Minutes of the twenty eighth meeting of National Committee on Dam Safety (NCDS) held in CWC, New Delhi on 3.7.2007

The 28th meeting of the National Committee on Dam Safety (NCDS) was held on 3 July 2007 in the Committee Room of CWC, Sewa Bhavan, R.K.Puram, New Delhi under the Chairmanship of Shri S.K.Das, Chairman, CWC & NCDS.

The list of officers / representatives of various States / Organizations who attended the meeting is given at Annex I.

28.0.0 Opening Remarks

28.0.1 At the outset, Chairman welcomed the members & all other representatives present. He felt that this meeting could have been convened earlier. But as most of the States as well as DSO, CWC were very much occupied with the World Bank assisted DRIP, and as there were no specific issues of dams in distress which were to be discussed any time during 2006, the meeting could not be convened earlier. Thereafter, he requested Chief Engineer (DSO), Member-Secretary (NCDS) to take up the agenda items for discussion.

28.1.0 Confirmation of the minutes of 27th meeting

Chief Engineer (DSO) and Member-Secretary, NCDS informed that the minutes of the 27th meeting were circulated to all the members vide letter No.3/19/NCDS/2004/DSM/1125-56 dated 14-11-2005. Compliance reports on the same from some of the States / Organizations were received. No objections to the minutes were raised. Therefore, the minutes could be taken as confirmed. This was agreed to by all the members.

28.2.0 Issues relating to Dam Rehabilitation & Improvement Project (DRIP)

28.2.1 Chief Engineer (DSO) briefly explained the status of Dam Rehabilitation & Improvement Project (DRIP) and informed that the last meeting of the National Level Steering Committee was held on 20.4.2007 under the Chairmanship of Secretary (WR), Government of India. Most of the participating States were in favour of taking up the project under normal mode of funding and to take up simultaneous exercise for concretizing the concept of Dam Rehabilitation & Improvement Fund (DRIF).

As per the requirement of the World Bank, Environmental and Social Assessment Studies are to be carried out on some

completed water resources projects for preparation of an Environmental and Social Framework for the project. Accordingly, 10 projects in four States, viz. Gujarat, Madhya Pradesh, Maharashtra and West Bengal have been identified and the work has been awarded to a consultancy firm, viz. M/s Consulting Engineering Services (P) Ltd., New Delhi.

The consultant will visit these sites in connection with the studies. The four States have been requested to give full cooperation to the consultant.

28.3.0 Review of National Scenario

28.3.1 Member-Secretary requested the representative from Uttar Pradesh to apprise the Committee, the latest position in respect of Obra, Nagwa, Maudaha and Maro dams in which deficiencies were noticed and reported earlier. The Executive Engineer, Dam Safety Cell, Lucknow informed that information in this regard was still awaited from the field offices.

28.3.2 **Breaching of large dams:**

Nand Gavan Dam, Maharashtra : Representatives from Maharashtra informed that the latest position regarding remedial measures taken is not available with the State DSO.

28.3.3 Breaching of small dams

Pratappura dam, Gujarat : No representative from Gujarat attended the meeting and as such the committee could not be apprised about the latest position regarding hydrologic review and rehabilitation of the dam.

Idukki dam, Kerala : Representative from Kerala State Electricity Board (KSEB) did not attend the meeting. The representative from Kerala Irrigation Department was requested to collect the latest position on preparation and submission of the detailed report on the structural behaviour of the dam from KSEB and inform DSO, CWC.

Idamalayar & Sholayar dams, Kerala : Director (DSR), CWC informed the committee that a report regarding distress in Idamalayar dam has only been received. This has been examined and some more technical data has been requested from KSEB which is awaited. No report in respect of Sholayar dam has been received. The representative from Kerala Irrigation Department has been requested to inform KSEB for a suitable action in this regard.

Salal (J&K), Rangit (Sikkim) and Baira (HP) dams : It was informed by the representative from NHPC that deficiencies observed in these dams have already been rectified.

