

BEFORE THE NATIONAL GREEN TRIBUNAL,
SOUTHERN ZONE, CHENNAI

Original Application No.120 of 2024

IN THE MATTER OF:

Suo Motu

.... Applicant

-Vs-

Irrigation & Command Area
Development (CAD)
Through its Engineer in Chief,
Siddipet District, Telangana

.... Respondents

Additional Report filed by the Irrigation
& Command Area Development (CAD) Department-R-4



Counsel For The Respondents – R4
Mrs H. Yasmeen Ali

PLACE: CHENNAI
DATE: 23.11.2024

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**BEFORE THE NATIONAL GREEN TRIBUNAL,
SOUTHERN ZONE, CHENNAI**

Original Application No.120 of 2024
[Earlier O.A. No.151 of 2024 (PB)]

Suo Motu

.... Applicant

-Vs-

Irrigation & Command Area Development (CAD)
Through its Engineer in Chief, Siddipet District, Telangana

.... Respondents

Report filed by the Irrigation & Command Area Development (CAD) Department-R-4

Additional Report for the Observations of NGT on 11.09.2024

1. Whether Environmental Clearance is there for proposed reservoir? Survey/Investigation Details for the reservoir.

The Central water commission has approved total estimated cost for the Kaleshwaram project for Rs.80,190.46 Crores vide CWC Lr.CWC I.D.No.10-A/27/2017/CA(I)-2/77 dated:01.05.2018 (Enclosed as Annexure-1) out of which an amount of Rs.9669.96 Crores is approved for the formation of Sri Komaravelli Mallannasagar Reservoir.

The Government of India, Ministry of Environment, Forest & Climate Change (I.A.I-Division) has accorded the Environmental clearance vide letter no.J-12011/1/2017-IA-I(R) dated:22.12.2017 (Enclosed as Annexure-2) for Kaleshwaram Project as a whole and Sri Komaravelli Mallannasagar Reservoir is part of Kaleshwaram Project under Link-IV.

2. Furnish the NGRI Recommendation and the Action Taken reports. For Zone-II condition before and after construction of the reservoir.

Before formation of the Sri Komaravelli Mallannasagar Reservoir while approving the design and drawings, as per the suggestion of Chief Engineer, Central Designs Organization, Hyderabad, the Executive Engineer, Irrigation Division No.6, Gajwel has addressed the Director, Council of Scientific and Industrial Research (CSIR)- National Geophysical Research Institute (NGRI), Hyderabad for conducting the site-specific seismic studies pertaining to Sri Komaravelli Mallanna Sagar Reservoir. Subsequently, the Chief Scientist, National Geophysical Research Institute, Hyderabad along with his team visited the site and conducted Ground Penetration Radar studies. As per the results, the

Chief Scientist, National Geophysical Research Institute has submitted a Preliminary Seismotectonic and Ground Penetration Radar studies Appraisal (Overview) around Mallanna Sagar dated:23.08.2018 (Enclosed as Annexure-3).

Further, the National Geophysical Research Institute has reported that it has carried out Ground Penetration Radar survey at site and as per the latitude and longitude of the location (aa' @ N-17057.451', E-78047.915'; 65m length and bb' @ N 17057.469', E-780 47.942'; 68 m length) it falls nearby Full Reservoir Level at +557.000m and away from the bund alignment of the Sri Komaravelli Mallannasagar reservoir, where the ground level is almost +557.000m. The water column at the location where Ground Penetration Radar survey conducted by National Geophysical Research Institute is zero for the reservoir full capacity of 50 thousand Million Cubic feet (TMC) at +557.000m.

As per I.S. Code 1893-Part-1 Sri Komaravelli Mallannasagar Reservoir falls under Seismic Zone-II (lowest seismicity level) category (Enclosed as Annexure-4). However, during the design of earth bund, basic horizontal seismic coefficients ($\alpha_0=0.02$ as per Table-2 of I.S:1893-1984) is considered and designed accordingly by Chief Engineer, Central Designs Organization, Hyderabad. Factor of safety obtained for steady seepage (1.11) and sudden draw down (1.0) conditions are more than required value of 1.0. The design and drawings were approved and formation of reservoir has been executed as per approved drawings and specifications.

As per Dam Safety Act- Decemeber-2021 (Enclosed as Annexure-5) Part-II- Section-I- Chapter-VII Clause no.34(I), every specified dam having a height of thirty meters and above or falling under such seismic zone, as may be specified by the regulations, the owner of the specified dam shall establish a seismological station in the vicinity of each such dam for recording micro and strong motion earthquakes and such other data as may be specified by the regulations.

Keeping in view the guidelines of the Dam Safety Act-2021 and the recommendations of Comptroller and Auditor General of India (CAG), The Engineer-in-Chief (I), Gajwel vide Lr.No.ENC/GJL/DCE/DEE-4/AEE-1/SKMS/2023-24/369 Dt:21.02.2024 (Enclosed as Annexure-6) have requested the National Geophysical Research Institute, Hyderabad to furnish the expert opinion on conducting further detailed seismic studies for Sri Komaravelli Mallanna Sagar. In response, National Geophysical Research Institute, Hyderabad vide their letter dated:29.04.2024 (Enclosed as Annexure-7) have opined and recommended to carry out the continuous seismic monitoring of the reservoir as per Central Water Commission guidelines.

National Geophysical Research Institute, Hyderabad has submitted a detailed proposal (Enclosed as Annexure-8) for Supplying and Installation of recommended seismic instruments for

monitoring the seismic activity of Sri Komaravelli Mallanna Sagar Reservoir and requested for payment for Rs.534.325 Lakhs. The Seismic monitoring, Delineation of seismically active faults/lineaments and Determination of Peak Ground Acceleration (PGA) levels of the dam structure during the occurrence of near field earthquakes will be carried out by National Geophysical Research Institute, Hyderabad by March-2025.

3. Furnish the details of Safety measures already taken during the filling of the reservoir for last three years. What are the observations/ damages (if any) during this period?

The water filled into Sri Komaravelli Mallannasagar Reservoir can be drawn from the flood accumulated at Yellampally reservoir and Mid Manair Reservoir.

The filling of reservoir is being done duly following the guidelines given in the IS 15472:2004 code (Enclosed as Annexure-9). The trail run of this reservoir started on 22nd August-2021 and was inaugurated by the then hon'ble Chief minister on 23rd February-2022. During the initial filling the reservoir was filled maximum upto a level of +537.550m for a capacity of 16.180 TMC which is 1/3rd of total capacity where head of water is 2/3rd of maximum head of water of 54.40 m. During this season the reservoir is filled upto the maximum level of +541.060 m for a capacity of 21.12 TMC which is almost 42% of the total capacity where the head of water is 70% of maximum head of water. At present 19.710 TMC of water available in the reservoir up to a level of +540.100 m.

The water is released from Sri Komaravelli Mallannasagar Reservoir to various packages to meet the demand of both Kharif and rabi seasons. Total amount of Water released from Sri Komaravelli Mallannasagar Reservoir from the year 2021 to till date to various packages viz., Package-12 canal-7.850 TMC, Kondapochamma Sagar reservoir-24.130 TMC, Kudellivagu upto Upper Manair dam -4.922 TMC and Package-15 canal-1.15 TMC.

Further, 2.584 TMC of water is released for drinking water to Mission Bhagiratha water treatment plant of 125 MLD capacity. Further, the Government of Telangana has allocated 20 TMC of water to Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB) to draw from Sri Komaravelli Mallannasagar reservoir vide G.O.Ms No.77 (MA&UD Engg Dept) Dated:05.07.2024 (Enclosed as Annexure-10).

Further, it is submitted that Sri Komaravelli Mallannasagar Reservoir is listed under specified dams under National Dam Safety Authority, New Delhi bearing the Project Identification Code (PIC) No.TL169HH0192 (Enclosed as Annexure-11) vide Sl.No.3. Therefore, all the Dam safety guidelines asper the Dam safety act-2021 and the instructions of National Dam Safety Authority, New Delhi in coordination with State Dam Safety Organization, Hyderabad are being followed scrupulously.

Regarding the safety of the reservoir, it is to be reported that, the seepage discharges through the dam body are monitored on day-to-day basis by the field staff. As per the observations the seepage discharges are well within the range of allowable limits (Enclosed as Annexure-12). There no seismic tremors felt in the vicinity due to filling of the reservoir. Thus, the reservoir is in safe and in healthy condition.

4. Whether the Emergency Action (EAP) is prepared? Who has recommended the EAP and How it will be implemented?

As per Dam Safety Act- Decemeber-2021 Part-II- Section-I-Chapter-VIII Clause no.36, every specified dam in respect of each of specified dam, shall,—

“(a) prepare emergency action plan before allowing the initial filling of the reservoir and thereafter update such plans at regular intervals;

(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.”

As the initial filling started in August-2021 which is before the commencement of the act, the point (b) is applicable to Sri Komaravelli Mallannasagar Reservoir.

Adhering to the above conditions of the act, The Preparation of Emergency Action Plan for Sri Komaravelli Mallannasagar Reservoir has been entrusted to Central Water & Power Research Station, Pune and required fee for the same also been remitted (Enclosed as Annexure-13). The start of work is delayed due to the staff of the institute are engaged in the Maharashtra state Election duty. The preparation of Emergency Action Plan will be completed by March-2025.

5. Whether there is any Operation and Maintenance Manual? Furnish the details.

The Operation and Maintenance of the reservoir is being monitored by the Superintending Engineer, Irrigation Circle, Gajwel based on the CWC Guidelines for Preparation of O&M Manual for dams vide Chapter-2 Project Operation, Chapter-3 Project Inspection and Chapter-4 Project Maintenance (Enclosed as Annexure-14) duly following the Dam safety guidelines.

6. What is the Impact on reservoir upstream and downstream in a critical condition?

Sri Komaravelli Mallannasagar reservoir is filled mainly through pumping which can be controlled. The flood due the self-catchment is very negligible. Hence, there will be less impact on the reservoir upstream and downstream during the critical condition. However, the Emergency

Action Plan is being prepared by Central Water & Power Research Station, Pune and the guidelines will be followed scrupulously.

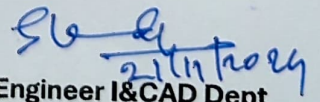
7. Regarding the Inquiry Commission on Kaleshwaram Project by Sri Pinaki Chandra Ghose, Former Judge of Supreme Court of India:

The Kaleshwaram Project has been divided into seven (7) links (Enclosed as Annexure-15) which are as follows:

Link No.	Particulars
Link-I	From Lakshmi Barrage (Medigadda) on Godavari River to Sripada Yellampally Project
Link-II	From Sripada Yellampally Project to Mid Manair Reservoir (Package 6, 7 & 8)
Link-III	From Mid Manair Reservoir to Upper Manair Reservoir (Package 9)
Link-IV	From Mid Manair Reservoir to Konda Pochamma Reservoir (Package 10, 11, 12, 13 & 14)
Link-V	From SKMS to Baswapur Reservoir (Nrusimha Sagar) (Package 15 & 16)
Link-VI	From Sri Komaravelli Mallana Sagar to Singur Reservoir (Package 17, 18 & 19)
Link-VII	From SRSP Foreshore to Nizam Sagar Canals (Package 20, 21 and 22) and to Dilwapur (Package 27) and Hangarga (Package 28) village for Nirmal and Mudhole Constituency

The Telangana State Government has ordered an Inquiry commission on vide G.O.Ms.No.6 Irrigation and CAD (Projects-IV) Department dated:14.03.2024 (Enclosed as Annexure-16). Asper the G.O the Inquiry is limited only to barrages in Link-I which are Medigadda, Annaram and Sundilla Barrages. The Inquiry has to be completed by 31st Decemeber-2024 vide G.O.Ms.No.25 Irrigation and CAD (Projects-IV) Department dated:12.11.2024 (Enclosed as Annexure-17). Sri Komaravelli Mallannasagar Reservoir is an independent reservoir comes under Link-IV which is from Mid Manair Reservoir to Konda Pochamma Reservoir. Hence, Sri Komaravelli Mallannasagar Reservoir is not a part of the Inquiry commission asper the above Government Order.

This is submitted for your kind favour of information and perusal. The case is listed on 26.11.2024.


Executive Engineer I&CAD Dept
Irrigation Division No.6
Gajwel

**Government of India
Central Water Commission
Cost Appraisal (Irrigation)-2 Directorate**

**6th Floor(S), Sewa Bhawan,
R.K.Puram, New Delhi-66
Tel.Ph.011-29583427**

Sub: Kaleshwaram Project, Telangana (New CCA 738851 ha & stabilization of existing CCA 762028 ha) - Examination of Cost Estimates-reg.

**Ref: (i) CWC No. 6/231/2017/PA(S)/180-92 dated 28.02.2017
(ii) CE/KPH/DCE/DEE-3/AEE-9/CWC/camp/2017 dated 27.11.2017**

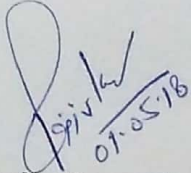
The cost estimate of the project cited above for Rs. 80704.84 Cr. at SOR 2015-16 was received from Project Authorities vide letter under reference no. (ii) above for examination of cost aspects. After examination of estimates and compliances submitted by the State Govt. on various observations/ clarifications sought by this directorate and also detailed discussion/ consultation with the project authorities, cost of the project has been finalised for **Rs. 80190.46 Cr** (at SOR 2015-16), out of which an expenditure of Rs. 23,022.74 Cr has been incurred up to December-2017 according to details submitted by the competent authority of the project. It was further informed by the State Govt. that during the period of Jan.'18 to March'18 an expenditure of Rs.7630.98 cr was incurred and total expenditure on the project is Rs. 30653.72 Cr. up to March, 2018 vide their letter dated 25.04.2018.

The finalized cost is subject to correctness of detailed surveys and investigations, approved final alignments of distribution system and final drawings and designs submitted by the project authorities, quantities considered in the estimate with supporting documents provided and duly certified by the project authorities as also the acceptance of the project by the other concerned directorates of CWC and other associated central agencies.

Further, it is important to note that it was intimated vide the D.O. letter no.6/231/2017-PA(S)/1602-1605 dated 22.12.2017 addressed to the Principal Secretary (Irrigation & CAD), Govt. of Telangana from the Chief Engineer (PAO), CWC that estimate should be realistic and need not to be revised in next three years at least. In response to this, Principal Secretary (Irrigation & CAD), Govt. of Telangana vide his D.O. letter no. 1/Spl.CS(Irr)/2018 dated 6.01.2018 has given the targeted dates of completion for the project components through its packages as December, 2018 as the latest. The abstract of cost of the proposal is enclosed herewith for necessary action.

