. P. Rajendran, B.E.,
Chief Engineer, WRD.,
Operation and Maintenance,
Chepauk, Chennai-5.
Email id: **ceomwro@gmail.com**

To

The Chairman,
National DamSafety Authority (NDSA),
Central Water Commission,GOI,
4th Floor(S) Sewa Bhavan,R.K.Puram,
New Delhi-110066.
E-mail id:- memberdr-cwc@nic.in

Lr.No.DS/Dam safety Act/ NDSA/ 2022 dated: 30.11.2022

Sir,

Sub: TNWRD – Dam safety Act, 2021 –Furnishing of report to National Dam Safety Authority (NDSA) on the compliance of Mandates of the Dam Safety Act 2021– Regarding..

Ref:
1. Superintending Engineer & Director, WRD, Dam Safety Directorate, Chepauk, Chennai Lr.No. M / F.10 / HSR-Status of Inspection / DSD / AE IV / 2022 dated 18.10.2022.(Addressed to the Chairman, NDSA)
2. Superintending Engineer & Director, WRD, Dam Safety Directorate, Chepauk, Chennai.Lr.No. M / F.3 / Dam Safety Act / DSD / AE IV / 2022 dated 01.11.2022 addressed to the Chairman ,NDSA.
3. From the Member (Regulation),National Dam Safety Authority letter .No. NDSA/MRG/GEN/2022/111-150,dated 09.11.2022.
4. From the Chairman ,National Dam Safety Authority, Letter No. F.No.3/1/2022/NDSA/M(T)/120-239,dated 10.11.2022
5. Engineer –in-Chief &Chief Engineer(GI), WRD, Chepauk, Chennai letter No.S7(5) /52982/OT6/2022 Dated 11.11.2022 addressed to this office.
6. Special Secretary to Government letter No.18609/WR2/2022-3 dated 17.11.2022 addressed to the EIC &CE(GI),WRD, Chennai & to this office.

****

With reference to the NDSA letters 3rd and 4th cited, I herewith furnish the report on the compliance of Mandates of the Dam Safety Act 2021 as follows.

1. Comprehensive Dam Safety Evaluation (CDSE) Procedure (Chapter IX of Dam Safety Act (DSA):

WRD: In this regard, it is informed that, out of 90 WRD dams, Dam Safety Review Panel (DSRP) has already completed Comprehensive Dam Safety Evaluation (CDSE) for 68 WRD dams under DRIP Phase I project (Period from April 2012 to March 2021). Under DRIP Phase II & III Project (Period from April 2021 to December 2027), 8 new dams along with 29 DRIP I dams ie., (total 37 WRD dams) were proposed for rehabilitation and improvement works and DSRP is being carried out for DRIP II & III dams.

For the remaining 14 WRD dams, the Comprehensive Dam Safety Evaluation (CDSE) will be done in due course.

CE(ESIKE)
Dir (DSD-II)

TANGEDCO: Regarding 38 TANGEDCO dams, DSRP has already completed Comprehensive Dam Safety Evaluation (CDSE) for 20 dams under DRIP Phase I project. Under DRIP Phase II & III Project, remaining 18 dams along with 9 DRIP I dams ie., (total 27 TANGEDCO dams) were proposed for rehabilitation and improvement works and DSRP is being carried out for the DRIP II & III dams.

2. Operation & Maintenance (Section 28 of DSA):

WRD: Out of 90 WRD dams, Operation & Maintenance (O&M) Manual for **68** DRIP Phase-I dams were prepared and published in the CWC website (www.damsafety.cwc.gov.in)

TANGEDCO: Out of 38 TANGEDCO dams, 20 dams were taken up under DRIP Phase I and O&M Manual for 18 dams were prepared and published in the CWC website (www.damsafety.cwc.gov.in). O&M Manual for Mukurthi dam has been sent to CWC for review and for Porthimund dam, it is under preparation.

As per Section 28(2) of the Dam Safety Act, 2021, the Regional Chief Engineers, WRD and Chief Engineer, Hydro, TANGEDCO were requested to prepare the O&M Manual for the balance **22 WRD dams** and **18 TANGEDCO dams** vide Superintending Engineer & Director ,WRD, Dam Safety Directorate, Chennai reference letter 2nd cited.

3. Establishment of Dam Safety Unit (Section 30 of DSA):

WRD: As per Dam Safety Act, 2021, the Dam Safety Units have been formed for all the 90 WRD dams.

TANGEDCO: Out of 38 TANGEDCO dams, the Dam Safety Units are formed for 38 dams.

4. Carrying out timely pre-monsoon and post-monsoon inspections in respect of each dam and report to NDSA (Section 31(1) of DSA):

The following 4 monsoon inspections for all the 128 specified dams (90 WRD & 38 TANGEDCO) are being carried out in Tamilnadu by the field / dam Engineers regularly as per the CWC Proforma and the table is given below.

Sl. No.	Period	Target date for inspection	Target Date for Reporting
1.	Pre Monsoon	10th Apr – 14th Jun	Before 25th June
2.	Monsoon I	15th Jun – 15th Aug	Before 25th August
3	Monsoon II	16th Aug – 14th Nov	Before 25th November
4.	Post Monsoon	15th November-9th April of succeeding year	Before 20th April

With respect to **Pre-Monsoon inspection 2022** (period from 10th April 2022 to 14th June 2022) and **Monsoon I Inspection 2022** (period from 15th June 2022 to 15th August 2022), the

Health Status Reports (HSR) along with the soft copy of the Pre-monsoon 2022 & Monsoon I 2022 Inspection reports for 127 specified dams in Tamil Nadu (90 WRD dams + 37 TANGEDCO dams, except 1 dam in TANGEDCO due to non access of road) were submitted to the Chairman, NDSA vide Superintending Engineer & Director ,WRD, Dam Safety Directorate, Chennai reference letter 1st cited.

The **Monsoon II Inspection report 2022** (period from 16th August 2022 to 14th November 2022) will be received shortly from the concerned Inspecting officers and the same will be scrutinized in this office and will be submitted to the Government and the Chairman,NDSA by the end of December 2022.

As the target date for reporting of post monsoon report is only on before 20th April 2023,the same will be submitted to the Government and Chairman NDSA before June 2023.

30/11/22

for Chief Engineer, WRD.,
Operation and Maintenance,
Chepauk, Chennai-5.

30/11/2022

Copy presented to The Special Secretary to the Government, Water Resources Department, Secretariat, Chennai-9 for information.

Copy to

1. The Member (Regulation),National Dam Safety Authority,9th floor(S),Sewa Shawan,R.K.Puram ,New Delhi-66 for information. email cedesene@nic.in.
2. The Engineer –in-Chief &Chief Engineer(GI), WRD, Chepauk, Chennai-5 for information
3. The Chief Engineer, WRD, Chennai Region, Chennai-5 for information & necessary action.
4. The Chief Engineer, WRD.,Coimbatore Region, Coimbatore for information & necessary action.
5. The Chief Engineer, WRD.,Madurai Region, Madurai. for information & necessary action.
6. The Chief Engineer, WRD.,Trichy Region, Trichy for information & necessary action.
7. The Chief Engineer, Civil DRIP,TANGEDCO, 3rd floor Eastern wing, NPKRR Maaligai, No. 144, Anna Salai, Chennai-2 for information & necessary action.
8. The Chief Engineer, Hydro,TANGEDCO, 5th floor Eastern wing, NPKRR Maaligai, No. 144, Anna Salai, Chennai-2 for information & necessary action.
9. The Superintending Engineer & Director, WRD, Dam Safety Directorate, Chennai-5 for information and taking necessary follow-up action

Annexure XII - A

Category I Dams as per post monsoon inspections 2022-23

S. No.	Name of Dam	State	River Basin	Year of Completion	Type	Design Dishcharge (cumec)	Length of Crest, m	Height, m	Capacity, MCM	Reasons	Remedial Measures
1.	Laigaon	Odisha	Gouduni Nala, Mahanadi Basin	1971	Earthen	345.26	580	15.84	1.63	Sinkholes in d/s slope, Cracks on Slope, Movement/Settlement of Soil Mass etc	Works proposed under DRIP for redesign of rip-rap, construction of drains, dwarf wall, reconstruction of wing wall of surplus escape etc
2.	Kumbho	Odisha	Kumbho Nala, Mahanadi Basin	1995	Earthen	242	165	18.24	4.06	Sinkholes near abutments, Leakage, uneven settlement on dam top, EDA damaged in floods	Works proposed under DRIP for Backfilling of sink holes, Provision of Loading Berm, Construction of drains, renovation of rip rap etc.
3.	Parhel	Odisha	ParhelNala, Mahanadi Basin	1988	Earthen	132.44	530	15.34	1.12	Issues in Dam Slope, Cracks etc	Works proposed under DRIP for resectioning of dam slope, treatment of cracks etc.
4.	Rukura	Odisha	RukuraNala, Brahamani Basin	2018	Earthen	1442.5	1133	26	43.9	Sinkholes, Seepage through dam body/foundation, Uneven settlements on rip rap etc.	Technical Investigations by CSMRS
5.	Jirgo	UP	Jirgo River, Ganga Basin	1958	Earthen	1994.33 (Revised to 3537)	8600	29.9	147.45	Design flood has been reviewed and revised from 1994.33 cumecs to 3537 cumecs	Works proposed under DRIP for Construction of additional spillway, Repair of Floor & Side Wall of Flood Escape Gate, Strengthening of earthwork at D/S Slope etc.

S. No.	Name of Dam	State	River Basin	Year of Completion	Type	Design Dishcharge (cumec)	Length of Crest, m	Height, m	Capacity, MCM	Reasons	Remedial Measures
6.	Lower Khajuri	UP	Khajuri River, Ganga Basin	1949	Composite	1293	366	20.20	1.465	Seepage problem through the body due to which bulging of stone masonry has been observed etc.	Works proposed under DRIP for Seepage treatment, Gates repair, Tomography & Resistivity Imaging Survey, Stability Analysis etc.
7.	Cholavaram	TN	Tank (Kosastha Paiyar, Chennai Basin)		Earthen		108	19.96	30.61	Longitudinal crack at middle of the bund from LS 2600 m to 2800 m and there has been a local slippage in bund, Weed growth in the u/s and d/s slopes etc.	Works proposed under DRIP for testing of shear strength, stability analysis etc.
8.	Khoripura	MP	Local Nala, Narmada Basin	1984	Earthen	85	1545	12	2.45	Seepage was found in the downstream Nala Portion of the reservoir, etc.	Treatment of seepage in d/s portion of the dam, Repair of Retaining wall & Re-sectioning of dam etc.

Annexure XII - B

Category II Dams as per post monsoon inspections 2022-23

State Wise List:

State	Number of Cat-II Dams
Bihar	1
Chhattisgarh	1
Jharkhand	6
Karnataka	7
Madhya Pradesh	7
Odisha	32
Punjab	3
Tamil Nadu	13
Telangana	18
Uttar Pradesh	14
Uttarakhand	8
West Bengal	5
Grand Total	**115**

Dam Wise List:

S. No.	Name of Dam	State
1	Kharagpur Lake	Bihar
2	Jaipur Reservoir	Jharkhand
3	Katri Reservoir	Jharkhand
4	Ranital Reservoir	Jharkhand
5	Butanduba Reservoir	Jharkhand
6	Malay Reservoir	Jharkhand
7	Temarain Reservoir	Jharkhand
8	Ardei	Odisha
9	Arikul	Odisha
10	Badjore ,Mayurbhanja	Odisha
11	Baghua	Odisha
12	Bhatrajore	Odisha
13	Bhetabar	Odisha
14	Garh	Odisha
15	Gohira	Odisha
16	Gundurposi	Odisha
17	Haguri	Odisha
18	Hanumantia	Odisha

19	Hariharjore	Odisha
20	Jagadala	Odisha
21	Jagataghai	Odisha
22	Jamunabandha	Odisha
23	Juanria	Odisha
24	Kalimati	Odisha
25	Kanjhari	Odisha
26	Karada	Odisha
27	Khajuria	Odisha
28	Kodabahal	Odisha
29	Kumarkhunti	Odisha
30	Mahisanalla	Odisha
31	Panaskhal	Odisha
32	Raghubeda	Odisha
33	Randa	Odisha
34	Ret	Odisha
35	Rissia	Odisha
36	Sanamuligaon	Odisha
37	Satiguda (UKP)	Odisha
38	Sindhei	Odisha
39	Suhagi	Odisha
40	MALIARAJORE	West Bengal
41	DANGRA	West Bengal
42	SALI	West Bengal
43	HANUMATA	West Bengal
44	Jainti Dam	Punjab
45	Perch Dam	Punjab
46	Mirzapur Dam	Punjab
47	Jamini dam	Uttar Pradesh
48	Shahzad dam	Uttar Pradesh
49	Dhandraul dam	Uttar Pradesh
50	Baigul dam	Uttar Pradesh
51	Dhora dam	Uttar Pradesh
52	Sharda sagar dam	Uttar Pradesh
53	Chandra prabha tank	Uttar Pradesh
54	Rihand dam	Uttar Pradesh
55	Gangau dam	Uttar Pradesh