Kohira dam, Bihar : Representative from Bihar informed that rehabilitation measures have been suggested and the report regarding implementation of the same is awaited from the field.

All the States / Organisations who are owners of the above dams were requested to inform DSO, CWC regarding the latest position of the measures taken for these dams.

Member-Secretary then requested all the States / Organizations to indicate if there were any failures of dams after the 27th NCDS meeting as no such reports were received in DSO, CWC. In response, no failure was reported by the States, except Madhya Pradesh. The representative from Madhya Pradesh informed that one dam namely, Piplai in District Raisen has breached in September 2006 due to piping. On this point, the Chairman advised that we need to be more vigilant. He felt that it would have been prudent on the part of the State to have notified the breach to DSO, CWC so that a team from CWC would have visited the dam site. He advised that whenever such an event takes place, States should not feel shy to get in touch with CWC. The representative from Madhya Pradesh has been requested to send a detailed note with the present status to DSO, CWC.

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

28.4.1 CWC Publications on the “Report on Dam Safety Procedures” (1986) and “Guidelines for Safety Inspection of Dams” (1987) are proposed to be revised / updated. As per records available, comments / suggestions from Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and BBMB have been received. Madhya Pradesh has informed that they do not have any comments. In this context, the Chairman emphasized that the Committee wanted to update the procedures with the latest technology and the experience gathered by the States in handling the dam safety activities. But unfortunately, the desired feedback has not been received from the States. Particularly in view of Madhya Pradesh’s sending ‘No comments,’ he expressed that Madhya Pradesh is part and parcel of the dam safety activities in the country and the committee expects Madhya Pradesh to have a lot to add in respect of technicalities and experience to these Guidelines.

The technology has advanced over the last 2 decades and so are the practices. We should, therefore, have a new look into the subject matter. The States were once again requested to respond by December 2007. DSO, CWC would then take up the updating work with the information received from the States.

28.5.0 Dam Safety Legislation

Representative from Rajasthan informed that the Government of Rajasthan has recently decided not to have a legislation on dam safety enacted for Rajasthan. He was then requested to send a formal intimation in this regard to DSO, CWC within a week.

Many States have reported that the enactment of the Dam Safety Legislation is under process. All the States were requested to seriously try to legislate the Dam Safety Act as early as possible.

28.6.0 Emergency Action Plans & Inundation maps for downstream areas

The guidelines for EAP were circulated to all the NCDS members. Member-Secretary requested all the members to inform the committee about the action taken by them on the preparation of EAP.

Information as provided by the members is as follows:

Andhra Pradesh : The Engineer-in-Chief has informed that the project authorities have been requested for initiating preparation of EAPs.

Bihar : EAPs for 14 dams have been completed and submitted to DSO, CWC.

Karnataka : Director, KERS proposed to form a sub-committee of NCDS for coordinating the work of preparation of EAPs of dams which are in series located in more than one State. They have requested the NCDS to form the sub-committees.

Kerala : EAP for Nayyar dam has been completed.

Madhya Pradesh : EAPs for 4 projects (Gandhi Sagar, Tawa, Kolar and Thanwar) have been prepared.

Maharashtra : EAPs for 3 dams of National Importance [Koyna, Isapur, Paithon (Jayakwadi)] have been prepared and the same for another 2 dams (Ujjaini and Totladoh) are in progress.

Orissa : Preliminary EAPs for Balimela and Jalaput dams have been prepared through WAPCOS.

Uttar Pradesh : Field officers have been requested to take up the work. Chairman suggested to take up the preparation of EAP for Matatila dam to start with.

West Bengal : Action is to be initiated. Chairman suggested to take up EAP for Kangsabati dam.

DVC : Any failure of most of the DVC's dams will affect the downstream State of West Bengal. As such, EAP should be prepared jointly by DVC and West Bengal. Chairman suggested that initiative has to be taken by the owner of the dam. He suggested that, to start with, Maithon or Panchet dam may be taken up.