This issues with the approval of Chief Engineer (PAO), CWC.

Encl: As Above


(Rajiv Kumar)
Director

**Director, PA (S) Dte., CWC, Sewa Bhawan, R.K.Puram, New Delhi CWC I.D. No.
10-A/27/2017/CA(I)-2/77 dated: 04-05-2018**

KALESHWARAM PROJECT, TELANGANA

GENERAL ABSTRACT

S. No.		UNIT-I	UNIT-II	TOTAL
		Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)
	Direct Charges			
I	WORKS			
1	A - Preliminary	7423.13	21370.32	28793.45
2	B. Land			
3	C-works	427853.22	437679.29	865532.51
4	D- Regulators	2648459.56	1884052.81	4532512.36
5	E-Falls	1450.00	29744.17	31194.17
6	F Cross Drainage Works	0.00	7839.78	7839.78
7	G Bridges	0.00	271375.75	271375.75
8	H Escape	0.00	42638.72	42638.72
9	J Power Plant	0.00	0.00	0.00
10	K Buildings	0.00	0.00	0.00
11	L ₁ Earthwork	2216.12	2462.00	4678.12
12	L ₂ Lining	0.00	317046.18	317046.18
13	L ₃ Tunnel	0.00	182992.62	182992.62
14	M Plantation	0.00	779706.48	779706.48
15	N Tanks and Reservoirs	113.50	0.00	113.50
16	O Miscellaneous	0.00	25136.94	25136.94
17	P Maintenance	23055.67	33505.60	56561.27
18	Q - Special T & P	26610.76	39497.80	66108.56
19	R - Communication	112.00	0.00	112.00
20	U-Distributaries and Minors	8759.00	2273.95	11032.95
21	V-Water courses / field channels	191.33	378950.93	379142.26
22	X Environment and Ecology	0.00	25404.96	25404.96
23	Y - Losses on stock	29436.07	20982.09	50418.16
		6079.83	8273.65	14353.48
	Total of I-Works:	3181760.18	4510934.03	7692694.21
II	Establishment Charges @ 2% of I -works less B-land for Unit-I & Unit-II respectively	55078.14	81465.09	136543.23
III	Tools & Plants @ 1% of cost of I-Works	31817.60	45109.34	76926.94
	Taxes	0.00	0.00	0.00
IV	Suspense	0.00	0.00	0.00
V	Receipt and Recoveries (- ve)	0.00	0.00	0.00
	Total Direct Charges:	3268655.93	4637508.46	7906164.39
	Indirect Charges			
a)	Capital Value of abatement of land revenue (5% of Culturable land revenue of B-Land)	14070.96	21883.96	35954.93
b)	Audit & Account Charges @ 1% of cost of I-Works	31817.60	45109.34	76926.94
	Total Indirect Charges (a+b):	45888.56	66993.30	112881.87
	Total Direct & Indirect Charges:	3314544.49	4704501.77	8019046.26
	Grand Total Cost in crore	33145.44	47045.02	80190.46

[Handwritten Signature]

KALESHWARAM PROJECT, TELANGANA

Unit-I

S. No.	SUB HEADS	MEDIGADDA BARRAGE	ANNARAM BARRAGE	SUNDILA BARRAGE	New Reservoir Malakpet Package 9	New Reservoir Ananthagiri Package 10	New Reservoir Sri Ranganayaka Sagar Package 11	New Reservoir Komaravelli Mallana Sagar Package 12	New Reservoir Konda Pochamma Package 14	New Reservoir Gandhamalla Package 15	New Reservoir Baswapur Package 16	New Reservoir Chevella Package 24	TOTAL
		Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)
1	Direct Charges												
I	WORKS												
1	A - Preliminary	293.00	2189.40	1383.00	370.00	422.00	114.00	797.94	1132.31	207.48	254.00	260.00	7423.13
2	B. Land	39276.49	17386.82	10744.05	7093.66	33968.42	14958.30	159434.00	49374.62	57790.55	37826.31	0.00	427853.22
3	C-works	584836.64	361270.62	390173.05	47226.96	41121.98	48553.41	743923.24	167888.03	76362.31	159295.20	27808.12	2648459.56
4	D- Regulators										1450.00		1450.00
5	E-Falls												0.00
6	F Cross Drainage Works												0.00
7	G Bridges										0.00		0.00
8	H Escape												0.00
9	J Power Plant												0.00
10	K Buildings	1016.12	450.00	450.00	100.00	100.00						100.00	2216.12
11	L ₁ Earthwork												0.00
12	L ₂ Lining												0.00
13	L ₃ Tunnel												0.00
14	M Plantation	57.50		56.00									113.50
15	N Tanks and Reservoirs												0.00
16	O Miscellaneous	3667.00	3508.50	4257.08	100.00	100.00	359.90	2097.40	998.00	4336.93	3530.86	100.00	23055.67
17	P Maintenance	5862.53	3619.71	3909.23	473.27	412.22	485.53	7439.23	1678.88	843.62	1607.45	279.08	26610.76
18	Q - Special T & P	50.00	31.00	31.00									112.00
19	R - Communication	209.00	250.00	300.00						8000.00			8759.00
20	U-Distributaries and Minors	191.33											191.33
21	V-Water courses / field channels												0.00
22	X Environment and Ecology	6793.70	144.00	139.50	2223.89	6153.55		12478.67	751.38	751.38			29436.07
23	Y - Losses on stock (0.25% of Total I works)	1298.86	794.67	876.80	118.32	103.05	114.32	1756.02	374.43	199.77	373.82	69.77	6079.83
	Total of I-Works:	643552.17	389644.72	412319.71	57706.10	82381.22	64585.46	927926.50	222197.65	148492.04	204337.64	28616.97	3181760.18
II	Establishment @2% of cost of I-Works less B-Land	12085.51	7445.16	8031.51	1012.25	968.26	992.54	15369.85	3456.46	1814.03	3330.23	572.34	55078.14
III	Tools & Plants @ 1% of cost of I-Works	6435.52	3896.45	4123.20	577.06	823.81	645.85	9279.27	2221.98	1484.92	2043.38	286.17	31817.60
IV	Suspense	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
V	Receipt and Recoveries (- ve)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Direct Charges:	662073.20	400986.32	424474.42	59295.41	84173.29	66223.86	952575.62	227876.09	151790.99	209711.25	29475.48	3268655.93
2	Indirect Charges												
a)	Capital Value of abatement of land revenue (5% of Culturable land revenue of B-Land)	1944.82	850.84	537.20	254.68	735.57	647.92	5141.40	1409.53	1315.28	1233.72	0.00	14070.96
b)	Audit & Account Charges @ 1% of cost of I-Works	6435.52	3896.45	4123.20	577.06	823.81	645.85	9279.27	2221.98	1484.92	2043.38	286.17	31817.60
	Total Indirect Charges (a+b):	8380.35	4747.29	4660.40	831.74	1559.38	1293.77	14420.67	3631.51	2800.20	3277.09	286.17	45888.56
	Total Direct & Indirect Charges:	670453.55	405733.61	429134.82	60127.15	85732.67	67517.63	966996.28	231507.59	154591.19	212988.34	29761.65	3314544.49
	Grand Total Cost in crore	6704.54	4057.34	4291.35	601.27	857.33	675.18	9669.96	2315.08	1545.91	2129.88	297.62	33145.44
													<i>Grand Total Cost in crore</i> 33145.44

KALESHWARAM PROJECT TELANGANA

Unit-II

S. No.	SUB HEADS	Package 6	Package 7	Package 8	Package 9	Package 10	Package 11	Package 12	Package 13	Package 14	Package 15	Package 16	Package 17	Package 18	Package 19	Package 20	Package 21	Package 22	Package 23	Package 24	Package 25	Package 26	Package 27	Package 28	TOTAL	
	DESCRIPTION	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	Amount (in Rs. Lakh)	
1	Direct Charges																									
I	WORKS																									
1	A - Preliminary	1900.00	665.00	717.20	4686.57	1427.89	1263.00	952.00	349.00	549.00	434.00	700.00	634.80	513.18	536.78	528.23	756.60	852.54	642.00	1020.15	683.00	658.80	504.77	395.81	21370.32	
2	B. Land	3128.61	7812.23	4114.39	25382.60	8440.67	23743.14	27415.73	19409.67	30450.18	27096.66	38667.93	2918.75	15160.73	15759.81	5621.10	19269.61	78598.85	1368.79	10119.89	20718.20	30899.86	15288.77	6293.12	437679.29	
3	C-works	383953.56	0.00	427551.07	41076.16	183494.00	234356.04	210428.29		178552.25					40309.07	23977.36	33376.01	49047.84	30340.17	0.00	296.90	17091.66	30202.43		1884052.81	
4	D- Regulators	2911.84	1334.51	3401.45	638.74	961.61	3543.70	6329.45	225.43	666.30	1170.52	686.19	14.10	713.26	208.39	1599.72	2601.76	1913.80	0.00	300.31	322.83	200.29	0.00	0.00	29744.17	
5	E-Falls	1608.77							99.61		378.97	2565.96					50.96	0.00	0.00	2608.81	5.48	195.38	325.85		7839.78	
6	F Cross Drainage Works		1345.79	2317.13	4281.70	1297.83		1013.28	20943.01	79450.47	20118.84	36947.11	784.70	14775.24	15139.49	472.01	1324.37	17782.49	0.00	3929.89	17354.74	14721.44	12699.60	4676.61	271375.75	
7	G Bridges	785.11	505.25	1929.57	675.05	252.17		1261.05	4432.06	1282.88	2127.90	4587.56	571.83	2906.31	729.40	180.34	812.05	4761.87	0.00	1378.08	3639.27	5581.91	2871.77	1367.28	42638.72	
8	H Escape																									0.00
9	J Power Plant																									0.00
10	K Buildings	100.00	100.00	100.00	100.00	100.00				1272.00								90.00	100.00	100.00	100.00	100.00	100.00	100.00	2462.00	
11	L ₁ Earthwork	6087.07	5497.30	5091.28	3308.28	2544.12	2296.80	3554.12	17368.62	42925.05	22591.03	15999.82	3261.16	29830.69	43315.10	2665.08	1002.23	30321.85	0.00	7773.59	24591.37	24050.53	16752.86	6218.25	317046.18	
12	L ₂ Lining	1258.44		2680.79	1861.82	896.61	9165.82	5839.05	8090.33	23056.70	15023.44	22724.12	1037.83	6968.82	2211.63	1436.07	18622.84	6289.50	0.00	9161.69	15818.23	23610.56	3522.46	3715.89	182992.62	
13	L ₃ Tunnel	104217.44	125607.43	57130.57	26240.28	41510.25	51624.73	81985.46			12873.34	0.00	91848.44	19239.23		37579.43	19724.61	15456.49	50165.09	10073.73	16737.46	0.00	17692.50	0.00	779706.48	
14	M Plantation																									0.00
15	N Tanks and Reservoirs		8079.54		6067.56												8573.73	1446.11	0.00				550.00	420.00	25136.94	
16	O Miscellaneous	204.00	77.00	212.00	891.29	275.55	8313.68	250.78	250.00	18878.00	115.41	115.45	315.28	176.32	157.31	62.79	156.26	157.34	0.00	162.00	100.00	1467.00	583.84	584.31	33505.60	
17	P Maintenance	5009.22	1424.70	5002.02	954.81	2373.87	3211.57	3335.54	583.09	4525.68	859.27	1149.03	975.18	772.71	754.95	842.42	1110.67	1407.42	993.13	654.80	1139.99	1046.84	807.93	562.96	39497.80	
18	Q - Special T & P																									0.00
19	R - Communication					782.42		654.33				419.80					312.51	104.89							2273.95	
20	U-Distributaries and Minors			10210.73	5043.41	18335.81	20444.87	6458.84	125362.44	10584.28	28156.30		2579.60	12628.21		30872.14	26498.78		2202.29	29842.23	32833.49	8470.16	8427.34		378950.93	
21	V-Water courses / field channels			1021.08	504.34	1833.58	2044.49	690.97		1058.96	2816.20		1058.96	2816.20		257.96	1262.82	3087.21	2649.88	220.25	2984.12	3283.35	847.02	842.73	25404.96	
22	X Environment and Ecology	70.00		2449.31	0.00					295.39	190.88		7911.00			5700.59	974.45		0.00	0.00	0.00	3390.47	0.00		20982.09	
23	Y - Losses on stock(0.25% of Total I works)	1063.39	339.61	1053.04	202.55	494.65	562.32	497.75	137.29	947.45	200.95	265.89	165.81	175.19	177.39	223.17	256.00	322.47	237.66	145.68	273.15	250.16	170.20	111.90	8273.65	
	Total of I-Works:	512297.45	152788.36	511300.50	130048.51	250399.38	358250.18	366006.20	79037.91	508213.79	114824.44	155801.36	102527.88	101980.24	92881.28	91519.43	138160.55	223055.70	102554.51	77582.53	136913.40	139006.59	101539.39	64244.47	4510934.03	
II	Establishment @ 2% of cost of I-Works less B-Land	10183.38	2899.52	10143.72	2093.32	4839.17	6690.14	6771.81	1192.56	9555.27	1754.56	2342.67	1992.18	1736.39	1542.43	1717.97	2377.82	2889.14	2023.71	1349.25	2323.90	2162.13	1725.01	1159.03	81465.09	
III	Tools & Plants @ 1% of cost of I-Works	5122.97	1527.88	5113.01	1300.49	2503.99	3582.50	3660.06	790.38	5082.14	1148.24	1558.01	1025.28	1019.80	928.81	915.19	1381.61	2230.56	1025.55	775.83	1369.13	1390.07	1015.39	642.44	45109.34	
IV	Suspense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
V	Receipt and Recoveries (- ve)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
	Total Direct Charges:	527603.80	157215.77	526557.23	133442.31	257742.55	368522.82	376438.07	81020.85	522851.20	117727.24	159702.04	105545.34	104736.43	95352.52	94152.59	141919.97	228175.39	105603.77	79707.61	140606.44	142558.79	104279.80	66045.95	4637508.46	
2	Indirect Charges																									
a)	Capital Value of abatement of land revenue (5% of Culturable land revenue of B-Land)	156.43	390.61	205.72	1269.13	422.03	1187.16	1370.79	970.48	1522.51	1354.83	1933.40	145.94	758.04	787.99	281.06	963.48	3929.94	68.44	505.99	1035.91	1544.99	764.44	314.66	21883.96	
b)	Audit & Account Charges @ 1% of cost of I-Works	5122.97	1527.88	5113.01	1300.49	2503.99	3582.50	3660.06	790.38	5082.14	1148.24	1558.01	1025.28	1019.80	928.81	915.19	1381.61	2230.56	1025.55	775.83	1369.13	1390.07	1015.39	642.44	45109.34	
	Total Indirect Charges (a+b):	5279.41	1918.50	5318.72	2569.62	2926.03	4769.66	5030.85	1760.86	6604.65	2503.08	3491.41	1171.22	1777.84	1716.80	1196.25	2345.09	6160.50	1093.98	1281.82	2405.04	2935.06	1779.83	957.10	66993.30	
	Total Direct & Indirect Charges:	532883.21	159134.26	531875.96	136011.93	260668.57	373292.48	381468.92	82781.71	529455.85	120230.32	163193.45	106716.55	106514.27	97069.32	95348.84	144265.06	234335.89	106697.75	80989.43	143011.48	145493.85	106059.63	67003.05	4704501.77	
	Grand Total Cost in crore	5328.83	1591.34	5318.76	1360.12	2606.69	3732.92	3814.69	827.82	5294.56	1202.30	1631.93	1067.17	1065.14	970.69	953.49	1442.65	2343.36	1066.98	809.89	1430.11	1454.94	1060.60	670.03	47045.02	

ANNEXURE-2

No. J-12011/1/2017-IA-I(R)
Government of India
Ministry of Environment, Forest & Climate Change
[IA.I - Division]

Indira Paryavaran Bhavan
3rd Floor, Vayu Wing
Jor Bagh Road
New Delhi —110 003

Dated: 22nd December, 2017

To,

Shri B. Hariram
The Chief Engineer
Kaleshwaram Project
1st Floor, Jalasoudha Building
Errumanzil
Hyderabad - 500082.