56	Pahunj dam	Uttar Pradesh
57	Adwa dam	Uttar Pradesh
58	Sirsi dam	Uttar Pradesh
59	Tumaria Dam	Uttarakhand
60	Tumaria Extention Dam	Uttarakhand
61	Bhimtal Dam	Uttarakhand
62	Kosi Barrage Ramnagar	Uttarakhand
63	Joshiyara Barrage	Uttarakhand
64	Maneri Dam Stage-I	Uttarakhand
65	Dhela Barrage	Uttarakhand
66	Philka Barrage	Uttarakhand
67	Almatti	Karnataka
68	Thonnur	Karnataka
69	Votehole	Karnataka
70	Devarabilikere	Karnataka
71	Hagari Bommana Halli Pickup	Karnataka
72	Hirehalla	Karnataka
73	Talakalale	Karnataka
74	Siddhamalli	Tamil Nadu
75	Sholayar	Tamil Nadu
76	Kadamparai	Tamil Nadu
77	Teesta low dam-III Barrage	West Bengal
78	Thunakkadavu	Tamil Nadu
79	Srisailam Project	Telangana
80	Bhimgoda	Uttar Pradesh
81	Bambassa	Uttar Pradesh
82	Upper Palakmati	Madhya Pradesh
83	Banda Bedra Dam	Madhya Pradesh
84	Chandia Nalla Upper Lower	Madhya Pradesh
85	Barka	Madhya Pradesh
86	Bhamkapura	Madhya Pradesh
87	Samrat Ashok Sagar	Madhya Pradesh
88	NayaKheda	Madhya Pradesh
89	Siddhamalli	Tamil Nadu
90	Sholayar	Tamil Nadu
91	Anaikuttam	Tamil Nadu

92	Golwarpatti	Tamil Nadu
93	Kodaganar	Tamil Nadu
94	Nanganjiyar	Tamil Nadu
95	Uppar(Tiruppur)	Tamil Nadu
96	Kadamparai	Tamil Nadu
97	Pillur	Tamil Nadu
98	Ravi Shankar Sagar Project	Chhattisgarh
99	Sathnala	Telangana
100	Kaddem Project	Telangana
101	Siram Sagar Project	Telangana
102	Nizam Sagar	Telangana
103	Koulasnala Project	Telangana
104	Gujjulavagu Project, Gandhari	Telangana
105	Pothangal Project, Pothangal	Telangana
106	Komarambhim Project	Telangana
107	Shanigaram	Telangana
108	Singur	Telangana
109	Musi Project	Telangana
110	Jurala Project	Telangana
111	Relampadu	Telangana
112	Gundlavagu Project	Telangana
113	Malluruvagu	Telangana
114	Pakhal Lake	Telangana
115	Pedda Vagu	Telangana

Annexure XIII

State wise List of Status of Inspection of Large Dams in India

(As on 04.05.2023)

Sl. No.	States/UT	Total No. of Large Dams completed (As per NRLD, 2019)	Nos. of Dams Inspected as reported by States (Post-Monsoon 2022-23)	Nos. of Dams Inspected as reported by States (Pre-Monsoon 2023-24)
1	Andhra Pradesh	149	80	-
2	Arunachal Pradesh	1	4*	-
3	Assam	3	4*	-
4	Bihar	24	29*	11
5	Chhattisgarh	249	127	-
6	Goa	5	6*	6
7	Gujarat	620	598	44
8	Haryana	1	3*	-
9	Himachal Pradesh	19	23*	-
10	Jharkhand	55	31	-
11	Karnataka	230	231*	-
12	Kerala	61	61	-
13	Madhya Pradesh	899	428	32
14	Maharashtra	2117	2445*	-
15	Manipur	3	4*	-
16	Meghalaya	8	7	-
17	Mizoram	1	1	-
18	Nagaland	1	1	-
19	Odisha	200	204*	-
20	Punjab	14	15*	-
21	Rajasthan	204	209*	-
22	Sikkim	2	2	-
23	Tamil Nadu	118	128*	-
24	Telangana	168	177*	51
25	Tripura	1	1	-
26	Uttar Pradesh	117	139*	28
27	Uttarakhand	17	23*	-
28	West Bengal	30	30	-
29	Andaman and Nicobar Island (UT)	2	0	-
30	Jammu and Kashmir (UT)	15	10 8 (J&K) 2 (Ladakh)	-
31	Ladakh (UT)			-
	Total	**5334**	**5021**	**172**

***** *NRLD-2019 was published based upon the information provided by States/project authorities. Now the same has to be updated based upon the revised information submitted by the states on numbers of dams meeting the criteria of large dam.*

Note: The above list also includes 65 specified dams where NDSA act as SDSO.

Annexure XIV

Category wise details of dams where NDSA shall act as SDSO

A-Dams owned by CPSUs

S No	Agency	Dams owned	Post Monsoon inspection conducted	Category I	Category II
1	National Hydroelectric Power Corporation (NHPC)	20	20	0	1
2	Narmada Hydro Development Corporation (NHDC)	2	2	0	0
3	National Thermal Power Corporation (NTPC)	1	1	0	0
4	Bhakra Beas Management Board (BBMB)	4	4	0	0
5	Damodar Valley Corporation (DVC)	4	4	0	0
6	North Eastern Electric Power Corporation Limited (NEEPCO)	8	8	0	0
7	Satluj Jal Vidyut Nigam Ltd (SJVNL)	1	1	0	0
8	Tehri Hydro Development Corporation Limited (THDCL)	2	2	0	0
9	Kudremukh Iron Ore Company Limited	1	1	0	0
10	Steel Authority of India Limited Rourkela	1	1*	0	0
	Total (A)	44	44	0	1

B-Dams owned by one state and located in another state/inter-state dams

S No	Dam is owned by	Dam is situated in	Dams owned	Post Monsoon inspection conducted	Category I	Category II
1	Uttar Pradesh	Uttarakhand	7	7	0	4
2	Uttar Pradesh	Madhya Pradesh	3	3	0	1
3	West Bengal	Jharkhand	1	1	0	0
4	Tamil Nadu	Kerala	4	4	0	1
5	Andhra and Telangana	#	2	2*	0	0
6	Tungabhadra Board	Andhra and Karnataka	1	1	0	0
7	Odisha and Andhra	Andhra	1	1*	0	0
8	Betwa River Board	MP & UP	1	1	0	0
9	Bihar	Jharkhand	1			
Total (B)			21	20	0	6

Dams under NDSA (A+B)	**Post Monsoon inspection conducted**	**Category I**	**Category II**
65	**64**	**0**	**7**

* Dam owners have not specified category.

NDSA Letter dated 03.04.2023

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
National Dam Safety Authority
Office of Member (Regulation)

Letter no. NDSA/MRG/GEN/2022/ 7-45 Date: 03 .04.2023

To,

SDSOs of all concerned States and UTs/ All CPSUs/ Dam Owners (As per List Attached)

Sub: Implementation of Provisions of Dam Safety Act (DSA) 2021 - regarding.
Ref: (1) This office even number letter dated 26.08.2022
(2) This office even number letter dated 09.11.2022

Sir,

Please refer to the above cited letters (Copy enclosed), vide which this office had requested to all the SDSOs/ CPSUs/ Dam Owners for the implementation of provisions of Dam Safety Act (DSA) 2021.

In this regard, it is requested to submit the following by 24th April 2023:

Clause/ Provision as per DSA 2021	Subject	Information Sought
18	Maintenance of Log books	1. No. of specified dams for which log books are not available? 2. Log book record (Photocopies/ PDF) for the year 2022 for any 5nos. (2 high, 1 medium and 2 low height) specified dams under your jurisdiction.
32	Instrumentations to be installed in every specified dam.	1. No. of specified dams for which no instrument is in place? 2. Methodology to be adopted for installation of instruments as per the guidelines/ regulations? 3. Instrumentation record of at least 3 instruments each from any 5 nos. (2 high, 1 medium and 2 low height) specified dams under your jurisdiction for the duration Jan – March 2023.
33	Hydro meteorological Station	1. No. of specified dams for which there is no hydro meteorological station in the vicinity of specified dam? 2. Record of hydro meteorological station in the vicinity of any 5 nos. (2 high, 1 medium and 2 low height) specified dams for March 2023 under your jurisdiction.

सातवां तल (द), सेवा भवन
आर. के. पुरम, नई दिल्ली- 66
फ़ोन - 011-29583608
ई-मेल - cedesene@nic.in

9th Floor (S), Sewa Bhawan
R.K.Puram, New Delhi 66
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सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
National Dam Safety Authority
Office of Member (Regulation)

Clause/ Provision	Subject	Information Sought
34	Seismological Station	1. No. of specified dams for which there is no seismological station in the vicinity of specified dam? 2. Record of seismological station in the vicinity for any 2 nos. (Preferably the highest dam & lowest dam) specified dams for year 2022 under your jurisdiction.
27	Initial filling of reservoirs	1. No. of dams under construction which fall under specified dams as per DSA 2021. 2. Diversion arrangement being adopted and also proposed initial reservoir filling methodology specific to each specified dam under construction under your jurisdiction.
28	Operation & Maintenance (O&M)	1. No. of specified dams for which there is no Operation & Maintenance Manual? 2. O&M Manual (scanned PDF format etc.) for 2 nos. (highest and lowest dam) specified dams under your jurisdiction.
30	Dam Safety Unit (DSU)	1. No. of specified dams for which there is no DSU established? 2. DSU Establishment office order/ constitution order copy (PDF) for 3 nos. (Highest, Medium and Lowest height) specified dams under your jurisdiction.

Yours sincerely,

Vivek Tripathi,
Member (Regulation)

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सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
National Dam Safety Authority
Office of Member (Regulation)

Copy for kind information to :

1. Secretary, DoWR, RD & GR, Ministry of Jal Shakti, New Delhi.
2. Chairman, NCDS & Chairman, CWC
3. Chairman, NDSA, New Delhi and Member (D&R), CWC.
4. SDSOs of all concerned States and UTs/ All CPSUs/ Dam Owners (As per List Attached)
5. Member (Policy & Research), NDSA, New Delhi
6. Member (Technical), NDSA, New Delhi
7. Member (Disaster & Resilience), NDSA, New Delhi
8. All Regional Directors of NDSA

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NDSA Letter dated 16.01.2023

भारत सरकार/ Government of India
जल शक्ति मंत्रालय/ Ministry of Jal Shakti
जल संसाधन नदी विकास एवं गंगा संरक्षण विभाग/ Dept. of Water Resources, RD&GR
राष्ट्रीय बाँध सुरक्षा प्राधिकरण/ National Dam Safety Authority
****

Letter no.259-1/NDSA/2022/37/112-160 **Dated:16.01.2023**

Subject: Request for recommending domain experts for constitution of Sub-Committees in various domains for the National Committee on Dam Safety (NCDS)– reg.

Sir(s),

As you are aware that the Dam Safety Act (DSA), 2021 has been notified on 14.12.2021 and it has become effective from 30th December 2021. As per the provisions of Section 5(1) of DSA, 2021, the Central Government has constituted National Committee on Dam Safety (NCDS) under the chairmanship of Chairman, Central Water Commission (CWC) vide Gazette Notification dated 17.02.2022.

2. It is proposed to constitute 9 Sub-Committees to render technical advice to the National Committee on Dam Safety on the identified domains. The details of the Sub-Committees to be constituted are enclosed herewith as Annexure-I.

3. Suitable experts are required to be made members of the sub-committee for which broad based consultations are being held. In this regard you are also requested to send the list of domain experts for the various Sub-Committees from your Institution/Organisation along with their updated CVs within the period of 15 days at email IDs: dsd2dte-cwc@gov.in & sect-ncds@gov.in for consideration .