On a query from NHPC it was clarified by the Chairman that EAP forms a part of Disaster Management Plan (DMP). In case DMP is already prepared for a dam, no separate EAP need to be prepared.

In general it was suggested by the Chairman to take up preparation of EAPs for dams of National Importance and dams which do not involve more than one State initially. He felt that formation of sub-committee may not produce the desired result.

28.7.0 Preparation of Data Book, Completion Reports, O & M Manual

The position regarding completion / submission of these reports by various States / Organizations was reviewed by the Member-Secretary with reference to the status prepared in DSO, CWC and all the members were requested to complete the work as early as possible.

28.8.0 Dam safety activities and Inspection of Dams

28.8.1 The Chairman emphasized the importance of periodical inspection and requested all the members to be regular in pre- & post-monsoon inspections. He expressed that the report for 2006 should have been received in CWC by this time. Those States which have not yet submitted the Health

Status Reports for 2006 were requested to send the same positively by September 2007.

All the members of NCDS have been requested to identify the dams which are not conforming to BIS Codes. A list of related BIS codes have earlier been furnished to the members for necessary action.

28.9.0 Safety review of large dams:

28.9.1 The position regarding formation of Dam Safety Review Panel (DSRP) was reviewed by the Committee and it was found that most the States / Organizations are yet to form such Panels. Chairman stressed the need for an independent review panel. He also reminded that if any State wants to be a part of the World Bank assisted Dam Rehabilitation & Improvement Project (DRIP), then independent dam safety review panels must be constituted, otherwise it will not be possible to get the World Bank assistance.

28.10.0 Monitoring safety aspects of inter-State dams by Sub-Committees

28.10.1 Position regarding the activities of the three Sub-committees constituted by NCDS to monitor and review the safety aspects of inter-State dams is as under:

(a) Mahanadi River System: Last meeting was held on 21.8.2006. Next meeting is likely to be held shortly in Raipur.

(b) Parambikulam Aliyar Project: The two States of Kerala and Tamil Nadu are having different views regarding continuation of the sub-committee. Tamil Nadu informed the Committee that they have inspected and are taking care of all the 9 dams under the Parambikulam Aliyar System. Chairman requested that they may send the inspection reports of these 9 dams to DSO, CWC in a week's time.

(c) Subarnarekha River System: Last meeting was held on 13.7.2006. Representative from Jharkhand informed that the next meeting is likely to be held in November 2007.

28.11.0 Setting up of hydrological units in the States

28.11.1 On review of the status of setting up of hydrological units in the States, it was found that some States are yet to set up such units. All such States were requested to take suitable action in this regard so that hydrology review is done for all the large dams.

Chief Engineer (HSO) informed the Committee that the design factors would have to undergo certain revisions considering that most of the designs of dams were carried out a number of years back. That time, a thumb-rule was used for estimating design flood. Over the years that methodology has changed and, keeping in view the safety of the dam, review of hydrological studies is all the more necessary. He also stated that hydrological review would have to be done not only from the hydrological point of view but also from the point of view of reduction in storage due to accumulation of sediment in the reservoir.

28.12.0 Instrumentation of dams.

28.12.1 Detailed report on the status of instrumentation of dams was requested from the dam owning authorities, which are awaited. Some members reported that analysis of data is pending because of shortage of manpower. Chairman suggested that to overcome shortage of manpower, retired engineers may be appointed on contract basis and the raw data may be got analysed and structural reports prepared by them. He insisted that the structural behaviour report is a must. He desired that the report may be prepared by the member States / Organizations in respect of atleast a few dams and submitted to DSO, CWC before the next meeting.