Subject: Kaleshwaram Project in Karimnagar District of Telangana by I & CAD Department, Government of Telangana - Environmental Clearance (EC) - regarding.

Sir,

This has reference to your letter No.CE/KPH/DCE-3/DEE-3/AEE-9/EIA&EMP/Vol.II/2017 dated 16.11.2017 and 26.11.2017 on the above mentioned subject.

2. The above referred proposal was considered by the Expert Appraisal Committee (EAC) for River Valley & Hydroelectric Projects in its meeting held on 5.12.2017. The comments and observations of EAC on the project may be seen in the Minutes of the meeting which are available on the web-site of this Ministry.
3. The Public Hearings were conducted in 15 Districts (i.e. Karimnagar on 22.8.2017, Nizamabad on 22.8.2017, Medchal-Malkajgiri on 22.8.2017, Yadadri-Bhunanagiri on 22.8.2017; Peddapally on 23.8.2017, Nalgonda on 23.8.2017, Sangareddy on 23.8.2017, Kamareddy on 23.8.2017; Nirmal on 24.8.2017, Jagityal on 24.8.2017, Medak on 26.8.2017, Jayashankar-Bhupalapally on 26.8.2017, Manchiryal on 26.8.2017, Rajanna Sircilla on 26.8.2017 & Siddipet on 26.8.2017) of Telangana and 1 District (Gadchiroli on 27.9.2017) of Maharashtra as per the provisions of EIA Notification, 2006.
4. The project envisages construction of a barrage across River Godavari in near Medigadda village in Karimnagar District of Telangana for diversion of 180 TMC of water for providing irrigation facility in 7,38,851 ha covering 7 Districts namely Adilabad, Karimnagar, Nizamabad, Warangal, Medak, Nalgonda and Rangareddy Districts. It is also proposed to stabilize the existing command area of 7,62,028 ha of area. The project is also proposes to provide drinking water facility for Hyderabad and Secunderabad cities. Total land requirement is about 37,852 ha. Out of which



3168.1315 ha is forest land and 34,684 ha is private land. The total submergence area is about 18,302 ha. In addition to Medigadda barrage, 2 more barrages between Medigadda and Sripada Yellampally Project are likely to be constructed, one at Annaram and the other at Sundilla. The total length of water canal system is about 1,832 km. This project lies in the interstate boundary with submergence of 174.37 ha of area in Maharashtra State. Total estimated cost of the project is about Rs. 80,499.71 Crores and proposed to be completed in 3 years.

5. It was noted that the project involves (i) diversion of 180 TMC water from Godavari river, (ii) additional 20 TMC water will be drawn from Yellampally barrage, (iii) 10 TMC of water from self-yield tanks and (iv) 25 TMC of water from utilizable groundwater; put together 225 TMC of net water availability. Out of this, 30 TMC of water will be used for providing drinking water facility for twin cities of Hyderabad and Secunderabad, 10 TMC of water to en-route villages, 16 TMC of water for industrial purpose, 134.5 TMC for irrigation facility in 7,38,851 ha of new command area and 34.5 TMC of water for stabilization of 7,62,028 ha of area. The CWC has cleared water availability vide letter No. 6-231/2017-PA(S)/1327-28 dated 30.10.2017 for the project.

6. The Expert Appraisal Committee, after due consideration of the relevant documents submitted by the project proponent and clarification furnished in response to its observations, have recommended for grant of Environmental Clearance for the project mentioned above. Accordingly, the Ministry of Environment, Forest & Climate Change hereby accords necessary environmental clearance for the above project as per the provisions of Environment Impact Assessment Notification, 2006 and its subsequent amendment in 2009, subject to compliance of following conditions:

Part - A - Specific Conditions:

- i. The Catchment Area Treatment (CAT) Plan as has been proposed in the Chapter-9 of EMP (9.1 - CAT Plan; November, 2017) shall be implemented in consultation with the Telangana State Forest Department. The allocated grant of Rs. 362.04 Crores for this purpose should be fully utilized and not be diverted for any other purpose. As per plan, the area of CAT is 32.83 Sq.km.
- ii. The project involves acquisition of 34,684 ha of land. The R&R benefits for the land losing will have to comply with the Right to Fair Compensation and Transparency in land acquisition, Rehabilitation & Resettlement Act, 2013 or any other act which would be beneficial to the project oustees. Adequate publicity of the compensation package should be circulated in the affected villages. All R&R issues shall be completed before commissioning of the project.
- iii. Construction work to be carried-out after following due procedure of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 as applicable to the State of Telangana (21/2017) as amended by Act.



- iv. A Monitoring Committee for R&R shall be constituted which shall include representatives of project affected persons including representative from SC/ST category and a woman beneficiary.
- v. All commitment made during the public hearing should be fulfilled completely by the project proponent and record maintained, if any.
- vi. The Command Area Development (CAD) Plan as proposed in the EIA/EMP report (November, 2017) report shall be strictly implemented.
- vii. Consolidation and compaction of the generated muck should be carried-out in the muck dumping sites. As proposed in the muck disposal plan, out of 1480 lakh m³ muck generated, the entire to be utilized for service road & inspection paths, embankments, land leveling, filling trenches, and construction material for CD works, road etc. and restoration works for canal banks should be strictly adhered. The muck disposal sites shall be reclaimed/ restored with vegetation once capacity is utilized. Allocated amount of Rs.32.79 crores for this purpose should be fully utilized and not be diverted for any other purpose.
- viii. The proposed compensatory afforestation programme in 5333.817 ha of degraded forest area with twenty two (22) local plant species identified for the programme shall be undertaken strictly in consultation with State Forest Department. The allocated amount of Rs. 722.30 Crores for this purpose should be fully utilized and not to be diverted for any other purpose.
- ix. To enhance the environment of project site, greenbelt, as proposed in the EIA/EMP report (November, 2017) shall be developed. The proposed greenbelt shall be developed in the barrages of the project and reservoirs periphery of 110.20 km and canal bank of 116.334 km of the project proposed with local plant species in consultation with State Forest Department should be taken-up strictly. The allocated grant of Rs. 19.21 Crores should be fully utilized this purpose and not be diverted for any other purpose.
- x. The Fisheries Development Plan as proposed in the EIA/EMP (November, 2017) for the conservation of fish in river & reservoir shall be implemented completely in consultation State Fisheries Department. A budget of Rs. 485 Crores provided for fisheries development plan should be utilized fully for this purpose and not to be diverted for any other purpose.
- xi. The proposed Biodiversity Conservation and Management Plan as proposed in the EIA/EMP report (November, 2017) should be implemented in consultation with State Forest Department. The allocated grant of Rs. 3.36 Crores should be fully utilized this purpose and not be diverted for any other purpose.
- xii. Water User Association's (WUAs) / Co-operative shall be formed and involvement of the whole community for disciplined use of available waters shall be ensured.



- xiii. Conjunctive use of surface water shall be planned to check water logging as well as to increase productivity.
- xiv. The equipment likely to generate high noise levels during the construction period or otherwise shall meet the ambient noise level standards as notified under the Noise Pollution (Regulation and Control) Rules, 2000, as amended in 2010 under the Environment Protection Act (EPA), 1986. Ambient Noise level monitoring shall be conducted on a monthly basis during the period of construction at suitable locations and copy of the test reports to be submitted to Regional Office, MoEF & CC, Chennai on six monthly basis.
- xv. The On Farm Development (OFD) works shall be completed and WUAs (Water User Associations) shall be made functional before commencement of irrigation.
- xvi. Occurrence of stagnant pools/slow moving water channels during construction and operation of the project providing breeding source for vector mosquitoes and other parasites. The river should be properly channelized so that no small pools and puddles are allowed to be formed. Even after taking precautions, due to un-foreseen situations, breeding of mosquito and resultant malaria or mosquito borne diseases can increase. If such a situation arises, it will be the responsibility of project authorities to take all steps i.e. residual insecticidal spray in all the project area and surrounding 3 km area keeping the flight range of mosquitoes in consideration.
- xvii. Any other clearance from any other organization/department if required should be obtained.
- xviii. The submergence area is very large, micro-climatic change conditions in the project area during construction/post-construction period to be brought-out/reported at regular intervals.
- xix. Plans for greenbelt development and reservoir rim treatment have to be made in consultation with State Forest Department. Preference shall also be given to plant local indigenous species.
- xx. Solid waste generated, especially plastic waste should not be disposed of as landfill material. It should be treated with scientific approach and recycled.
- xxi. Six monthly compliance reports shall be submitted to Regional Office, MoEF & CC, Chennai until completion of the modernization works.

Part - B. General Conditions:

- i. Adequate arrangements for providing free fuel like LPG shall be made at the project cost for the labour engaged in the construction work so that indiscriminate felling of trees is prevented.
- ii. Medical facilities as well as recreational facilities shall also be provided to the labourers.



- iii. The labourers to be engaged for construction works shall be thoroughly examined by health personnel and adequately treated before issuing them work permit.
 - iv. Water sprinkling arrangements shall be made to suppress the fugitive emissions and on monthly basis, ambient air quality to be monitored during the period of construction.
 - v. Potable drinking water and proper sanitary facilities shall be provided for the labour force.
 - vi. Restoration of construction area including dumping sites of excavated materials shall be ensured by leveling, filling up of borrow pits, landscaping etc. The area should be properly treated with suitable plantation.
 - vii. Environmental parameters shall be monitored and six monthly monitoring reports shall be submitted to the concerned Regional Office of the Ministry, Chennai.
7. The Project Proponent shall provide full cooperation and all required documents / data to the Officials from concerned Regional Office of the Ministry, Chennai who would be monitoring the implementation of environmental safeguards.
8. The responsibility of implementation of environmental safeguards and carrying out environmental monitoring rests fully with Irrigation & CAD Department, Government of Telangana.
9. Besides the above stated conditions, the Project Proponent shall also implement all environmental safeguards, as proposed in the EIA/EMP report and other reports from time to time. The Regional Office of the Ministry, Chennai shall monitor implementation of EMP at regular intervals.
10. The Environmental Management Plan (EMP) shall be strictly adhered to and a sum of Rs. 16230.43 crores, the budgetary provisions for the implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately
11. In case of change in the scope of the project, the same shall be intimated to the Ministry and fresh approval, if required, shall be taken from the Ministry.
12. The Ministry reserves the right to add additional safeguard measures subsequently, if found necessary and to take action including revoking of the clearance under the provisions of the Environment (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time-bound and satisfactory manner.
13. This clearance letter is valid for a period of 10 years from the date of issue of this letter for commencement of construction work of the project.
14. A copy of the clearance letter shall be marked to concerned Panchayat/Zilla Parishad/ Municipal Corporation, Urban local body and local NGO, if any, from whom any suggestion/representations were received while processing the proposal. The clearance letter shall also be put on website by the project proponent.



15. State Pollution Control Board / Committee shall display a copy of the clearance letter at the Regional Office, District Industries Centre and Collector's / Tehsildar's Office for 30 days.

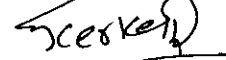
16. The project proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letters are available with the State Pollution Control Board / Committee and may also be seen at Website of the Ministry of Environment, Forest & Climate Change at <http://www.moef.nic.in>.

17. After 5 years of the commissioning of the Project, a study shall be undertaken regarding impact of the project on the environment and downstream ecology. The study shall be undertaken by an independent agency, decided in consultation with the Ministry.

18. The project proponent shall also submit six monthly reports on the status of compliance of stipulated EC conditions including the results of monthly monitored data (both in hard copies as well as by email) to the respective Regional Office of MoEF&CC, Chennai.

19. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days from the date of issue, as prescribed under Section-16 of the National Green Tribunal Act, 2010.

Yours faithfully,

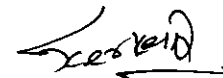


(Dr.S. Kerketta)

Director

Copy to:

1. The Secretary, Ministry of Water Resources, RD & GR, Shram Shakti, Bhawan, Rafi Marg, New Delhi 1.
2. The Special Chief Secretary, Irrigation & CAD Department, Government of Telangana, 5th Floor, B- Block, Secretariat, Hyderabad – 500 001.
3. The Principal Secretary, Environment, Forests, Science and Technology Department, Government of Telangana, 3rd Floor, D- Block, Secretariat, Hyderabad-500 001.
4. The Chief Engineer, Project Appraisal Directorate, Central Water Commission, Sewa Bhawan, R.K. Puram, New Delhi-110066.
5. The Addl. PCCF (Central), Regional Office (SR), Ministry of Environment, Forest & Climate Change, Regional Office (SEZ), 1st and 2nd Floor, Handloom Export Promotion Council, 34, Cathedral Garden Road, Nungambakkam, Chennai - 600034.
6. The Member Secretary, Telangana State Pollution Control Board, Payavaran Bhawan, Industrial Estate, Sanath Nagar, Hyderabad.
7. Guard file/Notice Board.