Yours Sincerely

Encl: A/a

(Vijai Saran)
Member (Policy & Research)

To

A. IITs

1. Director, Indian Institute of Technology Bombay, Powai Mumbai
   [Email: director@iitb.ac.in]
2. Director, Indian Institute of Technology Delhi, Hauz Khas New Delhi
   [Email: director@admin.iitd.ac.in]
3. Director, Indian Institute of Technology Guwahati, Guwahati
   [Email: director@iitg.ac.in]
4. Director, Indian Institute of Technology Kanpur, Kalyanpur, Kanpur
   [Email: director@iitk.ac.in]
5. Director, Indian Institute of Technology Kharagpur, Kharagpur

[Email: director@iitkgp.ac.in

6. Director, Indian Institute of Technology Madras, Chennai
   [Email: director @iitm.ac.in]
7. Director, Indian Institute of Technology Roorkee, Roorkee
   [Email: director@iitr.ac.in]
8. Director, Indian Institute of Technology (BHU), Varanasi
   [Email: director@iitbhu.ac.in]

B. <u>SDSO of States/UTs</u>

1. Chairman, State Dam Safety Organisation, Andhra Pradesh
   [Email:ce-damsafety@ap.gov.in, ce_hydrology@ap.gov.in]
2. Chairman, State Dam Safety Organisation, Arunachal Pradesh
   [Email: samanronrang@gmail.com]
3. Chairman, State Dam Safety Organisation, Assam
   [Email: saurav.saikia@apgcl.org]
4. Chairman, State Dam Safety Organisation, Bihar
   [Email: sdsobihar@gmail.com]
5. Chairman, State Dam Safety Organisation, Chhatisgarh
   [Email: cemrp@cgwrd.in, rakeshnagaria@gamil.com]
6. Chairman, State Dam Safety Organisation, Goa
   [Email: ankush.gaunker@gmail.com]
7. Chairman, State Dam Safety Organisation, Gujarat
   [Email: ce-ng-nwrws@gujarat.gov.in]
8. Chairman, State Dam Safety Organisation, Haryana
   [Email: mahadev395@gmail.com]
9. Chairman, State Dam Safety Organisation, Himachal Pradesh
   [Email: djjayin@gmail.com]
10. Chairman, State Dam Safety Organisation, Jharkhand
    [Email: cedesign-wrd-jhr@nic.in]
11. Chairman, State Dam Safety Organisation, Karnataka
    [Email: cedsobengaluru@gmail.com]
12. Chairman, State Dam Safety Organisation, Kerala
    [Email: cedamsafety@gmail.com]
13. Chairman, State Dam Safety Organisation, Madhya Pradesh
    [Email: encwrbpl@mp.nic.in, sdso_bhopal@yahoo.co.in]
14. Chairman, State Dam Safety Organisation, Maharashtra
    [Email: cehpswnasik@gmail.com]
15. Chairman, State Dam Safety Organisation, Manipur
    [Email: drip.manipur@gmail.com]
16. Chairman, State Dam Safety Organisation, Meghalaya
    [Email: bloomingwahlang@gmail.com]
17. Chairman, State Dam Safety Organisation, Mizoram
    [Email: phedeseurban@gmail.com]
18. Chairman, State Dam Safety Organisation, Nagaland
    [Email: addlcec.kohima@gmail.com]
19. Chairman, State Dam Safety Organisation, Odisha
    [Email: cedamsafety.odisha@gmail.com]

20. Chairman, State Dam Safety Organisation, Punjab
    [Email: cesdsopb@gmail.com]
21. Chairman, State Dam Safety Organisation, Rajasthan
    [Email: ceswrpd.wr@rajasthan.gov.in]
22. Chairman, State Dam Safety Organisation, Sikkim
    [Email: rabi2006@gmail.com]
23. Chairman, State Dam Safety Organisation, Tamil Nadu
    [Email: ceomwro@gmail.com]
24. Chairman, State Dam Safety Organisation, Telangana
    [Email: sdsotelangana2022@gmail.com]
25. Chairman, State Dam Safety Organisation, Tripura
    [Email: managing.director@tsecl.in]
26. Chairman, State Dam Safety Organisation, Uttarakhand
    [Email: ce.ddn.id@gmail.com]
27. Chairman, State Dam Safety Organisation, Uttar Pradesh
    [Email: cedesigniduplu-up@nic.in]
28. Chairman, State Dam Safety Organisation, West Bengal
    [Email: ce-dr@wbiwd.gov.in]
29. Chairman, UT Dam Safety Organisation, A&N Island
    [Email: ceapwd@and.nic.in]
30. Chairman, UT Dam Safety Organisation, Jammu & Kashmir
    [Email: babbisharma803@gmail.com]
31. Chairman, UT Dam Safety Organisation, Ladakh
    [Email: cepheifcladakh@gmail.com]

C. CPSUs

1. CMD, NHPC, NHPC Office Complex, Sector-33, Faridabad
   [Email: cmd@nhpc.nic.in]
2. CMD, NTPC, NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road, New Delhi —110003 [Email: ntpccc@ntpc.nic.in]
3. Chairman, BBMB, Sector 19-B, Madhya Marg, Chandigarh- 160019
   [Email: cman@bbmb.nic.in]
4. CMD, SJVNL, Shakti Sadan, Corporate Head Quarter, Shanan, Shimla, HP
   [Email: sectt.cmd@sjvn.nic.in]
5. CMD, THDC, Corporate Office, Rishikesh, Pragatipuram, By Pass Road, Rishikesh-249201[Email:cmd@thdc.co.in]
6. Chairman & Managing Director, NEEPCO Ltd., Lower New Colony, Shillong-793003 [Email: cmdneepco@neepco.co.in]
7. Chairman DVC, DVC Headquarter, VIP Road, Kolkata
   [Email: chairman@dvc.gov.in]

D. Copy for kind information to:

1. PPS to Chairman CWC and Chairman NCDS, New Delhi
2. PPS to Member (D&R) CWC and Chairman NDSA, New Delhi
3. PPS to JS (RD&PP), DoWR, RD & GR, MoJS, New Delhi

Annexure-I

The details of the Sub-Committees are as follows:

S.No.	Sub-Committee on	Domain Areas of the Sub-Committee (but not limited to)
1	Dam Safety Management	Dam Break Analysis Downstream Inundation Risk Classification Disaster Management Actions Dam Safety Management Approach
2	Hydraulic Safety	Upstream Precipitation Water Catchments Overtopping of Dams
3	Hydrological Safety	Reservoir Capacity Silting mechanisms and profiles De-silting need and techniques
4	Structural Engineering and Earthquake Safety	Seismic Hazard Assessment Structural Analysis Structural Design Structural Vulnerability Structural Risk Assessment Structural Safety Evaluation Earthquake Instrumentation Continued Operations of: (a) Appurtenant Structures, and (b) Penstocks and Outlets
5	Geological, Geophysical and Geotechnical Safety	Dam Foundation Reservoir Rim Stability
6	Hydro-Mechanical and Electrical Systems Safety	Locking of Gates Spillways and Energy Dissipaters Outlets Water Level Monitoring Hydro-power Generation Grid Failure Flooding of Power Stations
7	Monitoring and Instrumentation	Sensors: Monitoring of Dams Technical Software: GIS, Flood Routing, Dam Break Analysis, Seismic Structural Analysis, etc. Telemetry: Wireless & Wired Systems, Computer Sensors, etc.
8	R&D and Standards Development	Scrutiny of R&D Proposals on specific domains received for funding from Industry, academia & research organizations Research through Doctoral Programs
9	Capacity Development	Human Resource Requirement Resource Persons & Master Trainers Resource Materials Model Curriculum for degree programs Training of Engineers in different subjects (Post-Graduate Diploma Programs in Dam Safety; 1-day Sensitization Programs on specific themes)

Comments on Draft ToR & ToC for the Constitution of Sub-committees

Email **Dam Safety Design II**

Re: Draft Terms of References and Terms of conditions for the proposed Sub-committee of National Committee on Dam Safety (NCDS) on 'Structural Engineering and Earthquake Safety of Dams' -reg

From : cvrm@iitm.ac.in Thu, Apr 27, 2023 06:08 PM

Subject : Re: Draft Terms of References and Terms of conditions for the proposed Sub-committee of National Committee on Dam Safety (NCDS) on 'Structural Engineering and Earthquake Safety of Dams' -reg 1 attachment

To : Dam Safety Design II <dsd2dte-cwc@gov.in>

Cc : yogendra singh <yogendra.singh@eq.iitr.ac.in>, schowdhury@nhpc.nic.in, sankhadipchowdhury@gmail.com, belsare sanjay <belsare.sanjay@gmail.com>, fesadte-cwc <fesadte-cwc@nic.in>, Chairman cwc <chairman-cwc@nic.in>, Sanjay Kumar Sibal <memberdr-cwc@nic.in>, CEDSO <cedams@nic.in>, dsrinagesh@iitm.ac.in, idgrh4@gmail.com, yogendra eq <yogendra.eq@gmail.com>

Dear Mr. Gautam:

Thank you for the draft ToR of the Sub-Committee. Based on inputs received so far from our Members, here is the revised draft ToR of the Sub-Committee.

Thank you and with warm regards...
CVRMurty
..

P. S. Rao Institute Chair Professor
Department of Civil Engineering
Indian Institute of Technology Madras
Chennai 600036

cvrm@iitm.ac.in
(044) 2257 4302

From: Yogendra Singh <yogendra.eq@gmail.com>
Sent: 27 April 2023 16:58
To: Srinagesh D; 'Ishwer Datt Gupta'; 'Dam Safety Design II'
Cc: Murty C V R; 'yogendra singh'; schowdhury@nhpc.nic.in; sankhadipchowdhury@gmail.com; 'belsare sanjay'; 'fesadte-cwc'; 'Chairman cwc'; 'Sanjay Kumar Sibal'; 'CEDSO'
Subject: RE: Draft Terms of References and Terms of conditions for the proposed Sub-committee of National Committee on Dam Safety (NCDS) on 'Structural Engineering and Earthquake Safety of Dams' -reg

Dear Mr. Gautam,

I also agree with the views expressed by Prof. Gupta and Dr. Srinagesh, and I guess the Ministry/CWC also has the same understanding. The role of this sub-committee will be to provide guidance on development of various guidelines and documents. The actual development of these guidelines/documents shall be executed through suitable agencies in

project mode. The resources from DRIP-I and DRIP-II and services of various centres of excellence can be mobilized for this purpose.

With regards,

Yogendra Singh

From: Srinagesh D <dsrinagesh@iitm.ac.in>
Sent: 27 April 2023 09:35
To: Ishwer Datt Gupta <idgrh4@gmail.com>; Dam Safety Design II <dsd2dte-cwc@gov.in>
Cc: Murty C V R <cvrm@iitm.ac.in>; yogendra singh <yogendra.singh@eq.iitr.ac.in>; yogendra eq <yogendra.eq@gmail.com>; schowdhury@nhpc.nic.in; sankhadipchowdhury@gmail.com; belsare sanjay <belsare.sanjay@gmail.com>; fesadte-cwc <fesadte-cwc@nic.in>; Chairman cwc <chairman-cwc@nic.in>; Sanjay Kumar Sibal <memberdr-cwc@nic.in>; CEDSO <cedams@nic.in>
Subject: Re: Draft Terms of References and Terms of conditions for the proposed Sub-committee of National Committee on Dam Safety (NCDS) on 'Structural Engineering and Earthquake Safety of Dams' -reg

Dear Mr R K Gautam,
You have provided the draft Terms of Reference and conditions for the proposed Sub committee and I am thankful for the same

The terms of reference mentioned in Section 2 (a) with sub items i to vi requiring to prepare draft guidelines and manuals is a herculean task since as it requires a dedicated team in preparing these documents. I completely agree with Dr I D Gupta former Director of CWPRS that this task is assigned in project mode.

However, I have also a suggestion that under DRIP1 manuals and draft guidelines have prepared by external consultants for some of these sub items.

I request you to kindly approach the Project Director of DRIP 2 and 3 as you are one of the three Directors under the new DRIP Program, for the above mentioned manuals. If the manuals are already prepared the same may be circulated among the members for their comments and suggestions.