28.13.0 National Register of Large Dams.

28.13.1 Representative from Andhra Pradesh informed that additional 637 nos. of minor irrigation tanks have been identified as large dams as per ICOLD criteria. Similarly, 17 dams are also proposed to be included in the list of large dams by the State of Orissa. Member Secretary requested all the members to send the updated list of large dams in the prescribed format by October 2007 for updating the NRLD 2002 by December 2007.

28.14.0 Setting up of Management Information System (MIS) for dam safety.

Engineering data in respect of large dams for setting up of Management Information System (MIS) are yet to be received from most of the member States / Organizations. It was once again requested by the Member Secretary for supply of the data to DSO, CWC in the format already circulated. The Chairman also stressed on the supply of information / data stating that many a time, Parliament Questions are raised and VIP references are received and CWC is supposed to furnish

information related to status of safety, rehabilitation measures undertaken, etc. As such, DSO, CWC may be considered as a repository of such data / information and all necessary data, etc., may be supplied to them by the States as requested.

28.15.0 Dam Health and Rehabilitation Monitoring Application

Member-Secretary emphasized the need and urgency for qualitative data on dam related health and rehabilitation issues and informed that CWC is proposing to develop a software for storing the dams' health and rehabilitation data in an organized and standard manner. He intimated that preliminary planning on the structure has already been done by the Director (Software Management), CWC who will execute the development of the software. He then invited Director (SM), CWC, to make a presentation on the agenda item.

With a brief Power Point presentation, Director (SM) stated that the efforts being made for updating the database of 'National Register of Large Dams (NRLD)' and for creating MIS involving engineering data of large dams was essentially focused on historical and static data, and even then its generation was cumbersome. He was of the view that with the periodical process of recording the 'health status' of various dams by DSOs of States / PSUs and the envisaged rehabilitation measures for old dams, an immense amount of data is being generated, which is dynamic in nature and needs to be retained as time series. Underlining the urgent need for collecting and presenting the dam's health and rehabilitation related data in an organized and standard manner, he proposed NCDS to take up the task of developing the '**Dam Health and Rehabilitation Monitoring Application (DHARMA)'** software.

Highlighting the key features of DHARMA, he said that:

- The software development project will be executed by the 'Software Management Directorate' of CWC with software professionals outsourced from the market.
- State / PSU DSO concerned with a particular dam will be considered as the primary source of pertinent data in DHARMA; and for this purpose, adequately configured software with preliminary data as available in NRLD will be supplied by CWC;
- All dams will be given a unique 'Dam Identification Code' (DIC), and the ten digit alpha-numeric code (XX11XX1111) will carry tags of: State in which dam is

situated (first set of two-digit alpha code), concerned DSO (first set of two-digit numeric code), category (second set of two-digit alpha code for large, medium and small dams), and the serial number (second set of four-digit numeric code);

- DSO-codes have been assigned for the 18 State / PSU DSOs registered with CWC, and further codes will be assigned as and when new DSOs will be registered;
- Unique codes for dams that are listed under NRLD have already been generated, and for all other dams, auto generation of DIC will be affected by the concerned State / PSU DSO using their copy of DHARMA;
- The application in general will be divided into six modules. (i) The 'Basic Feature' module will contain such fundamental data as appearing in NRLD, besides providing tools for generating DIC in case of new dams. (ii) The 'Engineering Feature' module will allow entering of such information as: salient features, design, hydrology, geology, construction history, operation plan, instrumentation, maintenance schedule, earlier studies, safety related events, and known deficiencies, etc. (iii) The 'Stakeholders' module will record pertinent information about organizations / agencies responsible as / for owners, operations, beneficiaries, contractors, emergency action, etc., besides enlisting the impact of possible dam failure, parties affected, and the emergency action plan. (iv) The 'Dam Health' module will record the periodical observations of health inspection teams in a standard format. (v) The 'Dam Rehabilitation' module will catalogue such information on periodical repairs as: type of work, technique involved, cost of work, agencies involved, extent of mitigation, etc. (vi) The 'Analysis and Report' module will provide varied tools for capturing time-series data of pertinent parameters for the purpose of analysis and report preparation;
- The proposed software will allow multiple-level data processing (data entry, data editing, and data deletion) with adequate password protections. Most of the data will be captured through combo box provisions, thereby enabling standardization of data and limiting the scope of typographical work. The standardization will be made an evolving process with the help of 'Masters' which will be periodically updated by DSO-CWC.
- For flexibility of use, copying / saving of data in multiple files will be permitted. Appropriate tool will also be provided for assimilation of data files received from various sources for creation of a holistic national level database by CWC.
- To the extent digitized data is available in CWC, the basic and engineering data of all large dams will be captured before passing the customized applications to all DSOs. The missing basic / engineering / stakeholder data in case of large