(Dr.S. Kerketta)

Director

Preliminary Seismo-tectonic and GPR studies Appraisal around Mallanna Sagar Project, Telangana State

Telangana state in southern peninsular shield falls in Seismic Zone II with a few regions of north eastern districts fall in seismic zone III as per Bureau of Indian Standards Seismic zoning map, 2002 (Fig 1). India is divided into four seismic zones namely zone II to V. Zone II represents lowest seismicity level and hence, lower ground motion accelerations whilst, seismic zone V has the highest level of seismicity and ground motion accelerations. Historically southern Peninsular shield was believed to be stable and free from major earthquakes however, the occurrence of Koyna earthquake M 6.3, in 1967 and the Latur earthquake of M6.3, in 1993 has led to the realisation that the southern Peninsular shield is conspicuous with stable continental region earthquakes. This led to the design and installation of seismological instruments in this region and CSIR-NGRI has installed and operating 16 seismological stations in the states of Telangana and Andhra.

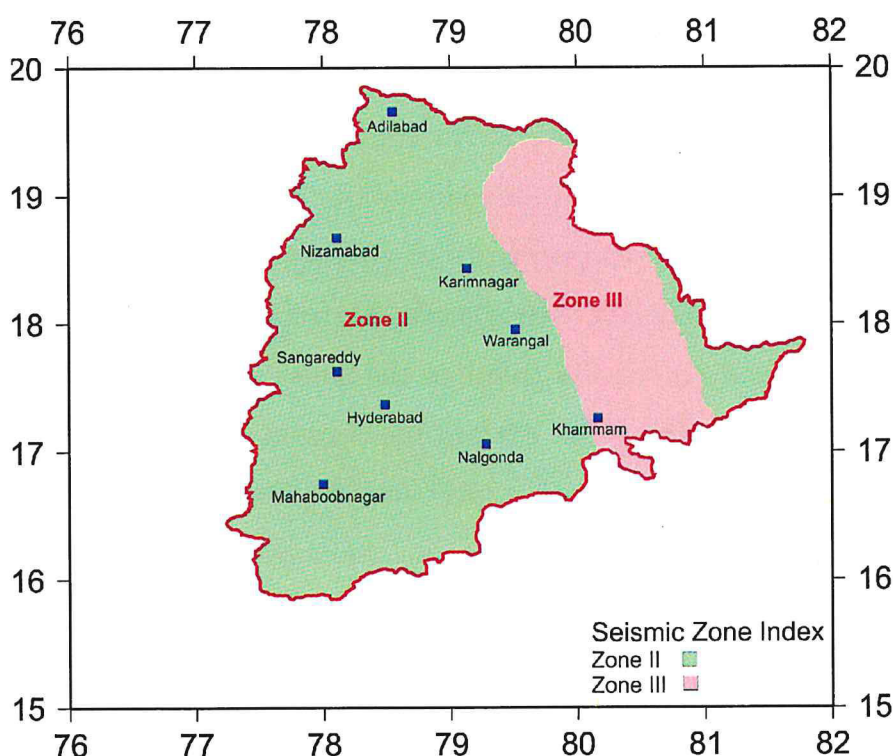


Figure 1 Seismic Zone Map of Telangana

9

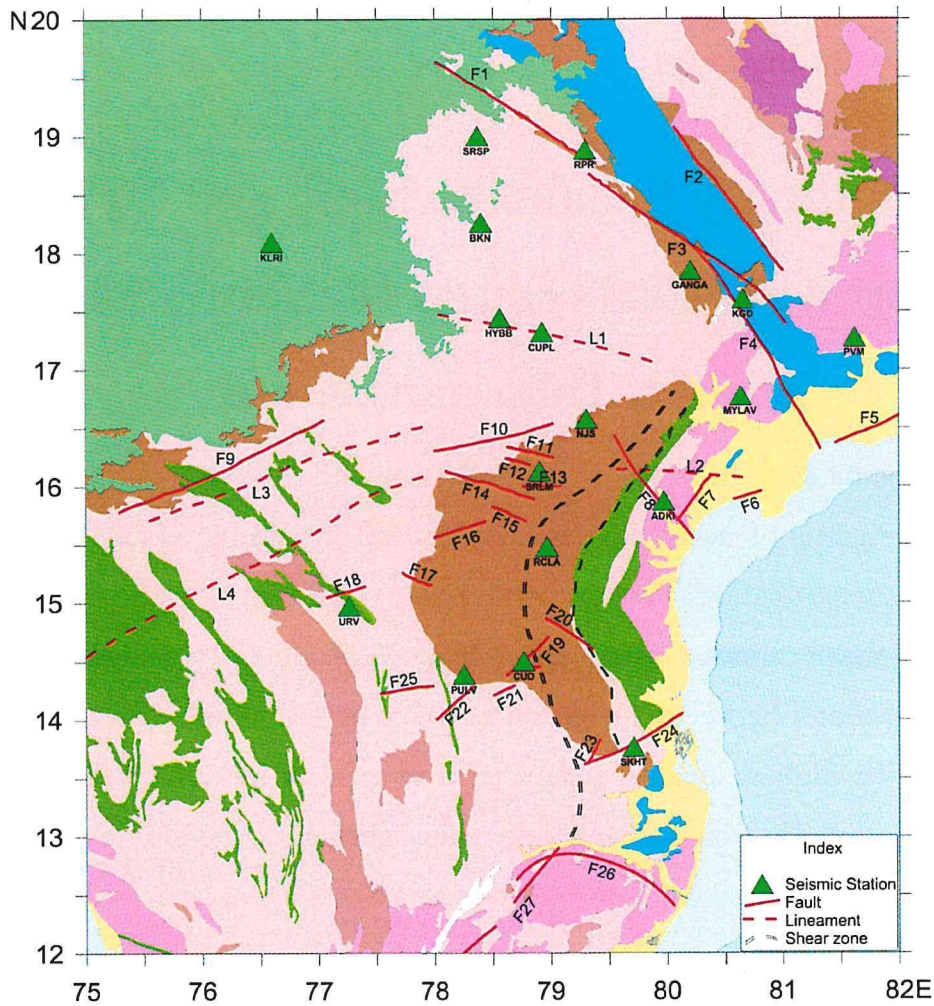


Figure 2 Major faults/Lineaments in Telangana and Andhra Pradesh as per the SEISAT 2000 and locations of seismological stations

Major tectonic features in and around the state:

The major tectonic feature in Telangana is the Godavari graben as shown in Figure 2. The graben forms the north eastern boundary and is linearly trending in the NW-SE direction about 350 km in length and 40 km width. Majority of the lineaments are of Archean age that can be basically characterized into two distinct sets: (1) NW-SE trend, predominantly found in the main basin, and (2) NE-SW trend, in the South eastern part of the valley. The major faults adjoining the rift are the Kadam fault (KF), Kinnerasani-Godavari fault (KGF), Kolleru-lake fault and the Godavari valley fault (GVF) (Figure 2). The green triangles are the seismological stations operating and about 7 of them are operating in Telangana.

Seismicity in the state

Recent seismicity in Telangana state along with the moderate sized earthquakes occurring in Ongole region of Andhra Pradesh and Latur region of Maharashtra. Though Ongole and Latur earthquakes occurred in neighbouring states these caused considerable ground shaking and minor damage to structures in Telangana region. As seen in Figure 3 the seismicity is mainly confined to Godavari Graben and I the neighbourhood of Hyderabad and diffused seismicity near Sriram Sagar Project.

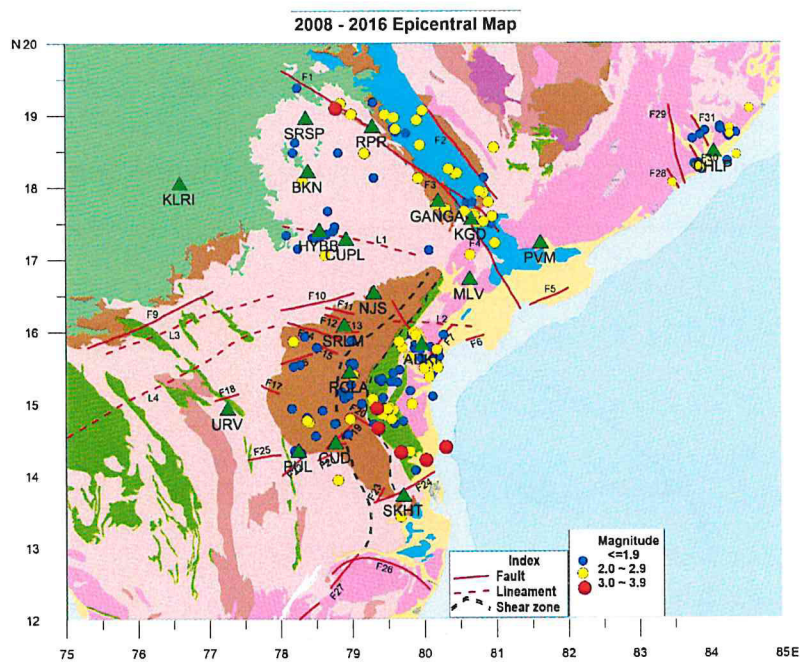


Figure 3 Seismicity map of Telangana and Andhra Pradesh

In the year 1969, moderate earthquake with magnitude 5.7 struck **Bhadrachalam** region in Khammam district as shown in Figure 4. This earthquake was felt in the entire south India Peninsular shield and there were reports of damage to structures in the epicentral region. The iso-seismal map is presented in Figure 5 clearly shows that the Mallanna Sagar Project is located along the Intensity VI contour. The Bhadrachalam earthquake occurred at a distance of about 200 km from Mallanna Sagar Project site.

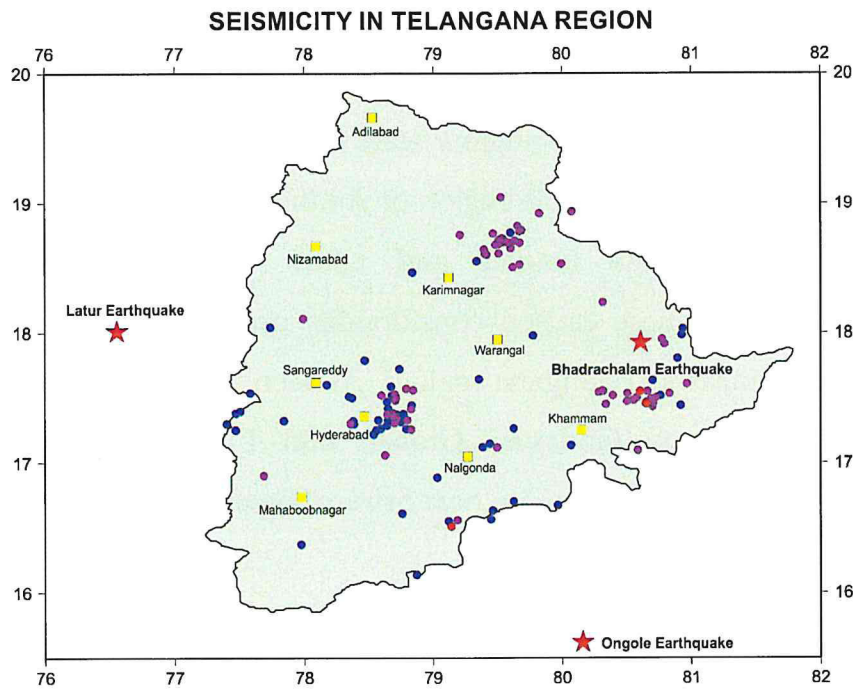


Figure 4 Major earthquake locations around the Mallanna Sagar Project

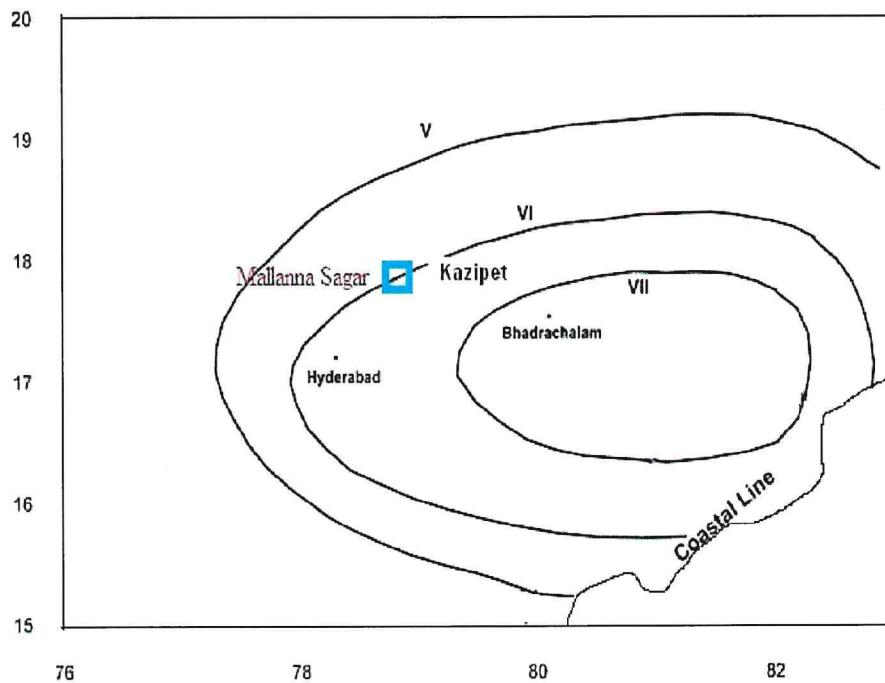


Figure 5 Isoseismal Map of 1969 Bhadrachalam earthquake

There other source region is Hyderabad which has reported episodes of swarm activity during the years 1982, 1994, 1995, 1998, 2000 and 2010. Largest swarm activity was in the vicinity of Gandipet reservoir area during 1982 with M 3.5 being the maximum magnitude earthquake. Swarm activities have also been reported from Jubilee hills and Vanasthalipuram of

Hyderabad. Largest magnitude tremor among this swarm sequences is 2.6 which occurred in Jubilee Hills during 2000.

Medchal Earthquake of June 30, 1983

Medchal area in suburbs of Hyderabad experienced earthquake of magnitude 4.9 (Figure 6). This earthquake had a depth of more than 15 km and was felt significantly in Hyderabad and minor cracks in the buildings have been reported. Upto distance of 200 km this earthquake was felt significantly because of its deep seated origin. Using three stations data from Hyderabad, Srisailam and Nagarjuna Sagar operated by CSIR-NGRI, the epicentre is located to the NE of the International Seismological centre epicentre. This epicentre distance of this earthquake is about 20 km from the Mallanna Sagar Project site and could be located on either of the two lineaments/faults which are east-west and north west-south east trending.