Warm regards

Srinagesh

From: Ishwer Datt Gupta <idgrh4@gmail.com>
Sent: Wednesday, April 26, 2023 4:14 PM
To: Dam Safety Design II
Cc: Murty C V R; yogendra singh; yogendra eq; schowdhury@nhpc.nic.in; sankhadipchowdhury@gmail.com; Srinagesh D; belsare sanjay; fesadte-cwc; Chairman cwc; Sanjay Kumar Sibal; CEDSO
Subject: Re: Draft Terms of References and Terms of conditions for the proposed Sub-committee of National Committee on Dam Safety (NCDS) on 'Structural Engineering and Earthquake Safety of Dams' -reg

Dear Mr. R K Gautam,
Thank you for providing the draft Terms of References and Terms of conditions for the proposed Sub-committee of National Committee on Dam Safety (NCDS) on ***'Structural Engineering and Earthquake Safety of Dams'.*** I have to offer the following observations on the same.

The terms of reference under item 2(a) indicates preparation of Guidelines/Manuals on the following six items:

i. Seismic Analysis of dams (Concrete & Embankment) and assessment criteria
ii. Assessment of Structural and Seismic Safety of dams
iii. Vulnerability Assessment of dams
iv. Dam Safety Evaluation including Seismic & Risk Assessment
v. Proposed rehabilitation & retrofitting of dams
vi. Any other aspect related to Structural Engineering and Earthquake Safety of Dams

I have some reservations about the feasibility of this big task to be performed by a committee of this type the modus operandi of which will mainly be to discuss the issues during meetings and only limited times devoted preceding and following the meetings. It is necessary that the job of preparing the draft Guidelines/manuals is awarded in the project mode and the present committee provides guidance for the same and then review and finalize the guidelines.

Dr. Ishwer Datt Gupta
Ex-Director, CWPRS Pune
Mobile +91 9423008130

On Mon, Apr 24, 2023 at 2:24 PM Dam Safety Design II <dsd2dte-cwc@gov.in> wrote:

> Sir,
>
> With reference to the subject matter, please find attached draft Terms of References and Terms of conditions for the proposed Sub-committee of National Committee on Dam Safety (NCDS) on ***'Structural Engineering and Earthquake Safety of Dams'.***
> In this regard, it is requested that the comments/views (if any) on above may be provided on or before 28th April, 2023 for obtaining concurrence of MoJS.
>
> With Regards
> R K Gautam
> Director

APPENDIX A. INSPECTION FIELD KIT EQUIPMENT

General Inspection Equipment

Inspection Checklist – Serves as a reminder to inspect for all important features and conditions. An example is presented in Appendix B.

General Embankment Sketch – A sketch of a typical dam embankment may be used to denote the location and dimensions of deficiencies on the embankment and abutments of the dam. A ruler may be useful for scaling dimensions on the sketch. A high-resolution aerial photograph of the dam is recommended for use during dam inspections.

Notebook and Pencil – It is important to write down observations at the time they are made. This reduces mistakes and the need to return to the area to refresh an inspector's memory. A clipboard can provide a sturdy writing surface.

Voice Recording Device – A small portable voice recorder can be used effectively to make a record of field observations when it is not convenient to make written notes. Most smartphones can record voice messages.

Camera – Photographs offer a reliable record of observed field conditions. They can be valuable in comparing past and present configurations. An inexpensive model usually takes pictures good enough for inspection records. Modern digital cameras are excellent for the development of comprehensive photographic records.

Hand Level – This is needed to find areas of interest accurately and to determine embankment heights and slopes. A surveying rod (stadia rod) or another type of measuring rod is a useful aid in making measurements.

Probe – A probe gives information on conditions below the surface, such as the depth and softness of a saturated area. Also, by observing moisture brought up on the probe's surface, an inspector can decide whether an area is saturated or simply moist. Probes with a metal tip are preferred. An effective and inexpensive probe can be made by removing the head from a golf club.

Tape Measure – Many descriptions are not accurate enough when estimated or paced. The tape measure provides accurate measurements which allow meaningful comparisons to be made.

Flashlight – The interior of an outlet in a dam can often be inspected adequately without crawling through by using a good flashlight or fluorescent lantern.

Shovel – A long-handled shovel is useful in clearing drain outfalls, removing debris, and locating monitoring points. A short-handled shovel may suffice and is more convenient to carry.

Rock or Geologist Hammer – Questionable-looking riprap or concrete can be checked for soundness with a rock hammer. Care must be taken not to break through thin spots or cause unnecessary damage.

Bonker – The condition of support material behind concrete or asphalt faced dams cannot be found out by observing the surface or facing. By firmly tapping the surface or the facing material, conditions below can be determined by the sound produced when the material is tapped. Facing material supported fully by fill material produces a "click" or "bink" sound while facing material that is over a void or hole in the facing produces a "clonk" or "bonk" sound. The bonker can be made of 30 mm diameter hardwood dowel with a metal tip firmly affixed to the tapping end. A rubber shoe like those on some furniture legs is recommended for the other end to allow the bonker to be used as a walking aid on steep, slippery slopes.

Binoculars – These are useful for inspecting limited access areas especially on concrete dams. They are also helpful for inspecting risers and trash racks that are not accessible from the dam embankment.

Bucket and Timer – These are used to make approximate measurements of seepage or leakage flows. Calculating the time needed for the seepage flow to fill the bucket enables an inspector to calculate the number of gallons per minute. Various container sizes may be needed, depending on the flow rates. More exact measurements can be made with a flow meter when the discharges are large.

Stakes and Flagging Tape – These are used to mark areas requiring future attention and to stake the limits of existing conditions, such as cracks and wet areas, to allow future comparison.

Knife or Machete – These tools can be useful for clearing weeds and brush, and for scraping rocks or soil.

First-Aid Kit – A basic first-aid kit should be part of every dam inspection kit in case of injury. At a minimum, it should include assorted bandages, antiseptic medicine, pain relief tablets, sunburn lotion, ice packs, a splint, sterilized gauze, scissors, tweezers, and sterilized tape.

Special Equipment

Video Camera – A video camera, preferably digital, can be used to record the entire site; this may be especially useful for concrete and masonry dams or spillways where access is difficult. A high-power magnification can be useful when video recording concrete and masonry dams. Most video cameras are equipped with sound and date recorders.

Inclinometer – An inclinometer is used to make quick measurements of embankment slopes.

Flow Meter – This instrument is used to measure flow velocity and quantity. The flow must be large; small amounts of seepage cannot be measured with a flow meter.

TV Monitor – A TV monitor is used to view and record conditions inside pipes and conduits that are inspected with a video camera mounted on a remote-controlled vehicle.

Two-way Radios – These are useful for communications when more than one inspector is present on large sites.

Confined Space Access Equipment – This includes equipment for personnel access to vertical risers or discharge conduits where emergency retrieval may be necessary. This includes such things as ropes, harnesses, and ladders. It also includes portable gas meters for testing confined spaces for harmful gasses that may be present. These may be required when entering discharge structures under the ground.

Boats – A boat may be required for access to areas on the reservoir, including shorelines and spillways.

Piezometer Gage or Water Level Indicator – Used to measure depth to water in piezometer or water wells.

Laptop Computers – These portable computers are a convenient tool for making field inspections cost effective and efficient. The computers must have software that is designed for dam inspections and must be compatible with other office equipment so that the information can be readily transferred to the inspection report. Pocket PC's are often referred to as "PDA's."

Global Positioning Sensor (GPS) – Handheld GPS units are recommended for use in mapping deficiencies found during inspections, such as areas were water is seeping from the ground, slides, and cracks. GPS units can be used to monitor the progression of deficiencies over a period of time if they are accurate enough. GPS units access GPS satellites to determine the

user's position. The best units can be used to find both spatial coordinates and ground surface elevation.

Safety Equipment and Protective Clothing

Hard Hat – A hard hat is recommended for inspecting large outlets or when working in construction areas.

Rope – Can be used when inspecting steep slopes or conduits. A rope can also be used when inspecting areas along the shoreline. Another person should be present to assist with using a rope.

Insect Repellent – Biting insects can reduce the efficiency and effectiveness of an inspector and sour his disposition. Ticks and mosquitoes can cause skin irritations and severe health problems in some instances.

Snake Bite Kit – In areas where poisonous snakes might be present, a snake bite kit should be included in the first-aid kit; protective leg guards are also available.

Watertight Boots - These are often needed when inspecting various areas of the dam site where standing water is present. Waist-high waders are useful for riser inspection.

Steel-toed Shoes – Steel-toed shoes should be used when there is a danger of debris falling on an inspector's feet.

Sturdy Hiking Boots – Hiking boots may help prevent slipping and falling when traversing slopes and wet areas. Good ankle support can aid in preventing injury to ankles.

Life Jacket – A life jacket is a safety measure to be used when inspecting areas where there is a danger of falling into the water, especially along the shoreline of a deep reservoir, or a reservoir with steep upstream slopes. They are a necessity if an inspector is using a boat and a lifeline if hanging from a safety scaffold.

Smartphone – A smart phone can come in handy in emergencies or when additional information is needed from the office or the owner's office.

Safety Glasses – May be needed in some cases for eye protection.

Gloves – May be useful if stakes are being installed, or if riprap and deteriorated concrete are being investigated.

Reflective Safety Vest or Coat – If inspections are performed during hunting seasons, bright colored clothing is a good preventative measure to avoid shooting accidents.

APPENDIX B. SCHEDULED DAM SAFETY INSPECTION CHECK LIST

A form designed for use during scheduled dam safety inspections – including pre- and post-monsoon inspections – follows. The form contains a comprehensive checklist (Part 2a) of items that are found at dams that need to be evaluated during a safety inspection. The checklist consists of (1) a series of questions that need to be answered as Yes/No/Not Applicable for each inspection item, (2) a remarks box in which critical aspects can be commented upon following each question, and (3) a final condition assessment (Unsatisfactory/Poor/Fair /Satisfactory) for that inspection item. Not all inspection items will be found at a dam. The form concludes with a Consolidated Dam Health Status Report (Part 2b).

The following information is provided for:

B.1 Personal Safety

For safety reasons, it is advisable to have three or more personnel on each inspection. This applies particularly travel to, and operations in, isolated areas.

B.2 Equipment

The following equipment items are noted here to ensure the Inspector is reminded of the importance to her/his personal safety. Additional detail is in Appendix A of this guideline:

- Checklist (enclosed), field book, pens and pencils
- Recording devices, including GPS, camera(s) both still and video
- Hand level, clinometer, tape measure, stakes and flagging material, crack gauge, probes and binoculars
- Safety gear including waders, harnesses, hard-hats, goggles, safety boots, SCBA (self-contained breathing apparatus, gas detector (carbon dioxide and other gases) for confined space entry, torch ("mine-safe") for unventilated conduits, tunnels or adits, first-aid kit, lock-off labels and anything else to comply with safety regulations
- Safety equipment for upstream water inspections from boat or elevated platform, includes life vests and life-lines
- Shovel, bucket, sealable plastic bags and a Geologist hammer

B.3 Recording Inspection Observations

Check and record the status of all items in the attached checklist under the remarks column. Provide accurate location (GPS or ground measurement) of questionable areas and take photographs. Note extents and limits of such areas (length, width, height or depth, volume). Provide a brief description of any anomalous condition such as:

- Quantity/quality of drain outflows, seepage and its source(s)
- Location, type and extent of deteriorated concrete
- Location, length, displacement and depth of cracks
- Extent of moist, wet, or saturated areas
- Defects, deterioration, damages, non-functional components such as detection and measuring devices, mechanical or electrically operated instruments and HM controls

Scheduled Dam Safety Inspection Form

Part 1a - Inspection Details:

Date of Inspection:		Type of Inspection (Pre/Post-monsoon):	
Dam Name:		Project ID Code (PIC):	
River:		Sub-River basin	
River basin		District:	
Nearest City:		State:	
Latitude:		Longitude:	
Dam Type:		Dam Purpose:	
Dam Owner:		Dam Operator:	
Year of Completion:		First filling (years/ levels):	
Earthquake Zone:		Hazard Classification:	
Catchment Area (in sq. km.):		Reservoir Surface Area (at FRL) (in sq. km.):	
Storage Capacity (MCM):	(i) Gross ……..(ii) Live……	Total Spillway Capacity (Cumec):	
Height of Dam (m) (from deepest foundation):		Total Length of Dam (m):	
Crest Length(m)		Top width of dam (m):	

Spillway Type:			
Design Flood adopted (PMF/SPF/ any other): Give relevant magnitude		Weather Conditions:	
Important Controlling Level	a) TBL RL ……. b) MWL RL …… c) FRL RL …….. d) Spillway Crest RL …… e) MDDL RL …… f) Lowest River bed RL …….. g) Deepest foundation level RL …….. h) Top of upstream parapet solid parapet wall RL ……	Reservoir water level on the date of inspection(m):	
Maximum and Minimum water levels reached during the last season with dates:		Maximum overflow during preceding monsoon with dates:	
Does the officer-in-charge of the operation and maintenance of the dam possess all the records as given in the Annexure I			

Part 1b - Inspection Remarks:

Please provide any additional information or comments not covered by Part 1a form above.