dams (and full historical data in case of other dams) will be captured by concerned State / PSU DSO.

- The health and rehabilitation related data will be captured by State / PSU DSOs on periodical basis, and such updated data files will be mailed to DSO-CWC on annual basis for further assimilation, analysis and enrichment of 'Masters.'

Outlining the strategy for development and implementation of the software, Director (SM) said that development of DHARMA software will be an evolutionary process with wider consultation within NCDS and with all DSOs. The module-wise development will be carried out in a phased manner; and even on completion of all modules the software will be subjected to continuous process of up-gradation. Since capturing of vast historical data will be a fairly time-consuming exercise, it will be carried out *pari-passu* with the software development; and hence, early versions of software will be of standalone Windows-application type, to be released module-wise with data compatibility precautions.

For facilitating wider consultation and for assimilation of practical conditions pertinent to the development and implementation process, a suggestion was made for creation of a permanent group under NCDS for carrying out periodical field-visits of old dams for meaningful interaction with field and DSO officials. The said proposal will enable qualitative enhancement of the application besides facilitating a wider use and acceptability of the application; and once overall modules of application are developed, the proposed group will assume a role of 'Audit Team' for ensuring uniform and effective implementation of DHARMA across all DSOs. Suggesting the name '**Dharma Implementation Group (DIG)**' for the proposed group, he further stated that it will have three officials on permanent basis and three officials on two-year's rotation. The DIG will be headed by Chief Engineer (DSO), CWC, with Director (DSM) as member and Director (SM) as member-secretary, while three officials of the rank of Superintending Engineers will be nominated from State / PSU DSOs as rotational members. As and when needed, DIG will co-opt other DSO representatives or officials from other organizations / NGOs as invitee members. The DIG will meet at various project locations at least thrice in a year; and needful arrangements for such meetings will be facilitated by the concerned State / PSU DSO. The periodical reports submitted by DIG will be discussed in the NCDS meetings for reviewing progress of development & implementation of DHARMA.

Enumerating the benefits of proposed software, he stated that DHARMA will facilitate generation and long-term storage of voluminous data by numerous State / PSU DSOs; enable a systematic presentation and interpretation of data for effective monitoring of the health of dams by Central / State / PSUs; help the decision making processes for affecting rehabilitation measures as and when needed; allow the larger sharing of database and knowledge-pool; and bring the much needed transparency on dam safety and rehabilitation measures.

After a brief discussion, the proposal for development & implementation of DHARMA – as brought out in presentation – was agreed by the Committee. The Committee also approved the formation of 'DHARMA Implementation Group' with the objectives, composition & terms of reference, as brought out in the presentation. The States of Maharashtra, Orissa and Andhra Pradesh volunteered to nominate one representative each as rotational member for the first two years; and this was also agreed by the Committee.

28.16.0 Discussions on other issues with the permission of the Chair.

Member-Secretary stated that for better interaction and meaningful discussion it would be better if NCDS meeting is arranged in some dam site in future. All the members endorsed his suggestion.

He then requested the member States for arranging the next meeting of December 2007 on which the representative from Andhra Pradesh volunteered to organize the next meeting at Nagarjuna Sagar dam site in Andhra Pradesh.

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