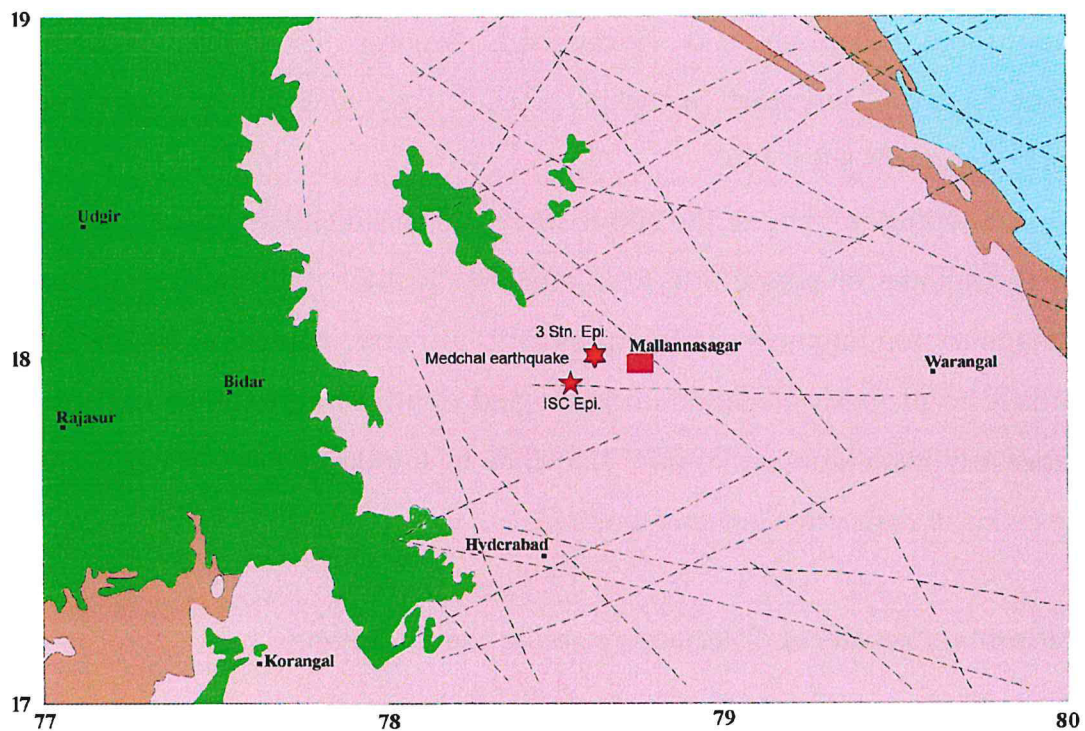


Figure 6 Epicentre location of the 1983 earthquake close to Mallanna Sagar Project

Prominent source regions:

In the year 1967, moderate earthquake with magnitude 5.4 struck Ongole region in Andhra Pradesh. The epicentral region of this earthquake is Located at ~ 300 km from the Mallanna Sagar project site

On September 29, 1993 a major earthquake of Magnitude 6.3 occurred in Latur, Maharastra state. Even though this earthquake occurred in neighbouring state the actual distance of the source region of this is in close distance to Zahirabad surrounding villages (~100 km). The Latur earthquake occurred at a distance of about 240 km to Mallanna Sagar Project site. This earthquake caused lots of damage to structures in epicentral region and also felt strongly in bordering districts Telangana. The seismic activity in this region continued for few years.

Apart from this natural earthquake activity along the Godavari Graben in coal mines most of the reported activity is artificial mine blast activity. Over all there are about 9 seismic stations installed in Telangana region to monitor the seismic activity in continuous mode. They are situated at Rampur, Kothagudem, Gangavaram, Sriram Sagar, Nagarjuna Sagar, Choutuppal, Bikanoor and Hyderabad. Among the above, Hyderabad seismological observatory is the permanent observatory, being operated in world standards since 1967.

Keeping in view of the above historical seismicity status of the region, An earthquake of magnitude 5 or more on Richter scale is likely to cause damage to non engineered structures and property. A level of loss of life or damage to property depends on place and depth of earthquake occurrence. Hence any installations planned should be in standards least to withstand to the levels of respective ground shaking.

Preliminary results of GPR survey across the fault zone

A field survey, to identify the shallow subsurface fault features, was carried out by NGRI team near project site (Figure 7). The area and location for the study were finalized after consulting the site engineer. The Ground

Penetration Radar (GPR) survey at the site was conducted on 17th of January, 2018 with the site engineer. The field pattern and outcrop suggest the area constitute of granite with 3 different phases of dyke emplacement. At the studied section, a ENE-WSW trending fault has displaced the NNW-SSE trending dyke by ~240 m with dextral strike slip disposition on the surface. The fault suggests strike-slip deformation possibly during ENE-WSW trending dyke emplacement during (?) early to mid-Proterozoic period. The GPR survey was conducted to map the shallow subsurface signature of the fault and the profiles are planned along the geomorphic expression of the fault (Figure 7 A).

In order to map the fault features, GPR profiles needed to be placed orthogonally to the fault, which was not possible due to poor accessibility of the rugged uneven terrain. A total 7 GPR 2D profiles with lengths ranging from 25m to 80m, were acquired following the possible accessible route. For this survey, the 200 MHz GPR antenna, having capability of mapping high resolution shallow subsurface, up to a depth of 5m, is deployed. The GPR data is acquired in 'distance mode' with the distance calibrated wheel perimeter. The signal gain was kept in auto mode and the frequency range was set by assigning a low pass and a high pass filter to get the desired signals. The dielectric value of the upper layer was assigned and the total depth of penetration was set to 5m. The acquired raw data was processed using the specialized software at CSIR-NGRI. The processing steps constitute the Auto Peak-Time shift, Background removal (to remove all the horizontal coherent noises using Full pass background removal), FIR (to increase the signal-noise ratio, low pass (=400) and high pass (=35) filters have been applied), Gain (max is 76 is applied in order to reduce the fluctuation of amplitude of traces) to obtain the preliminary results (Figure 7 B, C).

The preliminary results from two profiles at oblique angles (almost orthogonal) with the fault, marked as **aa'** (N17°57.451', E078°47.915': 65m length) and **bb'** (N17°57.469', E078°47.942': 68m length) are presented (Fig B, C). The preliminary shallow subsurface (~5 m) imaging by GPR suggests the

5

top soil / regolith in the area largely constitute of granite boulders and its weathering product extends for 50-60cm and at places has voids in surveyed sections (Fig. B, C). The top 3 m constitute of weathered granite and largely remain undisturbed except in 2-3 m wide fault zone, where the topsoil and rocks (weathered and fresh at depth) are disturbed by shearing. Since the host rock is massive granite, which does not have lithological layering, no lateral contrast is observed nor any dominant vertical component of deformation along the fault could be deciphered. Though, the top soil and weathered zone show downward perturbation along the fault zone. The preliminary data clearly suggests; it is a deep seated vertical fault with significant strike slip motion. The rocks in the fault zone are highly sheared and fractured. Further, there is at least three sets of dominant lineaments with distinct geomorphic signatures are observed in the region. To characterize their effect on shallow subsurface and understand their mutual relationship, it will be appropriate to conduct detailed survey with planned profile orientations. The same is proposed for future work for the region.

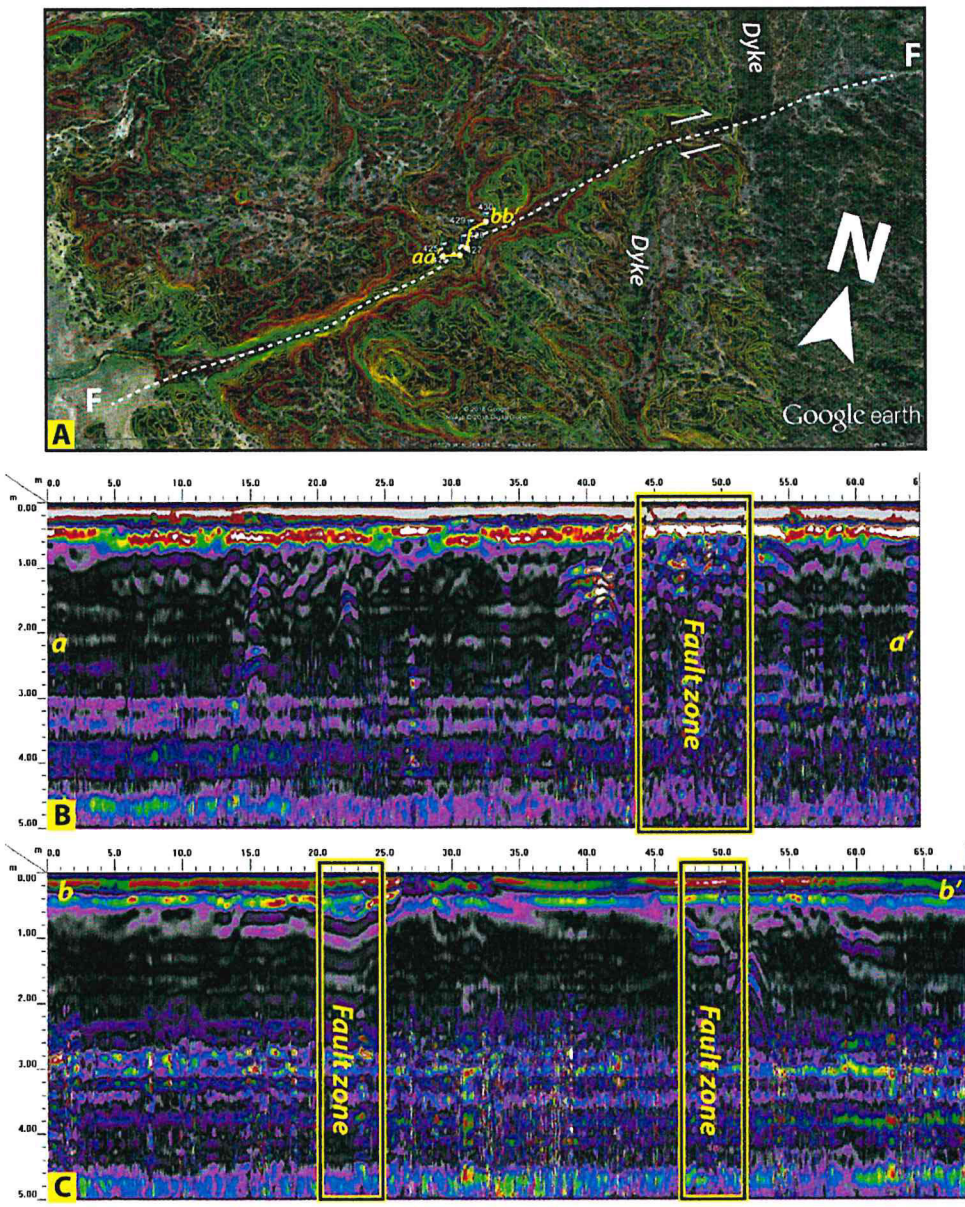


Figure 7. (A) Google image of study site overlaid with the 1 m contour interval marking the location of ENE-WSW trending fault that displace the NNW-SSE trending dyke by ~240 m. Multiple 2D GPR line survey was carried out as per the suggestions of site engineers. Note the location of 2-D profiles aa' & bb'. (B, C) The preliminary results of two lines aa' and bb' clearly show ~2-4 m thick disturbed zone along the fault in respective profiles.

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Medchal, Andhra Pradesh Earthquake of June 30, 1983

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R.K. Chadha

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ABSTRACT

The paper describes the seismic effects of Medchal, Andhra Pradesh earthquake of June 30, 1983. This earthquake is of scientific and general interest as it occurred in the middle of peninsular shield and caused cracks in some buildings in Hyderabad.

The magnitude of the earthquake is estimated to be 4.5 from the recorded duration at Hyderabad seismograph station of NGRI. The maximum intensity is assigned to be V. The area with this intensity is 30 km x 20 km, elongated in N-S direction and stretching about 20 to 50 km north of Hyderabad. The computer located epicentre with near stations data lies within this area at a distance of 30 km from Hyderabad and depth is computed to be 40 km. The earthquake was felt for about 20 sec in the meizoseismal area and 10 sec in Hyderabad. Within the meizoseismal area, intensity was higher in the northern and southern ends. There was less damage in the central part. In higher intensity area, tiles fell down in many houses, many houses developed cracks, one mud wall collapsed and at four places favourably placed rocks were displaced. These effects are described in detail. We also describe the isoseismals and known local geology. The cause of the earthquake is also visualized.

INTRODUCTION

The Medchal earthquake of June 30, 1983 caused general alarm in the twin cities of Hyderabad and Secunderabad as this earthquake is the first earthquake occurring in this area in the living memory. List of historical earthquakes in this area is given in Table I. The 1983 earthquake is of lesser intensity than the one in 1876. The intensity assigned for the 1983 earthquake is V in M.M. Scale. Though the earthquake is of moderate intensity it has aroused interest of scientific community as it occurred in the centre of the Peninsular Shield of India. In this paper we describe the effects of earthquake and mention about the source parameters, local geology and cause of the earthquake. Technical aspects of these investigations are described elsewhere (Rastogi and Chadha, 1984).

INTENSITY SURVEY

Initially, the purpose of the field study was to delineate the meizoseismal area. Analysis of Hyderabad seismograms indicated the epicentre to be about 30 km ^{WNW} of the seismic station and reports came in for more damage in the area 20 to 50 km north of Hyderabad (seismic station is in the eastern end of the city). Hence, survey for meizoseismal area was made in this area. The mode of survey was to interrogate as many number of persons possible in a particular area about their feelings and evidences regarding the temporary and permanent effects on objects/buildings. The strategy adopted was to estimate the intensity at a particular place and to approach the area with highest intensity. Once the meizoseismal area was delineated, the boundaries of intensities V/IV, IV/III and III/II (M.M. Scale) were estimated along certain roads leading out of the meizoseismal area (Figure 1 and 2). During the surveys the following points were observed.

1. The earthquake was felt in twin cities of Hyderabad and the area in the north with intensity IV and more.
2. There was no serious damage to any structure/building anywhere.
3. Damage was more in the area 20 to 50 km north of Hyderabad. This area lies east of N.H. 7 between Medchal and Shamirpet in the south to Tupran in the north. This area was assigned an intensity V.
4. Though intensity V is observed in a large area as shown in Figure 1, there was no clear-cut eye or an area of higher intensity. This suggests some depth of the focus. The depth calculated from isoseismals is 31-34 km. In fact, damage was rather more in the northern and southern parts of the meizoseismal area and lesser in the central part. This is due to the vertical approach of seismic waves immediately above the focus. This is corroborated by the felt report in the central area. The centre of the meizoseismal area is near Kakunda village (Figure 1). Here, a jolt or 'thud' from below was felt, and there were only minor cracks developed in some walls.