Part 2a - Inspection Checklist:

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
A-Reservoir						
A-1.1	**General Condition**					
1.1.1	Is the reservoir water level unusually high or low?					
1.1.2	Are there signs of decline in water quality?					
1.1.3	Are there signs of recent sediment deposition?					
1.1.4	Is floating debris present?					
1.1.5	Any indications of major active or inactive landslide area in the reservoir rim If so, indicate their locations and extent.					
1.1.6	Are there people or livestock in and around reservoir?					
1.1.7	Any other issues?					
B-Dam and Dam Reach (Embankment)						
B-1.1	**General Condition**					
1.1.1	Any major alterations or changes to the dam since the last inspection?					
1.1.2	Is there any new nearby development in the downstream floodplain?					
1.1.3	Any misalignment of poles, fencing or walls due to dam movement?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
B-1.2	**<u>Upstream Slope</u>**					
1.2.1	Any signs of bulging or concavity (depressions)? If so, indicate their locations and extent. (Check up the cross-sections with tape and level at random locations, at least two)					
1.2.2	Does the section of the dam and upstream slope appear structurally sound and stable?					
1.2.3	Presence of longitudinal or transverse cracks?					
1.2.4	Whether any signs of distress to stability of slopes noticed at any time in any part of the dam? If so, give brief details of the incidents and location, the method of treatment adopted and its effectiveness. Indicate the general condition of upstream pitching.					
1.2.5	Any degradation to slope protection (rip-rap)?					
1.2.6	Is there any profuse growth of bushes or weeds over any portion of the dam? If so, indicate the locations.					
1.2.7	Does the upstream slope shows existence of crab holes or holes made by rodents or burrowing animals or ant hills? If so, indicate the locations.					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.2.8	Any other issues?					
B-1.3	**Crest of Dam**					
1.3.1	Is the crest profile at proper elevation? (To be test checked at random locations by taking level)					
1.3.2	Does it show any signs of excessive and/or uneven settlement? If so, indicate such locations and extent of settlement. (Surface settlement points must be installed for observing this aspect)					
1.3.3	Is the surface of the crest free from undulations and local depressions or heaving?					
1.3.4	Does it provide an all-weather road surface?					
1.3.5	Any degradation to access road (sealed/unsealed)?					
1.3.6	Does it develop any visible cracks in transverse or longitudinal directions? If so, attach a map showing their locations and extent. Depth of cracks must be ascertained by taking open trenches extending below the bottom of cracks.					
1.3.7	What is the condition of the edges of crest? Have got eroded and cut up resulting in reduced effective width?					
1.3.8	Is the crest free from local slips throughout its length on either sides?					
1.3.9	Do the headers, guard stones and parapet wall provided at the edges of the crest appear in proper profile and plumb?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.3.10	Any degradation to upstream parapet or downstream curb wall?					
1.3.11	Evidence of livestock on dam crest?					
1.3.12	Trees or profuse growth of weeds/bushes at any location?					
1.3.13	Proper lighting arrangement at dam top?					
1.3.14	Any other issues?					
B-1.4	**<u>Downstream Slope</u>**					
1.4.1	Any signs of bulging or concavity (depressions)?					
1.4.2	Are there any wet or slushy patches or any concentrated leaks, springs or trickles observed on the downstream slopes or the toe? If so, indicate their locations and extent. Please look out for patches of extensive vegetation growth and examine them carefully and record the findings.					
1.4.3	Presence of longitudinal or transverse cracks?					
1.4.4	Any signs of distress to the stability of slopes?					
1.4.5	Are rain cuts/erosion channels present at any location?					
1.4.6	Are all the rain cuts and erosion channels properly treated and made good? Please indicate location of recurring damages, if any.					
1.4.7	Is there any profuse growth of bushes or weeds over any portion of the dam?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	If so, indicate the locations.					
1.4.8	Does the downstream slope shows existence of crab holes or holes made by rodents or burrowing animals or ant hills? If so, indicate the locations.					
1.4.9	Any other degradation to slope protection (turfing)? Indicate the general condition of downstream pitching/ turfing and rock toe.					
1.4.10	Is the downstream area clear of debris and free draining?					
1.4.11	Any other issues?					
B-1.5	**Downstream Drainage**					
1.5.1	Are there any signs of water logging, slushy conditions or growth of aquatic weeds on the downstream of the dam? To be checked upto 300 m downstream of toe					
1.5.2	Are there any standing pools of water in the downstream of dam? If so, give their locations and extent. To be checked upto 300 m downstream of toe					
1.5.3	Are there any boils observed in the vicinity of the downstream toe of the dam? If so, give locations.					
1.5.4	Is the downstream area sufficiently clear and free draining?					
1.5.5	What is the depth of ground water table on the downstream as evident from the existing wells in the vicinity of the dam				**a)** Max. ground water level…… **b)** Location ……	

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	To be checked upto 300 m downstream of toe. Does the water table show any marked variation in accordance with the variations in reservoir water level?				**c)** Date…… d) Corresponding Reservoir level……	
1.5.6	Are all the exposed drains working satisfactorily?					
1.5.7	Toe drains and cross drains. i. Are the portions of longitudinal toe drain and exposed cross drains beyond the downstream toe of the dam in regular section and freely draining? ii. Is the pitching to these drains intact? iii. Is there any weed growth in these drains? iv. Indicate other defects noticed in the drains, if any.					
1.5.8	Outfall Drain: (a) Is the outfall drain in proper shape and grade and freely draining? (b) Is the outfall drain properly cleaned and maintained? Does the outfall drain show any stagnant pools of water or weed growth?					
B-1.6	**Surface Drainage of Downstream Slope**					
1.6.1	Is the condition of the downstream slope drainage arrangements, if provided, satisfactory?					
1.6.2	Is the paving to these drains intact?					
1.6.3	Are all the drains properly maintained and free of vegetation growth and debris?					
1.6.4	Does the slope have a tendency to develop severe rain cuts at any location?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.6.5	Enumerate any other defects noticed in the surface drainage of downstream slope.					
B-1.7	**<u>Seepage Measurement</u>**					
1.7.1	Is the quantity of seepage being daily or periodically measured and recorded? Please check the registers and record observations.					
1.7.2	Does it show any abnormal rise or fall? If so, does it have any relation to a certain reservoir level elevation?					
1.7.3	Does the seepage show a turbid colour at any stage? Was such a phenomenon observed at any stage at any location in the past?					
1.7.4	What is the measured rate of seepage flow with date and reservoir level; i. On the day of present inspection ii. Maximum since last June iii. Minimum since last June				a) Date b) Rateofseepage flow (lpm) c) Reservoirlevel (m)	
1.7.5	Is the portion upstream and downstream of measuring points of seepage easily accessible with proper steps and paths and free of vegetation growth?					
1.7.6	Are the measuring points properly located, constructed and maintained so as to give accurate and reliable measurements of seepage in accordance with the relevant IS Codes?					
1.7.7	Is the method of taking seepage measurements satisfactory?					
B-1.8	**<u>Breaching Section (if provided)</u>**					
1.8.1	Is the breaching section easily accessible?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.8.2	Is the condition of the breaching section satisfactory?					
1.8.3	Is the note of instructions as to when and how to operate the breaching section available on record?					
1.8.4	For reconstruction after the breach are the following items decided in advance? a) Quarry for embankment material b) Suitable routes of access Is the maintenance staff fully aware of the instructions related to operation of the beaching section and for reconstruction after the breach					
1.8.5	Ascertain and indicate the latest event of operation of breaching section and its performance.					
1.8.6	Evidence of recent degradation?					
1.8.7	Any other issues?					
B-1.9	**Junction of Earth work with Masonry/Concrete dam sections and outlets**					
1.9.1	Is there any existence of leaks, springs or wet spots in the earth work in the vicinity of the junctions between earth work and masonry works? If so, what is the approximate rate and colour of the leakage? Does it turn turbid at any time? Please ascertain from enquiries and record the findings.					
1.9.2	Is there any tendency for separations, cracking, settlement or upheaval of the earth work in the vicinity of masonry or concrete?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	If so, indicate the locations and the exact nature of deficiency.					
1.9.3	Is there any tendency for surface erosion or slope instability at the junction?					
1.9.4	If the outlet conduit is located in the earth dam section, is the entire length of the conduit in perfect order and profile and free from offsets, open joints, cracks and leakage? Examine the conduit carefully from the downstream or from inside, if possible, and indicate the deficiencies observed, if any.					
1.9.5	Any other issues?					
B-1.10	**Relief Wells**					
1.10.1	Are the relief wells in good working condition and functioning well?					
1.10.2	Are the relief properly surged and cleaned periodically?					
1.10.3	Please indicate the dates of last surging and cleaning and the next surging due.					
1.10.4	Are the necessary plant and equipment for cleaning the relief wells, available with the office?					
1.10.5	Is the record of periodical measurements of discharge from each relief well maintained? If so, indicate total discharge and maximum discharge observed from a single well on the date of inspection.					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
B-1.11	**Abutment Contacts**					
1.11.1	Any presence of leaks, springs or wet spots near the abutment?					
1.11.2	Any presence of cracking, settlement or upheaval of earthwork?					
1.11.3	Any evidence of erosion or slope instability?					
1.11.4	Trees or profuse growth of weeds/bushes?					
1.11.5	Any degradation to up/downstream slope protection (rip-rap, turfing)?					
1.11.6	Any other issues?					
C-1	**Dam and Dam Block/Reach (Concrete/Masonry)**					
C-1.1	**General Condition**					
1.1.1	Any major alterations or changes to the dam since the last inspection?					
1.1.2	Is there any new nearby development in the downstream floodplain?					
1.1.3	Any misalignment of poles, fencing or walls due to dam movement?					
C-1.2	**Upstream Face**					
1.2.1	Evidence of surface defects (honeycombing, staining, stratification)?					
1.2.2	Concrete/masonry deterioration (spalling, leaching, disintegration)?					
1.2.3	Is cracking present (structural, thermal, along joints)?					
1.2.4	Evidence of differential settlement (displaced/offset/open joints)?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.2.5	Presence of vegetation (growth in joints between blocks)?					
1.2.6	Evidence of any other damage to joints and/or water stops?					
1.2.7	Any other issues?					
C-1.3	**Crest of Dam**					
1.3.1	Evidence of differential settlement (displaced/offset/open joints)?					
1.3.2	Presence of cracking (structural, thermal, along joints)?					
1.3.3	Profuse growth of weeds/grass/plants at any location?					
1.3.4	Any degradation to access road?					
1.3.5	Any degradation to upstream parapet or downstream curb wall?					
1.3.6	Any other issues?					
C-1.4	**Downstream Face**					
1.4.1	Evidence of surface defects (honey-combing, staining, stratification)?					
1.4.2	Concrete/masonry deterioration (spalling, leaching, disintegration)?					
1.4.3	Presence of cracking (structural, thermal, along joints)?					
1.4.4	Evidence of differential settlement (displaced/offset/open joints)?					
1.4.5	Presence of vegetation (growth in joints between blocks)?					
1.4.6	Evidence of any other damage to joints and/or water stops?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.4.7	Excessive seepage/sweating at any location on downstream face?					
1.4.8	Significant leakage at any location on downstream face?					
1.4.9	Any other issues?					
C-1.5	**Abutment Contacts**					
1.5.1	Any presence of leaks, springs or wet spots in vicinity of abutment?					
1.5.2	Any presence of cracking or settlement?					
1.5.3	Profuse growth of weeds/grass/plants at any location?					
1.5.4	Any other issues?					
D	**Gallery/Shaft and Drainage (Concrete/Masonry)**					
D-1.1	**General Condition**					
1.1.1	Slushy condition or water logging immediately downstream of dam?					
1.1.2	Any evidence of boiling in vicinity of dam toe?					
D-1.2	**Gallery/Shaft Condition**					
1.2.1	Any problems accessing or inspecting gallery/shaft (obstruction)?					
1.2.2	Any safety issues (inadequate handrails, lighting or ventilation)?					
1.2.3	Problems of inadequate drainage (slippery stairs, water logging of gallery, clogged porous or foundation drains)?					
1.2.4	Evidence of differential settlement (displaced/offset/open joints)?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.2.5	Excessive seepage/sweating at any location along gallery/shaft?					
1.2.6	Significant or excessive leakage at any location along gallery/shaft / porous drain? If yes, provide location(s).					
1.2.7	Are proper arrangements made for the measurement of seepage into the gallery? Is the seepage measured separately from- 1. Porous pipes? 2. Foundation drains? And 3. Monolith Joints? Are the above arrangements satisfactory?					
1.2.8	Has there been substantial progressive reduction in the seepage through the foundations? Is it due to choking of the drain holes? If so, indicate number of holes choked.					
1.2.9	Are all the foundation and porous holes periodically cleaned with reaming tool and air water jetting? Indicate the last date of such cleaning and extent of variation observed in the seepage discharge before and after the cleaning.					
1.2.10	Is the seepage water and the deposit, if any, from the seepage being regularly examined for chemical composition? If so, indicate the result and the probable source of dissolved salts, if any.					
1.2.11	Are any seepage water springs observed in the downstream area any where? If so, indicate the locations and state the physical nature of this seepage. Look out for such seepage spots particularly near the dykes, fault zone etc. Ascertain if chemical testings are made of water samples from such springs for dissolved salts.					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.2.12	Is there any leachate deposition? If yes provide location					
1.2.13	Any other issues?					
D-1.3	**Drain Condition**					
1.3.1	Is the flow in the drain unusually high or low?					
1.3.2	Presence of calcium or other deposits in drain?					
1.3.3	Is dewatering pumping station fully operational?					
1.3.4	Any problem inspecting pump?					
1.3.5	Any obstruction preventing or impairing smooth operation?					
1.3.6	Any deterioration of pump and associated equipment?					
1.3.7	Is sump well clean and maintained?					
1.3.8	Is V-notch before sump well clean and maintained?					
1.3.9	Any other evidence of the drain being blocked/having reduced section?					
1.3.10	Is the flow in the drain noticeably sporadic/irregular?					
1.3.11	Does the drainage water have unusual color (leachate)?					
1.3.12	Any other issues?					
D-1.4	**Body Wall (Masonry/Concrete) of 'NOF' Dam and Spillway**					
1.4.1	What is the total seepage into gallery from the porous pipes in the dam at lake full condition? How does it compare with the seepage when the					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	reservoir was first filled? (For the corresponding water level)					
1.4.2	If there has been substantial reduction in this seepage? Ascertain and indicate the probable reasons therefore.					
1.4.3	Has there been a tendency for gradual reduction of drainage through pipes and progressive appearance of sweating on the downstream face of the dam?					
1.4.4	Has there been considerable leaching from the seepage water and deposition of lime near the seepage exit spots?					
1.4.5	Are the samples of the seepage water and reservoir water being regularly tested for reactive and corrosive properties?					
1.4.6	Is there excessive seepage, sweating at any locations on the downstream face of the dam? (Examine the monolith or construction joints for such seepage and leaching and indicate the findings)					
1.4.7	Is there any swelling or cracking observed on the downstream face especially near the points of concentration of stresses like the toe or locations of abrupt change in geometry of the face of the opening? If so, indicate the details of observations.					
1.4.8	Is the pointing on upstream face of the dam in good condition? If not, indicate the nature and extent of deficiency.					
1.4.9	Are the registers and graphs showing the periodical measurements of seepage discharge from the porous drains in the gallery and from the					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	downstream face at various lake levels maintained at site?					
D 1.5	**<u>Waste Weir Bar and Tail Channel</u>**					
1.5.1	Is the Concrete/masonry spillway bar in good condition? Is there any leakage through the masonry or from the foundation? If so, what remedial measures are proposed/taken for minimizing the leakage? Is the record of leakage measurement maintained? What is the quantity of Seepage/Leakage on the date of inspection?					
1.5.2	Is the coping over the spillway bar in good condition?					
1.5.3	Does the upstream and downstream face of waste weir bar need pointing?					
1.5.4	Is there any scouring on downstream side of the bar and/or EDA? If so what remedial measures are proposed/taken?					
1.5.5	Are there any damages or undermining to guide walls, divide wall and other appurtenants? If so, what remedial measures are proposed/taken?					
D 1.6	**Structural performance of the 'NOF' and 'OF' Portions of Dam Foundations**					
1.6.1	Are there any signs of structural distress noticed in the dam spillway and foundations in the form of- i. Excessive deflection with respect to permissible deflection at the time of design ii. Tendency of gradual sliding iii. Cracking and upheaval or settlement in any part of the body wall or foundations, **iv.** Excessive uplift, v. Excessive seepage and leaching through the body of the dam and the					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	foundation.					
1.6.2	Conspicuous weathering of materials or components in any portion of the body wall or the foundations.					
E	**Spillway and Energy Dissipation Structure**					
E 1.1	**Spillway**					
1.1.1	Any problems inspecting spillway (obstructed access, damaged catwalk)?					
1.1.2	Any obstructions in or immediately downstream of the spillway?					
1.1.3	Evidence of abrasion, cavitation or scour on glacis (e.g. exposed reinforcement)?					
1.1.4	Presence of displaced, offset or open joints?					
1.1.5	Presence of cracking (structural, thermal, along joints)?					
1.1.6	Evidence of surface defects (honeycombing, staining, stratification)?					
1.1.7	Concrete/masonry deterioration (spalling, leaching, disintegration)?					
1.1.8	Presence of vegetation (growth in joints between blocks)?					
1.1.9	Evidence of any other damage to joints and/or waterstops?					
1.1.10	Excessive seepage/sweating at any location on spillway glacis?					
1.1.11	Significant leakage at any location on spillway glacis?					
1.1.12	Any other issues?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
E-1.2	**Energy Dissipation Structure**					
1.2.1	Any problems inspecting energy dissipation structure?					
1.2.2	Any obstructions in or immediately downstream of dissipation structure?					
1.2.3	Evidence of abrasion, cavitation or scour on dissipation structure?					
1.2.4	Presence of displaced, offset or open joints?					
1.2.5	Presence of cracking (structural, thermal, along joints)?					
1.2.6	Evidence of surface defects (honeycombing, staining, stratification)?					
1.2.7	Concrete/masonry deterioration (spalling, leaching, disintegration)?					
1.2.8	Presence of vegetation (growth in joints between blocks)?					
1.2.9	Evidence of any other damage to joints?					
1.2.10	Any problems with under-drainage (blockage of open drain holes)?					
1.2.11	Can the tail pond be drained easily for inspection of the stilling basin or bucket? If not, what are the alternatives available for dewatering? Please ascertain and indicate the last event of inspection of stilling basin (or bucket).					
1.2.12	From the examination of the levels and contour plans and reference marks in tail channel; ascertain if there is progressive erosion and retrogression in the tail channel. If so, indicate the extent and location of such erosion with reference to the various components of dam, spillway, outlet, power house etc.					
1.2.13	Is the concrete surface of the stilling basin and apron (or bucket) in good condition? Are there any indications of pitting, cracking, spalling or					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	wearing of the surface of bedding concrete? If so, please give details of the nature and extent of the damage.					
1.2.13	Is there any indication of abrasion and cavitation damage (pitting of concrete) especially at friction blocks , chute blocks and slotted roller teeth, the surface near the lower tangent point and the end sill? If so, please give the details of nature and extent of damage.					
1.2.14	Is the under drainage of the stilling basin (or bucket) satisfactory? Are all the open drain holes clear and functioning well?					
1.2.15	Any other issues?					
F	**Intake/Outlet and Water Conveyance Structure**					
F-1.1	**Intake/Outlet Structure**					
1.1.1	Any problems inspecting intake/outlet structure (obstructed/unsafe access)?					
1.1.2	Any obstructions in, upstream or downstream of intake/outlet structure?					
1.1.3	Evidence of abrasion, cavitation or scour on intake/outlet structure?					
1.1.4	Any evidence of structural distress (displaced/offset/open joints, cracking)?					
1.1.5	Any evidence of surface defects and/or concrete/masonry deterioration?					
1.1.6	Any other issues?					
F-1.2	**Water Conveyance Structure**					
1.2.1	Any problems inspecting intake/outlet structure (obstructed/unsafe access)?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.2.2	Any obstructions in, upstream or downstream of water conveyance structure?					
1.2.3	Evidence of abrasion, cavitation or scour on structure?					
1.2.4	Any evidence of structural distress (displaced/offset/open joints, cracking)?					
1.2.5	Any evidence of surface defects and/or material deterioration?					
1.2.6	Any evidence of seepage or leakage from water conveyance structure?					
1.2.7	Any other issues?					
G-1	**Hydro-Mechanical Component and Pump**					
G-1.1	**Spillway Gates (Radial gates, Vertical lift gates, Automatic gates)**					
1.1.1	Any problems inspecting gate/Stop-logs (obstructed/unsafe access)?					
1.1.2	Is the condition of the steel surface and the surface paint deteriorated?					
1.1.3	Are any connection bolts of rubber seals loosened or damaged? If so, indicate the details of defects.					
1.1.4	What is the general condition of rubber seals? Do any of the rubber seals show signs of weathering, hardening, cracking or tearing and damage?					
1.1.5	Are the rubber seals of side and bottom touching uniformly all along the sealing surface?					
1.1.6	Do the rollers (wherever applicable) touch the track plates uniformly? Are the rollers well lubricated?					
1.1.7	Are the embeded parts of spillway gates, emergency gates and stop-logs in sound condition and free from corrosion, uneven wear, cracking, chipping and dents? If not, state the nature of defects or deficiencies and					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	observation, if any, regarding such defects.					
1.1.8	Check the following for structural soundness of all members and welded, bolted and riveted connections, uneven wear, uneven bearing, cracking, chipping and dents and indicate the findings: (1) Gate leaf and stiffeners (2) End arms (3) Trunnion girders / Yoke girder (4) Stop logs (5) Lifting beams (6) Gantry cranes (7) Tracks (8) Trunnion bracket (9) Chains/ wire ropes (10) Bridge structure					
1.1.9	Are the trunnion bearings of radial gates properly lubricated?					
1.1.10	Is there any damage or wear caused to the seal plates? If so, indicate the nature of damage noticed.					
1.1.11	Are any of the mechanical or structural components and fastners or seals subjected to excessive wear? If so, please give details. Is there any tendency for recurring damage to any particular component? If so, please give details.					
1.1.12	Is sufficient stock of spares which need frequent replacement maintained at the site?					
1.1.13	Any issues with storage of equipment (emergency stop logs, lifting beam and gate leaves)?					
1.1.14	Any deterioration, corrosion? scaling? pitting? or cracking? of equipment (connecting bolts, welds?)					
1.1.15	Any obstructions preventing or impairing smooth operation?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.1.16	Any problems with the rollers (not touching tracks, inadequate lubrification)?					
1.1.17	Any debris, etc., in the gate grooves?					
1.1.18	Any damages to Radial Gate trunion pins? gate arms? lubrication? etc.?					
1.1.19	Any damage to embedded parts above waterline? access structure?					
1.1.20	Any damage to concrete grooves?					
1.1.21	Is the staff posted at the site for maintenance and operation of gates, hoists, equipments and electrical installations, well experienced, fully trained and conversant with the job requirements and responsibilities?					
1.1.22	Are the following documents maintained at the respective location of all the units? (1) Maintenance schedules specifying each operation, its frequency and 'due' and' done' dates. (2) Operating instructions with 'dos' and 'don't' for all operational units.					
1.1.23	Are the trunnion hub and the brackets well maintained?					
1.1.24	Are the trunnions likely to get submerged during actual working of the spillway? if so, ascertain the causes for the same and specify. Please enquire for occurrence of such events, if any.					
1.1.25	Are all the nuts of connecting bolts and anchorages properly tightened?					
1..1.26	Any other issues?					
G-1.2	**<u>Hoists, Cranes and Operating Mechanisms</u>**					
1.2.1	Are the hoists working satisfactorily?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.2.2	Any problems inspecting hoist/crane/operating mechanism?					
1.2.3	Is sufficient stock of spares which need frequent replacement maintained at the site?					
1.2.4	Is the full length of the chains or wire rope of the hoist in sound condition and free from broken strands?					
1.2.5	Is the electrical wiring in sound condition?					
1.2.6	Is the alternative power system for gate operation working properly?					
1.2.7	Is the alternate hand operation system of hoist working					
1.2.8	Any deterioration of equipment (connecting bolts, welds, surface, paint work?)					
1.2.9	Any wear or damage to wire cables and other moving parts?					
1.2.10	Any obstructions preventing or impairing smooth operation?					
1.2.11	Any health and safety concerns (e.g. lack of "danger" sign during maintenance)?					
1.2.12	Any other issues?					
G 1.3.	**<u>Spillway Bridge, Hoist Bridge, Trunnion Level Bridge Catwalks</u>**					
1.3.1	Are the decking, girders and structural supports of spillway bridge, hoist bridge, trunnion level bridge and catwalks structurally sound?					
1.3.2	Is the chequered platform of the bridge structurally sound and safe?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.3.3	Is there satisfactory arrangement to prevent unauthorized entry into the control structures and bridges?					
1.3.4	Are the structural members and joints sound and free from corrosion?					
1.3.5	When were the steel components painted last?					
1.3.6	Is the surface of steel work and paints satisfactory?					
1.3.7	Is the parapet or railing over the bridges sound, safe and painted?					
1.3.8	Is the walkway properly enchored to the piers?					
1.3.9	Are the track rails for gantry cranes structurally sound and intact?					
G-1.4	**<u>Valves</u>**					
1.4.1	Any problems inspecting valve?					
1.4.2	Any obstructions preventing or impairing smooth operation?					
1.4.3	Any deterioration of valve and associated equipment?					
1.4.4	Any other issues?					
G-1.5	**Walls: Guide walls/Divide walls/Junction walls/Return walls/Spray walls etc. (Strike out whichever is not applicable)**					
1.5.1	Are all the locations of such wall accessible for inspection, maintenance and repairs?					
1.5.2	Is the drainage of back sides of the walls (wherever applicable) from the weep holes satisfactory? If not, indicate the nature of deficiencies.					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.5.3	Is there any tendency for the water to undercut the ends of the walls?					
1.5.4	Is there any foundation erosion or scour noticed in the vicinity of such walls? If so, give the details of nature and extent of such damage.					
1.5.5	Is there any surface erosion/damage caused, to face or body of such walls?					
1.5.6	Do any of the walls show symptoms of unusual settlement, developments of cracks and tilting? If so, give details of the defects noticed.					
1.5.7	Is there any damage to guide bunds? If so, give details of the damage.					
G-1.6	**EndWeir**					
1.6.1	Is it accessible?					
1.6.2	Is there any erosion, pitting or spalling of the concrete or masonry surface? If so, give details					
1.6.3	Is there any scour noticed on the immediate downstream of such weir? If so, give details of location and extent of such damage.					
G-1.7	**HydraulicPerformanceofEnergy DissipationArrangements**					
1.7.1	Do the flow conditions in the stilling basin (or bucket) have a tendency to draw material into the bucket and cause its churning and abrasion damage to the surface of buckets baffle blocks, apron and end sill? Is the hydraulic performance in agreement with the results of model studies? (wherever applicable) Ascertain the performance from observed tail water rating curves and deficient observation, if any, such as sweep outs and excessive erosion					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	under plunge pools and locations of secondary rollers and retrogression.					
G-1.8	**<u>Trash Racks</u>**					
1.8.1	Is the trash rack fixed or movable?					
1.8.2	What is the mode of cleaning? Is it manual or by TRCM?					
1.8.3	Is the welding work on Trash Rack in sound health?					
1.8.4	Any problems inspecting trash rack?					
1.8.5	Problems of excessive debris and/or inadequate cleaning?					
1.8.6	Any deterioration of trash rack (rust, corrosion, and damaged blades)?					
1.8.7	Any other issues?					
G-1.9	**<u>Trash Rack Cleaning Machines</u>**					
1.9.1	Any problems inspecting trash rack cleaning machine?					
1.9.2	Missing or inadequate spare parts (particularly requiring regular replacement)?					
1.9.3	Any deterioration of equipment (wheel trolleys, gantry structures, operating mechanism, connecting bolts, welds, surface, paint work?)					
1.9.4	Any wear or damage to wire cables and other moving parts?					
1.9.5	Any obstructions preventing or impairing smooth operation?					
1.9.6	Missing or inadequate provision of back-up/standby power supply?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.9.7	Any health and safety concerns (e.g. lack of "danger" sign during maintenance)?					
1.9.8	Any other issues?					
G-1.10	**Pumps**					
1.10.1	Any problems inspecting pump?					
1.10.2	Any obstructions preventing or impairing smooth operation?					
1.10.3	Any deterioration of pump and associated equipment?					
1.10.4	Any other issues?					
G-1.11	**Approachb r i d g e ,operationplatformandcabin(foroutlets):**					
1.11.1	Are the decking, girders and structural supports of approach bridge structurally sound?					
1.11.2	Is the floor of the operating platform structurally sound and safe?					
1.11.3	Is there satisfactory arrangement to prevent unauthorized entry into the control structures of the outlet?					
1.11.4	Are the structural members and joints sound and free from corrosion?					
1.11.5	When were the steel components painted last?					
1.11.6	Is the surface of steel work and paint satisfactory?					
1.11.7	Is the parapet or railing over the control tower, operating platform and approach bridge sound and safe?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
G-1.12	**<u>Outlet</u>**					
1.12.1	Is the air vent periodically cleaned?					
1.12.2	Are there any structural damages to the intake well?					
1.12.3	Is there any leakage observed through the well proper and the conduit concrete or masonry? If so, give details of its location and extent.					
1.12.4	Isthereanydamagenoticedtotheconduitconcrete,breastwallandgateslots?					
1.12.5	Isthebye-pass valve/filling-in-valve (wherever provided) operating satisfactory? (a) Take operation trials of the following as provided andrecord the observations and defects noticed, if any. (1) Service gate(s). (2) Emergency gate(s). (3) Stop-log gate(s). (4) Sluice valves. Note- (i) The operating trial for the emergency gate shall be taken with service gate in partially open position to test the capability of emergency gate for self-closing under these conditions. The trial for the operation of the emergency gate under balanced condition of water pressure also needs to be taken (ii) To guard against the possibility of outlet gate hoist being operated forcibly after closed position of gate a "Distinctive Mark" should be insisted or check the functioning of the limit switches.					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.12.6	Aretherevibrationsandnoisenoticedinoperationofout-letgatesatanytime? Ifso,areanyperiodicalobservationstaken toascertaintheirseverity?					
1.12.7	Is the energy dissipation arrangement working satisfactorily for all the discharges? Is there any structural damage to the energy dissipation structure? If so, give details of nature and extent of damage.					
1.12.8	Is the conduit structurally sound and reasonably leak proof? If not, give details of nature and extent of the defects.					
1.12.9	Is there any seepage noticed around the conduit as ascertained from the observations of the downstream conditions? If so, is it likely to cause (In case of earth dams) erosion and piping?					
G-1.13	**<u>OutletGates</u>**					
1.13.1	Is the surface of gates and the paint deteriorated?					
1.13.2	Are the connecting bolts of rubber seals properly tightened or damaged?					
1.13.3	Do the rubber seals show signs of weathering and damage and need replacements?					
1.13.4	Aretherubbersealsofsidesandbottom touchingthebearing surfaceuniformly?					
1.13.5	Doalltherollerstouchthetrackplates?					
1.13.6	Aretherollerswell lubricated?					
1.13.7	Arethestemrodsforliftingthegates perfectly straight?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.13.8	Is the operation of outlet gates smooth? Are the actual operations of lifting and lowering of the gates and hoist mechanisms adequate and smooth?					
1.13.9	Are all the gears and hoist mechanisms well lubricated?					
1.13.10	Is the storing arrangement for emergency gate leaves and the stop logs in satisfactory condition?					
1.13.11	Arethesealplates/seatsinsoundcondition?					
1.13.12	Isthefulllengthofwirerope(whereverapplicable)ofthehoistinserviceableconditionandfreefromanybrokenstrands?					
1.13.13	Are allthenutsofconnectingbolt andanchorsproperly tightened?					
1.13.14	Are all the lifting beams in proper working order and in levelled condition. If not ascertain the nature and extent of problems. Do any of the mechanical or structural parts of the gate, fasteners of hoist show signs of excessive wear? If so, please give details.					
1.13.15	Is there any tendency for recurring damage to any particular component or components? If so, please give details.					
1.13.16	Is sufficient stock of spares, which need frequent replacement, maintained at the site?					
G-1.14	**River Outlet/River Sluice**					
1.14.1	Is the overall condition of river outlet works/river sluices satisfactory?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	Is the operation of the gate (Service/Emergency/Stop-log) satisfactory as ascertained by taking operating trial? If not, indicate the defects noticed.					
1.14.2	Are the trash racks (wherever provided) cleaned before monsoon?					
1.14.3	Is there excessive silting on the upstream of the sluice?					
1.14.4	When were the gates last opened for desilting, etc.?					
1.14.5	Please indicate the approximate quantity of the leakage through the gates, if any.					
1.14.6	Is there any seepage or leakage through the conduit surface?					
1.14.7	Is there any damage to the upstream and downstream convergence of the conduit?					
1.14.8	Is the condition of energy dissipation arrangement satisfactory? If not, indicate nature and extent of damage. Is there any retrogression noticed in the downstream channel? If so, give details of nature and extent of damage.					
H-1	**Access Road**					
H-1.1	**<u>General Condition</u>**					
1.1.1	Any problems ensuring security of dam site (including gates and fencing)?					
1.1.2	Is there a properly constructed and well maintained all weather access road to the dam site?					
1.1.3	What is the type of the pavement of the access road and its condition?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.1.4	Are there properly constructed and well maintained access road arrangements to the following components for inspection, maintenance and repairs? Top of Dam Spillway Gates and hoisting arrangement Drainage gallery, adits and exits Bridge structure Downstream stilling basin Junction and abutments Outet control tower Outlet gates Toe of earth dam, downstream drainage arrangements and berms. All saddle dams.					
1.1.5	What is the general condition of all the masonry structures on various access roads?					
1.1.6	Are all the structures on the access roads adequately safe for allowing passage of plant machinery for emergent repairs?					
1.1.7	Any obstructions along or at entrance to access road (temporary or long-term)?					
1.1.8	Any slope stability issues (road embankment or adjacent slopes)?					
1.1.9	Profuse growth of weeds/grass on or in vicinity of access road?					
1.1.10	Any drainage problems (standing water on or adjacent to road)?					
1.1.11	Any other degradation to road surface (ruts, potholes, cavities, cracking)?					
1.1.12	Any other issues?					
I-1	**Instrumentation**					
I-1.1	**General Condition**					
1.1.1	Are all the instruments installed accessible? (Attach separate list).				As per Annexure-II	