- 5. It was possible to draw isoseismal V clearly and others roughly. Isoseismals IV and III were drawn on very few observations and isoseismal II based on newspaper reports as well as personal communications.
- 6. There was clear indication of the isoseismal lines V and IV having an elliptical shape with major axis along N-S direction.

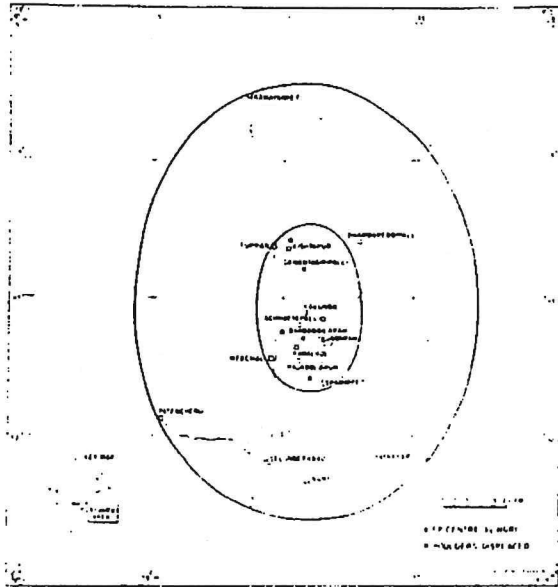


Fig.1 Isoseismal V and IV.

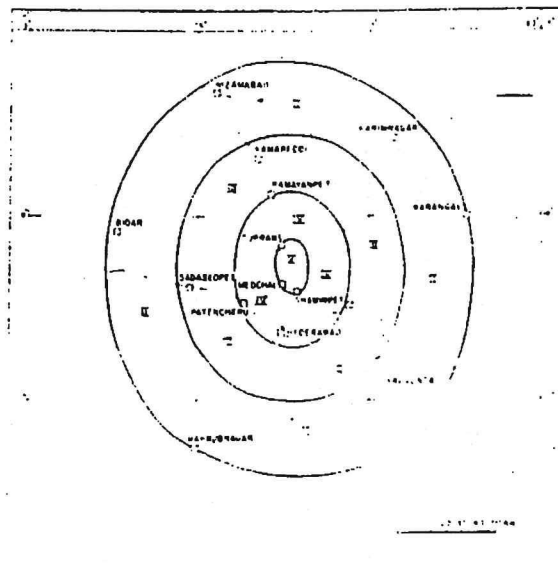


Fig.2 Isoseismals I to VI for Hyderabad Earthquake

MACROSEISMIC EFFECTS

The earthquake of 30th June, 1983 was felt for about 20 seconds in the meizoseismal area and about 10 seconds in twin cities of Hyderabad and Secunderabad.

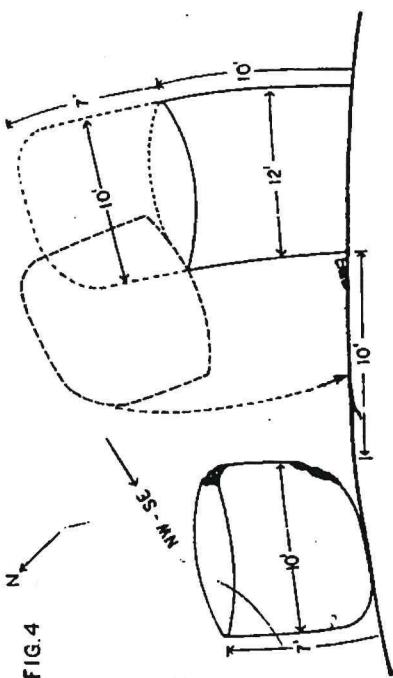
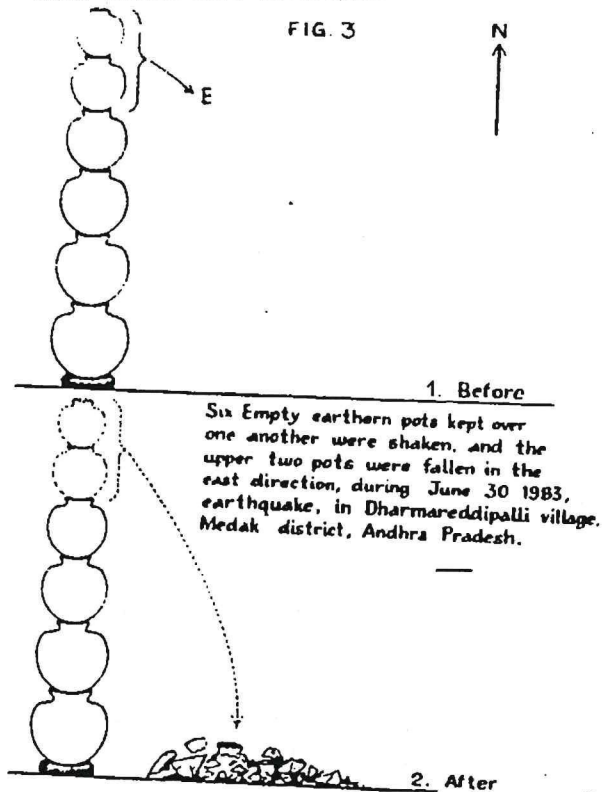
The earthquake was accompanied by loud sound variously described as thunder, passing of an aeroplane, moving of heavy trucks, rumbling and underground explosion. In the meizoseismal area, the most prominent sound was described as a thunder in the peripheral area and as explosion in the centre. In the intensity IV area the sound was mostly described as that of passing of heavy trucks or booming of an aeroplane. The sound was not much as compared to that in the meizoseismal area.

At a place around Kakunda near the centre of intensity V area people felt a jolt from below and were slightly pushed up. In the extreme south of meizoseismal area also near Raja Bolaram Tanda, people felt a jolt from below and a person felt that his lunch plate was thrown upwards.

Utensils kept in the racks and tiles were thrown down at many places in the V intensity area. A corner of tiled roof collapsed near Kishitapur in the north and a portion of tiled roof along with the mud wall near Bandamallaram in the south. At Dharmareddipalli, two out of 6 stacked earthen pots fell down and broke to pieces (Figure 3). In the southern portion of the meizoseismal area at Shamirpet and Yadavaram and in the north at Annathaziripalli and Kishitapur, huge boulders, placed favourably were rolled down due to this earthquake (Figures 4 and 5).

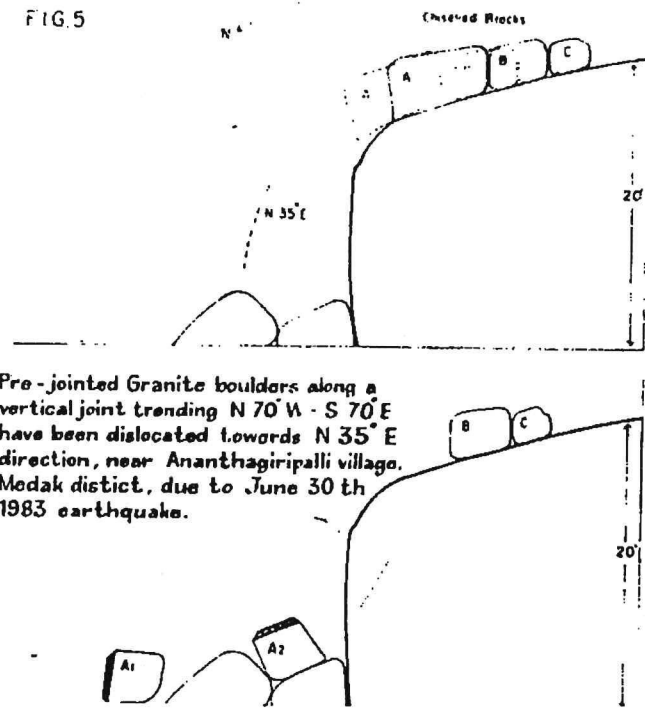
Observations at the individual places in the meizoseismal area are as follows. In the northern part of meizoseismal area near Kishitapur, huge chunks of rocks, favourably placed were displaced. Large sound of explosion type was heard in the area. Cracks were developed in the walls and in a house a corner of the tiled roof was collapsed. Just south of Nacharam, near Anantagiriipalli, some boulders were displaced and also explosion like sound was heard. Cracks in the walls and roofs are very frequent in this area. Just outside the meizoseismal area near Dharmareddipalli and Gajwel in the east, the sound was of a passing heavy vehicle. In the centre of the meizoseismal area near Kakunda, a thud from below was felt, and there were only minor cracks developed in some walls. Near Bandamallaram, just south of Kakunda, a corner of tiled roof and portion of the mud wall of a house was collapsed. Utensils were thrown out from the racks. Near Venhavyapalli, (in the centre of Meizoseismal area) thunder sound was heard from west. Tiles were fallen and utensils were thrown out of the racks. In Dasaripalli also in the centre of meizoseismal area) large thunder sound was heard. Towards south of the meizoseismal area, in Yadavaram boulders were rolled down. Large sound as of a passing aeroplane was felt and a jolt from below was felt by some people. Roofs of many houses were cracked. In Bivalkot, in the south, sound from west was heard. In the extreme south of meizoseismal area, near Raja Bolaram

Tanda, people felt a jolt from below and plates were thrown upwards. In the southwest of meizoseismal area, i.e., near Medchal, rumbling sound was heard with rattling of utensils. Minor cracks were developed.



A Granite boulder resting on another boulder along a pre-existing joint, fallen upside down, near kishtapur village, Medak district, due to June 30, 1983 earthquake

FIG. 5



Pre-jointed Granite boulders along a vertical joint trending N 70° W - S 70° E have been dislocated towards N 35° E direction, near Ananthagiripalli village, Medak district, due to June 30 th 1983 earthquake.

In many areas of intensity IV, like Ramavanpet, Secunderabad and Hyderabad shaking was felt prominently. Few buildings developed hair-line cracks in Hyderabad including those of the NGRI (Figures 6 to 8) and Board of Intermediate Education at Vampalli. In these two buildings cracks are between pillars and walls, beams and walls and sometimes at the junction of two walls. A wall of one house under construction in Lalapet developed crack in the middle.

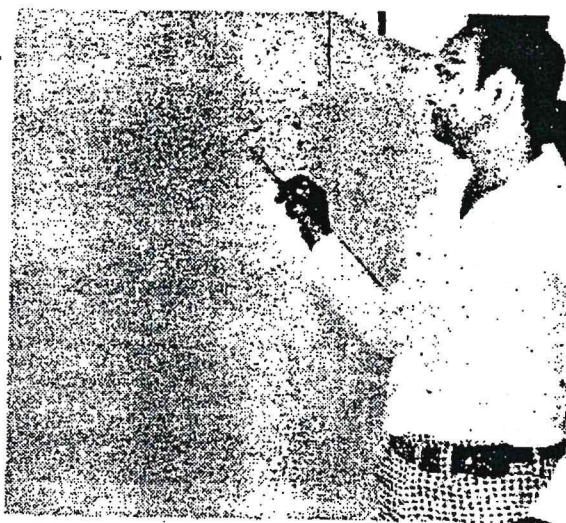


Fig.6 Cracks developed in the wall of ground floor canteen of NGRI, due to June 30 earthquake.

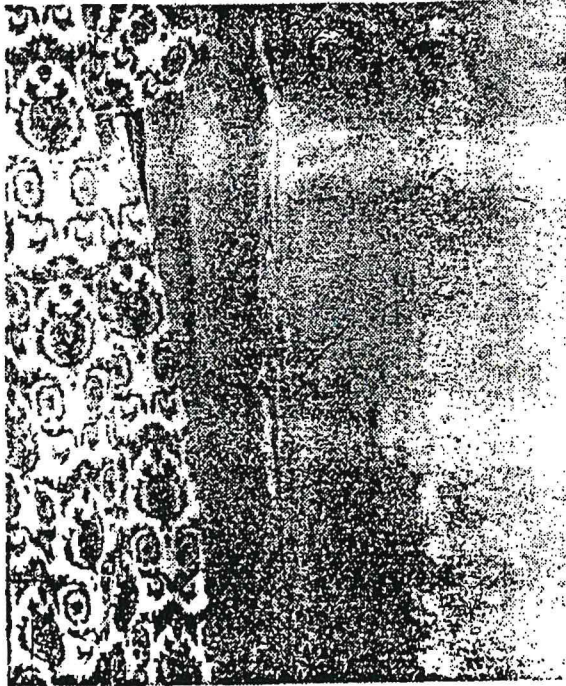


Fig.7 Crack developed at the contact of two adjacent walls in the second floor dining hall of NGRI, due to June 30, earthquake.

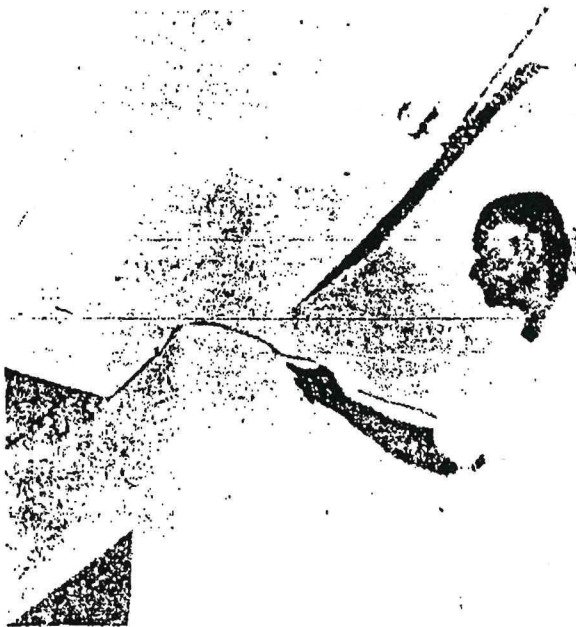


Fig.8 Cracks developed along the contact of beam and wall in NGRI library due to June 30, 1983 earthquake.

Direction of approach of earthquake waves or sound as noticed by persons at different places is shown in Figure 9. South of Tupran majority of the people reported west to east direction, while north of Tupran the reported direction was usually southwest to northeast.