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	Are all the locations properly lighted, ventilated and adequately protected from possibilities of damage?					
1.1.2	Any problems inspecting instrument (obstructed/unsafe access)?					
1.1.3	Is the instrument vulnerable to damage or theft (inadequate protection)?					
1.1.4	Any problems ensuring correct functioning of instrument (lighting, ventilation)?					
1.1.5	Any evidence of degradation to condition of instrument (rusting, vandalism)?					
1.1.6	Are all the instruments in working order? Ascertain the cases of instruments going out of order and indicate.					
1.1.7	Are all the registers of observations posted up-to-date? Please take test observations and initial the register.					
1.1.8	Are all the plotting of the instrumentation data completed up-to-date? Are sufficient stocks of spares, gauges, master gauges, stationary items etc., maintained at the site for uninterrupted data collection?					
1.1.9	Operator or public safety issues?					
1.1.10	Any other issues?					
I-1.2	**<u>CommunicationFacilities</u>**					
1.2.1	Are following facilities available at dam site? (1) Wireless Telephone / mobile/Fax/Internet					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.2.2	Any other issue (please indicate part, location, etc., as necessary)					
K-1	**Emergency Preparedness**					
K-1.1.	**Emergency Action Plan**					
1.1.1	Is the Emergency Action Plan (EAP) prepared for the dam as per the national guidelines? If not, the expected date of preparation of guidelines					
1.1.2	When EAP was last updated?					
1.1.3	If not, are any dam staff unaware or insufficiently conversant with the EAP?					
1.1.4	Any concerned authorities unaware or insufficiently conversant with the EAP?					
1.1.5	Are communication directories/contact details and other dynamic information are being updated annually?					
1.1.6	Any problems accessing or operating the communication/ warning system?					
1.1.7	Are inundation maps updated and available to concerned authorities?					
1.1.8	Are the concerned authorities informed about the system of emergency reporting procedures and warning?					
1.1.9	Are available safety spots on the downstream of the dam identified and made known to the concerned authorities? Are adequate warning devices and facilities provided at the dam?					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
1.1.8	Are proper arrangements made for security of the dam and preventing cases of unauthorized trespass, vandalism and sabotage to the dam works?					
1.1.9	Date of last annual stakeholder consultation meeting along with mock drill exercise conducted					
1.1.10	Does the EAP disseminated to all the concerned stakeholders?					
1.1.11	Any other issues?					
K-1.2	**Inspection of Records**					
1.2.1	Whetherfollowing Dam Safety Documents areprepared and approved by the competent authority? I. As Built Drawings II. EAP III. Completion Report IV. DataBook V. OandMmanual					
1.2.2	Are the relevant documents reviewed and updated from time to time?					
1.2.3	Are all the members of the maintenance staff adequately trained and fully conversant with their responsibilities concerning. (a) Designer's Operation Criteria. (b) Standing Operating Procedures. (c) Maintenance and Vigilance Procedures of the dam. (d) Maintenance and operation of all control equipments. (e) Reservoir Operation Schedules, Gate Operation Schedule (f) Maintenance and Operation of all instruments.					

S. No.	Inspection Item	Response[a]			Observations and recommendations, if any, of the authorized inspecting officer	Condition[b] (Unsatisfactory /Poor/Fair/ Satisfactory)
		Y	N	NA		
	(g) Identification of signs of deficient behavior. (h) Reporting Procedures of emergency situations. (i) Emergency repairs					
L-1.1	**Inspection Photographs**					
1.1.1	Information to be furnished as per Annexure - III					

[a]Respond either yes (Y), no (N) or not applicable (NA).

[b]Condition: Please rate the condition as either Satisfactory, Fair, Poor or Unsatisfactory as described below:

1. Satisfactory - No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria or tolerable risk guidelines.

2. Fair - No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

3. Poor - A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. Poor may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Further investigations and studies are necessary.

4. Unsatisfactory - A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

Part 2b – Action Taken on Remedial Measures Suggested in the Previous Inspection Report:

Previous Inspection Report Date:

SN	Observations/Significant Deficiencies Noticed	Remedial Measures Suggested	Action Taken Since Last Inspection Report
1.			
2.			
3.			
4.			
5.			
..			
..			

Part 2c - Consolidated Dam Health Status Report (as per the current inspection):

SN	Observations/Significant Deficiencies Noticed	Remedial Measures Suggested
6.		
7.		

8.		
9.		
10.		
..		
..		

Overall condition of dam based on above inspection – Unsatisfactory/Poor/Fair/Satisfactory (tick appropriate) **Overall Safety Category* of the Dam -**

*Category I– deficiencies which may lead to failure;
Category II – major deficiencies requiring prompt remedial measures;
Category III – minor remedial measures which are rectifiable during the year / No deficiencies

Name of Official(s) and Signature(s) :

Date:

Annexure-I

Record Required at Site (referred in Part 1a - Inspection Details)

Records that may be required for proper inspection and maintenance shall be available at site. These shall be properly maintained and kept up- to-date by including latest information available. Data in respect of upstream gauging stations, flood warning system and communication channels, if installed, shall be properly maintained.

General

1. Final detailed project report and details of modifications done during construction and a set of final drawings (as executed).

2. Index Plan of the area in which the dam is located showing important towns, roads, rail routes and communication facilities.

3. Index Plan of downstream area showing natural flood zone, flood zones corresponding to spillway design flood and dam break flood and all important towns / villages and property lying in these flood zones.

4. Contour map of dam site extending upto 200 m or 10 times the dam height (whichever is less) on upstream and downstream, showing all features of the dam like toe lines, fills, drains, relief walls, access roads, etc.

5. Record drawings of longitudinal section of dam foundation or cut off trench showing details of foundation stratigraphy, stage-wise construction of COT filling and raising of dam section or embankment zoning details and foundation treatment.

6. Record drawings of cross-sections of dam showing details of foundation treatment, under seepage control, zoning, internal and external drainage, all protective arrangements and stage-wise construction

7. Contour Plan of dam site with foundation trench showing details of foundation treatment and foundation drainage.

8. Contour Plan of reservoir basin.

9. Contour capacity and area capacity curve.

10. Reservoir maps showing silted basin, if observed.

11. Plan of the catchment area showing rain gauge stations and capacities of upstream storages.

12. Material properties adopted for design.

13. Details of design criteria followed.

14. Design report on flood studies and spillway design flood.

15. Design reports of outlets, power outlets river sluices, intake, conduit, energy dissipation arrangements and details of gates of hoists.

16. Geological data on the foundations and abutments.

17. Copies of geological reports,details of special foundation and abutment treatment carried out.

18. Record of tail channel geology and tail channel erosion.

19. Instrumentation drawings with details.

20. Instrumentation data and behavioural record.

21. Details of communication system, telephones, wireless, etc., directory of important key officers, flood warning procedures.

22. Flood forecasting system.

23. Photographs showing various phases of construction, pre-construction, etc.

Earth – Rockfill dams

1. Stage-wise construction record of the dam showing volumes and heights achieved in each season and time rate of progress.

2. Record of special compaction done near concrete / masonry structures, abutment contacts and outlet locations, if available.

3. Summarized records of compaction, control sampling and complete laboratory and field test resulted on all record samples.

4. Foundation details and geology as observed.

5. Data of water intake tests.

6. Detailed drawings and record of relief well observations.

7. Design report for the earth dam, covering the under-seepage control, stability of embankment junctions with masonry dam, instruments installed, etc.

8. Drawings showing the typical cross sections, including zoning, drainage arrangements, detailed details of slope protections provided for, etc., as per actual construction.

9. Details and location of instruments embedded / installed in and around the structures.

10. Record of corrective measures, repairs and treatment that have been done subsequent to construction.

11. Details of design criteria followed.

12. Photographs showing all phases of construction.

13. Important inspection reports and reports of consultants.

Concrete / Masonry dams

1. Details of construction history, including stages of construction, particularly in low blocks where considerable time elapsed prior to resumption of work.

2. Summarized data on control tests, carried out during construction in respect of concrete, mortar and their constituent materials, if available.

3. Reports on hydraulic model studies.

4. Drawings showing the details of energy dissipation arrangements, including foundation levels of apron, training walls and end weir.

5. Details and location of instruments embedded / installed in and around the structure.

6. Summarized data of observations on embedded / installed instruments.

7. Detailed drawings of all service facilities like internal lighting, emergency lighting, drainage, etc.

8. Drawing showing the uplift measurements and pressure relief arrangeme9. Summarized data of uplift pressures observed..

10. Summarized data of seepages, leaching observed in the drainage gallery and downstream face of the dam, their locations, etc.

11. Record of corrective measures, repair or treatment that have been done subsequent to completion.

12. Important inspection reports and reports of consultants.

13. Details of design criteria followed.

14. Photographs showing all phases of construction.

Operation and Maintenance

1. Gauge data of the river prior to the construction and after completion of work.

2. Detailed observations of flood discharges.

3. Detailed observations of hydraulic performance of energy dissipation basins.

4. Record of past performance stating briefly the defects developed and remedial measures carried out.

5. Drawings of outlets, maximum discharge capacity, maximum design operating head.

6. Standing orders regarding operation of the dam.

(a) Designers operating criteria.

(b) Standing operating procedures.

(c) Operations & Maintenance Manual.

(d) Inflow forecasting procedures.

(e) Gate operation procedures.

(f) Downstream flood warning procedure.

(g) Emergency Action Plan

7. Standard reference literature for operation and maintenance of reservoir, dam, ancillary work, gates, instrumentation, etc., including I.S. specifications, codes, manuals, manufacturers' literature, etc.

Annexure-II

CHECKLIST OF VARIOUS INSTRUMENTS INSTALLED ON LARGE DAMS

Name of Dam: **Location:**

Sl. No.	Name of Instruments	Nos.	Location	Since when installed (Month/ Year)	Whether in working condition (Yes/No)	Date last calibration / Date for next calibration	Observations maintained (Yes/No)	Agency responsible for data collection and processing	Analysis of data done at field level (Yes/No)	Data sent to SDSO regularly? (Yes/No)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
HYDRO-METEOROLOGICAL INSTRUMENTS											
1.	Raingauge on Dam										
2.	Raingauge in the Catchment										
3.	Pan Evaporimeter										
4.	Wind Velocity Recorder										
5.	Wind Direction Recorder										
6.	Wave Height Recorder										
7.	Wet and dry bulb Thermometer										
8.	Barometer										
9.	Thermometers for air Temp.										
10.	Thermometers for Reservoir Water Temp.										

Sl. No.	Name of Instruments	Nos.	Location	Since when installed (Month/ Year)	Whether in working condition (Yes/No)	Date last calibration / Date for next calibration	Observations maintained (Yes/No)	Agency responsible for data collection and processing	Analysis of data done at field level (Yes/No)	Data sent to SDSO regularly? (Yes/No)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
11.	Automatic Weather Station										
12.	**Reservoir level** (i) Staff gauge (ii) Automatic										
13.	**Other Hydro-meteorological Instruments, if any** (i) . (ii) . (iii) .										
GEO-TECHNICAL INSTRUMENTS											
1.	**Piezometers** (i) Stand pipe (ii) Casagrande (iii) Twin Tube (iv) Vibrating wire (v) Others										
2.	**Uplift pressure cell** (i) For permeable foundation (ii) For Rock foundation										
3.	**Strain Gauge** (i) Mechanical Strain										

Sl. No.	Name of Instruments	Nos.	Location	Since when installed (Month/ Year)	Whether in working condition (Yes/No)	Date last calibration / Date for next calibration	Observations maintained (Yes/No)	Agency responsible for data collection and processing	Analysis of data done at field level (Yes/No)	Data sent to SDSO regularly? (Yes/No)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Gauge (ii) Electrical Strain Gauge										
4.	**Strain Meter** (i) Vibrating wire										
5.	**Thermometers** (i) Resistance (ii) Vibrating Wire										
6.	**Stress Meter** (i) Mechanical (ii) Electrical										
7.	**Seepage Measurement** (i) V-Notch (ii) Other devices										
8.	**Automation** (i) Data logger (ii) Data Acquisition system (iii) Computers										
9.	(i) Plumb Bob – Direct (ii) Plumb Bob – Inverted (iii) Detachable Gauges for Surface										

Sl. No.	Name of Instruments	Nos.	Location	Since when installed (Month/ Year)	Whether in working condition (Yes/No)	Date last calibration / Date for next calibration	Observations maintained (Yes/No)	Agency responsible for data collection and processing	Analysis of data done at field level (Yes/No)	Data sent to SDSO regularly? (Yes/No)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Displacement (iv) Joint meter for internal joint movement (v) Tilt Meter (vi) Foundation Settlement Deformation Meter (vii) Inclinometer										
10.	**Other Geotechnical Instruments, if any** (i) . (ii) . (iii) .										
GEODETIC INSTRUMENTS											
1.	Total Stations										
2.	Survey Markers										
3.	Settlement Plates										
SEISMIC INSTRUMENTS											
1.	Seismograph										
2.	Accelerograph										

Annexure-III

PHOTOGRAPHS TO BE ATTACHED IN THE INSPECTION REPORT

All photographs shall be color photographs. Photographs shall be clear and include scale references where applicable. Photographs shall include, but not be limited to the following:

1. Overview of dam from upstream
2. Overview of dam from downstream
3. Overview of upstream face from right abutment
4. Overview of upstream face from left abutment
5. Overview of dam crest from right abutment
6. Overview of dam crest from left abutment
7. Overview of downstream face from right abutment
8. Overview of downstream face from left abutment
9. Overview of spillway from upstream
10. Overview of spillway from downstream (tailrace or channel area)
11. Overview of right training wall
12. Overview of left training wall
13. Overview of stilling basin
14. Overview of Galleries
15. Overview of downstream channel
16. Overview of Control Room exterior
17. Overview of Control Room interior
18. Overview of Gates
19. Overview of Hoisting Arrangements
20. Outlet inlets and discharge points
21. Overview of reservoir
22. Areas of specific deficiencies (e.g., cracks, erosion, displacement, seeps, deterioration, etc.)

Each photograph shall include a caption indicating the subject of the photograph as well as highlighting any specific deficiencies pictured. All photographs shall be presented with no more than two (2) photos per page.