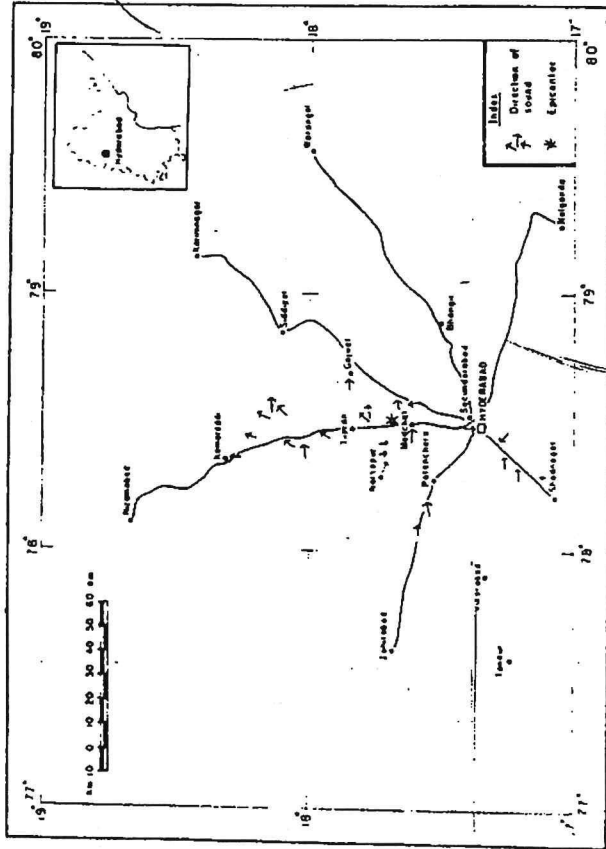


Fig.9 Direction of approach of sound or earthquake waves.

SOURCE PARAMETERS

The epicenter of the Medchal earthquake of June 30, 1983 determined by using the near seismic stations data is $17^{\circ} 41' N$, $79^{\circ} 30' E$. This epicentre is near the centre of the neotectonic area. Depth is of the order of 20 km. Seismogram portions showing this earthquake at different near stations are shown in Figures 10 to 13. As described earlier intensity is V on M.S. Scale. Magnitude of the earthquake is estimated to be 4.5. The epicentres determined by IMD and IIS using distant stations are far off from the neotectonic area. The magnitude determined by IMD at New Delhi station is an over estimate.

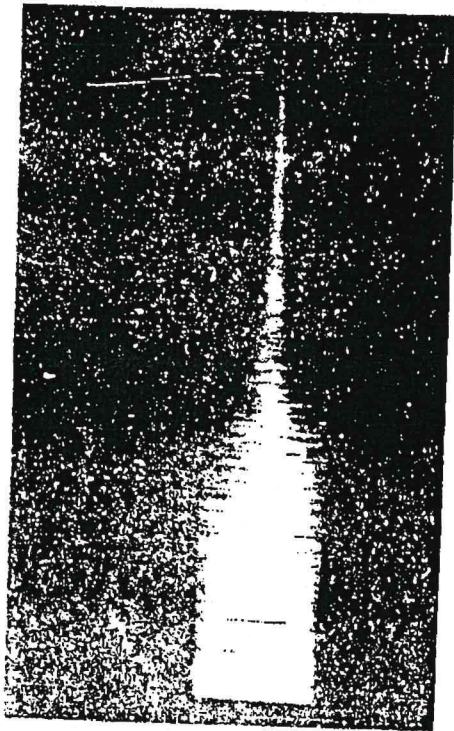


Fig.11 June 30, 1983 earthquake as recorded at Nagarjunasagar. Seismograph deployed is portacorder, and S 500 Seismometer

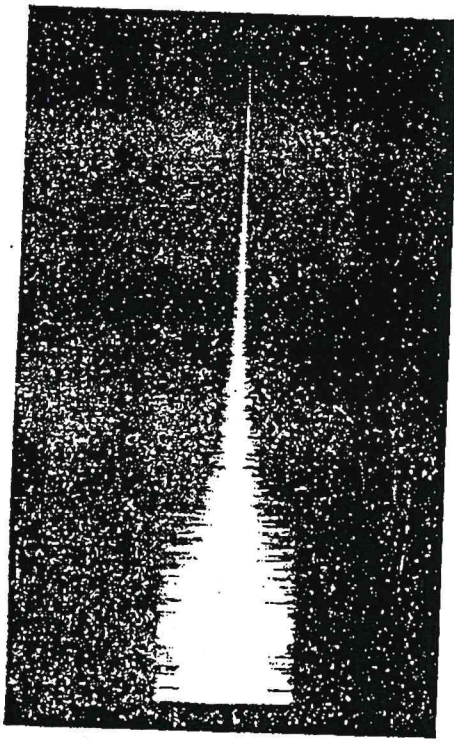
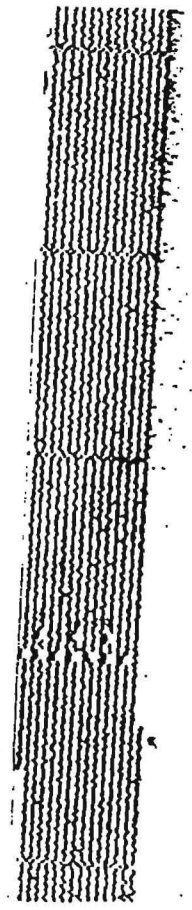


Fig.10 June 30, 1983 earthquake as recorded at Srisaillam Seismograph deployed is portacorder, and S 500 Seismometer.



HYDERABAD LA-TUDUVA
JUNE 30 1983

Fig.112 June 30, 1983 earthquake as recorded at Hyderabad short period Benioff seismograph, vertical component.

22

zones of weakness (Chandra, 1977).

CONCLUSION

The Medchal earthquake of 30th June 1983 was of intensity V on M.M. Scale and Ms magnitude 4.5. Intensity V area is 530 sq.km. The earthquake was felt in an area of 450,00 sq.km. Felt duration in meizoseismal area was about 20 sec and in twin cities of Hyderabad and Secunderabad about 10 sec. There was no serious damage anywhere. In view of this earthquake and intensity VI earthquake in 1876, seismic coefficient in this area may have to be revised.

ACKNOWLEDGEMENTS

The authors are thankful to India Meteorological Department and Bhabha Atomic Research Centre for providing their data. M/s. Indra Mohan, C.V.R. Rao and Md. Khawruddin helped in intensity survey. Mr.S.C.Bhatia obtained the computer location. The authors are grateful to Prof. V.K.Gaur, Director, NCRI for his keen interest and guidance in this study. Mr.K.Ramanna Rao assisted in typing this manuscript.

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2. Rastogi, B.K. and Chadha, R.K. (1984), "Source Parameters of the Medchal, Andhra Pradesh Earthquake of June 30, 1983", Communicated to Mausam.

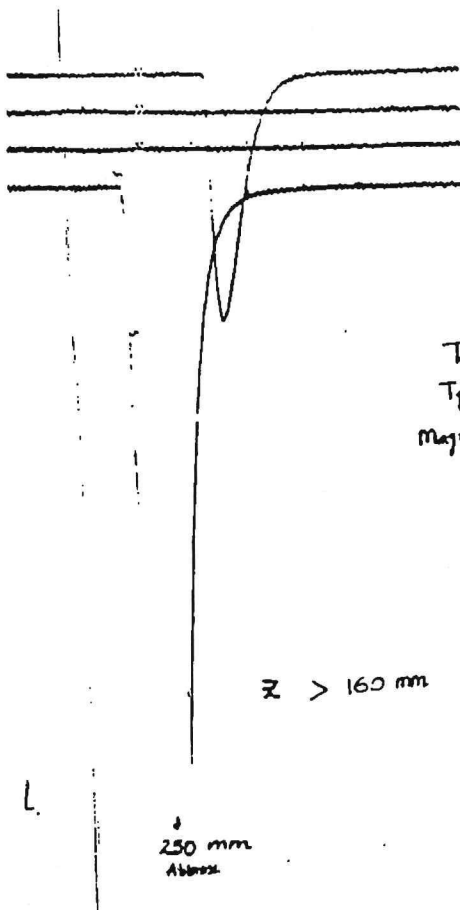


Fig.13 June 30, 1983 earthquake as recorded at Hyderabad vertical component long-period Press-Ewing seismograph.

LOCAL GEOLOGY AND CAUSE OF THE EARTHQUAKE

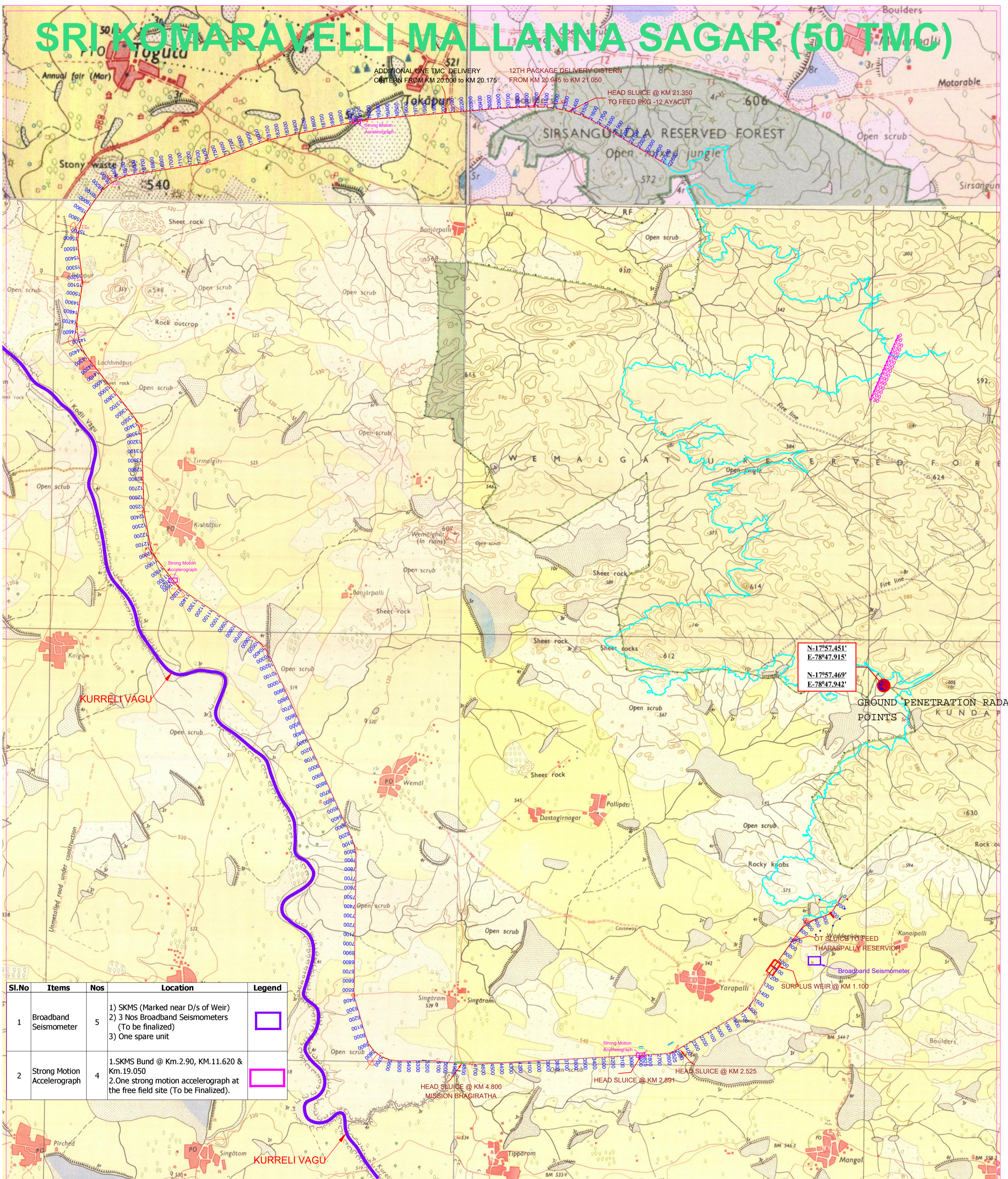
The country rocks in the area are Archean granites and gneisses. These rocks are intruded by dolerite dykes, pegmatite, aplite and quartz veins. The most predominant directions of the dykes are NE-SW and N-S. From the lineament map prepared by GSI, the lineaments passing through the meizoseismal area are as follows. One NE-SW trending megalineament passes through Medchal. One small lineament parallel to it passes through the centre of the meizoseismal area where it meets a small E-W trending lineament. The ground check of these lineaments has not been done. Any of these lineaments could be the zone of weakness along which the present earthquake has occurred. The present earthquake is a part of regional seismicity and is of tectonic origin. The small stresses, due to northward movement of the Indian continent, slowly accumulate. When these stresses exceed elastic limit, the earth blocks adjust themselves to equilibrium along

TABLE I
HISTORICAL EARTHQUAKES NEAR HYDERABAD

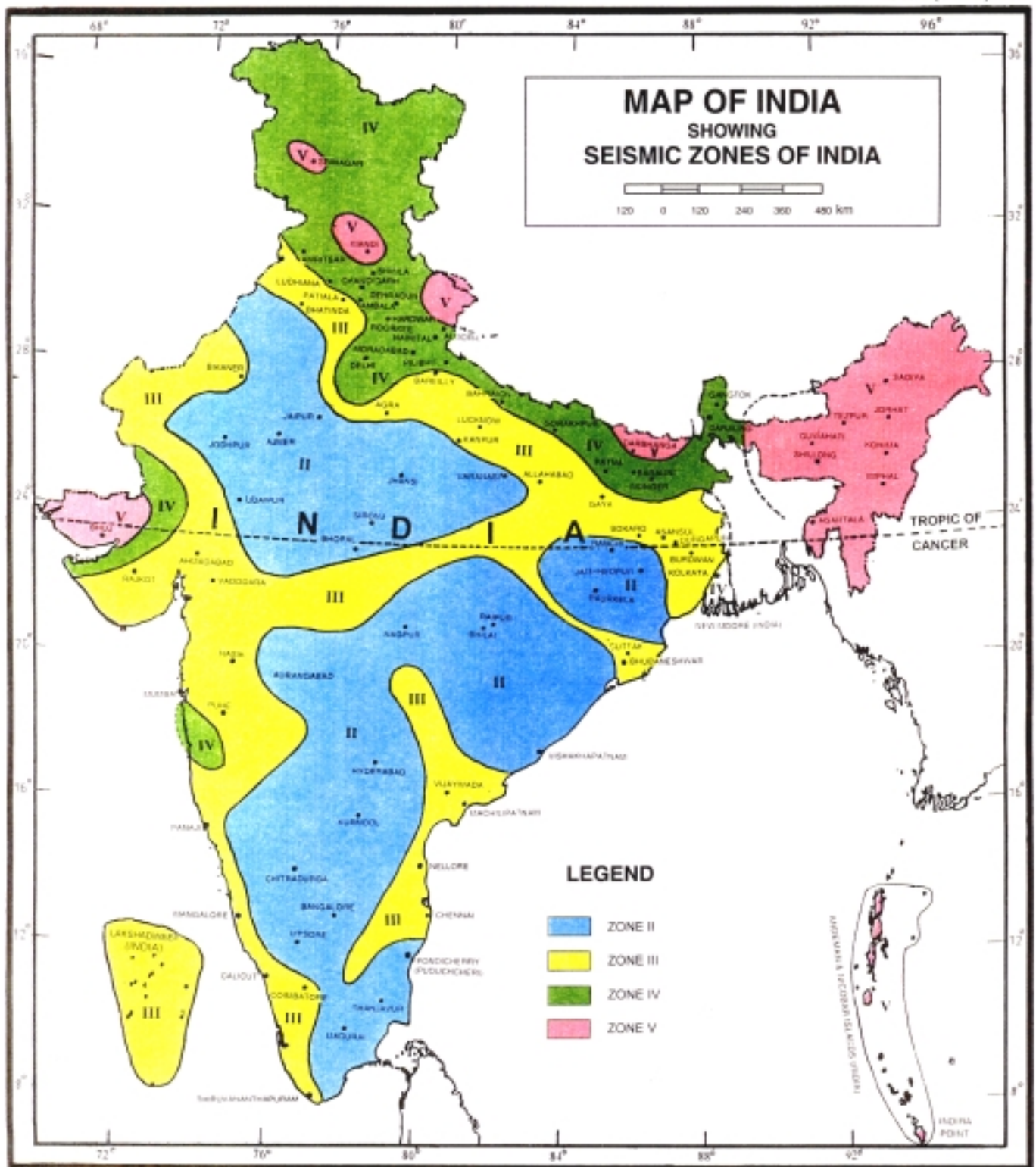
Date	Place	Description of Earthquake	Magnitude/ Intensity	Source
1843 Mar 12	Hyderabad	Shock felt around Hyderabad	IV	Oldham, 1883
1876 Oct/Nov.	Secunderabad	Felt throughout the city caused general alarm, glass panes broken in some of the houses, a number of sparrows found dead after the earthquake; Baracks in cantonment area were more or less in an oscillating condition during a period of 55-60 secs. Effects in different areas ranged from being thrown out of bed to as if being rocked in a cradle. Punkah wires jingled, doors and windows shook, parrots screamed, dogs barked and men woke up by the rolling and loud noise accompanying the earthquake; some private hunglows in and out of cantonment were damaged, but no large scale destruction or loss of life.	VI	TOI 7.11.76

[TOI: Times of India]

SRI KOMARAVELLI MALLANNA SAGAR (50 TMC)



Sl.No	Items	Nos	Location	Legend
1	Broadband Seismometer	5	1) SKMS (Marked near D/s of Weir) 2) 3 Nos Broadband Seismometers (To be finalized) 3) One spare unit	
2	Strong Motion Accelerograph	4	1.SKMS Bund @ Km.2.90, KM.11.620 & Km.19.050 2.One strong motion accelerograph at the free field site (To be Finalized).	



NOTE : Towns falling at the boundary of zones demarcation line between two zones shall be considered in High Zone.

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- Based upon Survey of India map with the permission of the Surveyor General of India.
- The responsibility for the correctness of internal details rests with the publisher.
- The territorial waters of India extend into the sea to distance of twelve nautical miles measured from the appropriate base line.
- The administrative headquarters of Chandigarh, Haryana and Punjab are at Chandigarh.
- The interstate boundaries between Arunachal Pradesh, Assam and Meghalaya shown on this map are as interpreted from the North-Eastern Areas (Reorganization) Act, 1971, but have yet to be verified.
- The external boundaries and coastlines of India agree with the Record/Master Copy certified by Survey of India.



भारत का राजपत्र The Gazette of India

सी.जी.-डी.एल.-अ.-14122021-231858
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असाधारण

EXTRAORDINARY

भाग II — खण्ड 1

PART II — Section 1

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं० 58] नई दिल्ली, मंगलवार, दिसम्बर 14, 2021/ अग्रहायण 23, 1943 (शक)
No. 58] NEW DELHI, TUESDAY, DECEMBER 14, 2021/AGRAHAYANA 23, 1943 (SAKA)

इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके।
Separate paging is given to this Part in order that it may be filed as a separate compilation.

MINISTRY OF LAW AND JUSTICE

(Legislative Department)

New Delhi, the 14th December, 2021/Agrahayana 23, 1943 (Saka)

The following Act of Parliament received the assent of the President on the 13th December, 2021, and is hereby published for general information:—

THE DAM SAFETY ACT, 2021

No. 41 OF 2021

[13th December, 2021.]

An Act to provide 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.

BE it enacted by Parliament in the Seventy-second Year of the Republic of India as follows:—

CHAPTER I

PRELIMINARY

1. (1) This Act may be called the Dam Safety Act, 2021.

(2) It extends to the whole of India.

(3) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint.

2. It is hereby declared that it is expedient in the public interest that the Union should take under its control the regulation of uniform dam safety procedure for specified dam to the extent hereinafter provided.

Short title,
extent and
commencement.

Declaration as
to expediency
of Union
control.

- Application. **3.** Save as provided under this Act, it applies to the owner of every specified dam,—
- (a) being a public sector undertaking or institution or a body owned or controlled by the Central Government or a State Government or jointly by one or more Governments, as the case may be; and
- (b) being an undertaking or company or institution or a body other than those owned or controlled by the State Government or the Central Government, as the case may be.
- Definitions. **4.** In this Act, unless the context otherwise requires,—
- (a) “alteration of dam” means alterations or repairs as may directly affect the safety of the dam or reservoir;
- (b) “annual report” means a report giving the activities of the Authority and the State Dam Safety Organisation and the safety status of the specified dams falling under their jurisdiction during each financial year;
- (c) “appurtenant structure” means the structure being—
- (i) spillways, either in the dam or separate therefrom;
- (ii) low level outlet structure and water conduits such as tunnels, pipelines or penstocks, either through the dam or its abutments or reservoir rim;
- (iii) hydro-mechanical equipment including gate, valve, hoist, elevators;
- (iv) energy dissipation and river training structure; and
- (v) other associated structures acting integrally with the dam or its reservoir or reservoir rim;
- (d) “Authority” means the National Dam Safety Authority established under section 8;
- (e) “dam” means any artificial barrier and its appurtenant structure constructed across rivers or tributaries thereof with a view to impound or divert water which also include barrage, weir and similar water impounding structures but does not include—
- (a) canal, aquaduct, navigation channel and similar water conveyance structures;
- (b) flood embankment, dike, guide bund and similar flow regulation structures;
- (f) “dam failure” means any failure of the structure or operation of a dam which leads to uncontrolled flow of impounded water resulting in downstream flooding, affecting the life and property of the people and the environment including flora, fauna and riverine ecology.
- Explanation.*—For the purposes of this clause, failure in the operation shall mean such faulty operations of the dam which are inconsistent with the operation and maintenance manual;
- (g) “dam incident” means all such problems occurring to a dam that have not degraded into a dam failure, and includes—
- (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; and

(xi) any other occurrence which a prudent dam engineer may relate to dam safety concerns;

(h) "dam safety unit" means a dam safety unit of any specified dam referred to in section 30;

(i) "distress condition" means the occurrence or potential development of such conditions in the dam or appurtenance structure or its reservoir or reservoir rim, which if left unattended to, may impede the safe operation of dam for its intended benefits or may pose serious risks to the life and property of people and the environment including flora, fauna and riverine ecology;

(j) "documentation" means all permanent records including electronic records concerning investigation, design, construction, operation, performance, maintenance, major repair, alteration, enlargement and safety of dams and includes design memorandum, construction drawings, geological reports, reports of specialised studies simulating structural and hydraulic response of the dam, changes made in design and drawings, quality control records, emergency action plan, operation and maintenance manual, instrumentation readings, inspection and testing reports, operational reports, and dam safety review reports and other similar reports;

(k) "enlargement of dam" means any change in the scope of an existing dam or reservoir, which raises water storage elevation or increases the volume of water impounded by the dam;

(l) "Government" means the Central Government or a State Government, as the case may be;

(m) "inspection" means on-site examination of any component of a dam and its appurtenant structure;

(n) "investigation" means collection of evidence, detailed examination, analysis or scrutiny of a specific problem pertaining to the dam and its appurtenant or a part thereof and includes laboratory testing, in-situ testing, geological exploration, model testing and mathematical simulation of the problem;

(o) "National Committee" means the National Committee on Dam Safety constituted under section 5;

(p) "notification" means a notification published in the Official Gazette and the term "notify" shall be construed accordingly;

(q) "operation of dam" means elements of the use, control and functioning of the dam which may primarily affect the storage, release of water and the structural safety of the dam;

(r) "operation and maintenance manual" means the written instructions that provide operation procedures, maintenance procedures, emergency procedures and any other features necessary for the safe operation of dam;

(s) “owner of specified dam” means the Central Government or a State Government or jointly by one or more Governments or public sector undertaking or local authority or company and any or all of such persons or organisations, who own, control, operate, or maintain a specified dam;

(t) “prescribed” means prescribed by rules made by the Central Government or, as the case may be, by the State Government;

(u) “regulations” means the regulations made by the Authority under this Act;

(v) “remedial measures” means such structural or non-structural measures, as may be required in relation to the specified dam or appurtenant structure or reservoir or reservoir rim or catchment area of reservoir for the purpose of removing or mitigating the distress condition of the specified dam;

(w) “reservoir” in relation to a dam shall mean any spread of water impounded by a specified dam;

(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;

(y) “State Committee” means the State Committee on Dam Safety constituted under sub-section (1) of section 11;

(z) “State Dam Safety Organisation” means the State Dam Safety Organisation established under section 14; and

(za) “vulnerability and hazard classification” means the system or systems of classifying dams on the basis of their condition, location, damage or hazard potential.

CHAPTER II

NATIONAL COMMITTEE ON DAM SAFETY

Constitution
of National
Committee.

5. (1) With effect from such date as the Central Government may, by notification, appoint, there shall be constituted, for the purposes of this Act, a National Committee to be known as the National Committee on Dam Safety consisting of the following members, namely:—

(a) the Chairman, Central Water Commission—Chairperson, *ex officio*;

(b) not exceeding ten representatives of the Central Government not below the rank of Joint Secretary to that Government or equivalent dealing with matters relating to dam engineering or dam safety, nominated by the Central Government—Members, *ex officio*;

(c) not exceeding seven representatives of the State Governments of the level of Engineer-in-Chief or equivalent by rotation, nominated by the Central Government—Members, *ex officio*; and

(d) not exceeding three specialists in the field of dam safety and allied fields nominated by the Central Government—Members.

(2) The National Committee shall be constituted within a period of sixty days from the date of commencement of this Act, and shall be reconstituted for every three years thereafter.

6. (1) The National Committee shall discharge such functions as specified in the First Schedule as may be necessary to prevent dam failure related disasters and to maintain standards of dam safety.

Functions of National Committee.

(2) The National Committee may, in discharge of its functions, constitute such sub-committees as it may consider necessary to assist it and the secretarial assistance to the National Committee and the sub-committees shall be provided by the Authority.

(3) The knowledge and information collected or generated by the National Committee shall be disseminated to all stakeholders by the Authority.

7. (1) The National Committee shall meet at such times and places and shall observe such rules of procedure in regard to the transaction of business at its meetings in the manner as may be prescribed by the Central Government:

Meetings of National Committee.

Provided that the National Committee shall meet twice in a year and one meeting shall be held before the onset of the monsoon season.

(2) The National Committee may invite the representative of the owner of any specified dam and such other experts in dam safety (including international experts) as it may consider appropriate for the discharge of its functions.

(3) The expenditure incurred on the National Committee shall be in such manner as may be prescribed by the Central Government.

CHAPTER III

NATIONAL DAM SAFETY AUTHORITY

8. (1) With effect from such date as the Central Government may by notification, appoint, there shall be established for the purposes of this Act, a National Dam Safety Authority, within a period of sixty days from the date of commencement of this Act.

Establishment of National Dam Safety Authority.

(2) The Authority shall be headed by an officer not below the rank of Additional Secretary to the Government of India or equivalent to be appointed by the Central Government who have knowledge of, and adequate qualification, experience and capacity in, dealing with problems relating to the dam engineering and dam safety management.

(3) The headquarters of the Authority shall be at the National Capital territory of Delhi and the Authority may establish offices at other places in India.

(4) The Authority shall comply with such directions as may, from time to time, be given to it by the Central Government.

9. (1) The Authority shall discharge such functions as specified in the Second Schedule as may be necessary to implement the policy, guidelines and standards evolved by the National Committee for proper surveillance, inspection and maintenance of specified dams and for such purposes, it shall have the power to enforce the attendance of any person and call for any information as may be necessary.

Functions of Authority.

(2) Without prejudice to the provisions contained in sub-section (1), the Authority shall make all endeavours to resolve any issue between the State Dam Safety Organisations of States or between a State Dam Safety Organisation and any owner of a specified dam in that State.

(3) Every decision of the Authority taken in respect of matters under this Act shall be final and binding upon all the parties to the issue.

Officers and
Employees of
Authority.

10. (1) The Central Government shall, for the purpose of enabling the Authority to perform functions under this Act, provide such number of officers and other employees as it may consider necessary:

Provided that the officers and other employees shall have such qualifications and experience in the field of dam safety including dam-design, hydro-mechanical engineering, hydrology, geo-technical investigation, instrumentation, dam-rehabilitation or such other fields as may be prescribed by the Central Government.

(2) The functions, powers, terms and conditions of service of the officers and other employees appointed under sub-section (1) shall be such as may be prescribed by the Central Government.

CHAPTER IV

STATE COMMITTEE ON DAM SAFETY

Constitution
of State
Committee
on Dam
Safety.

11. (1) With effect from such date as the State Government may, by notification, appoint, there shall be constituted, for the purposes of this Act, a State Committee on Dam Safety consisting of the following members, namely:—

(a) the Engineer-in-Chief or equivalent officer of the Department of the State responsible for Dam Safety—Chairperson, *ex officio*;

(b) technical and scientific officers of the rank of Chief Engineer, not exceeding six persons, from such Departments as may be decided by the State Government or from such other organisations owing specified dams—Members;

(c) the Chief Engineer or equivalent level officer of each such upstream States in cases where reservoir area of any of the specified dam of the State extends to another State—Members;

(d) the Chief Engineer or equivalent level officer of each such downstream State in cases where flood release of any of the specified dam of the State flows to a neighbouring State—Members;

(e) one representative of the Central Water Commission not below the rank of Director to be nominated by the Chairman, Central Water Commission—Member;

(f) experts in the field of hydrology or dam designs, not exceeding three, from engineering institutes—Members; and

(g) one representative of the Central Electricity Authority not below the rank of Director to be nominated by the Chairman, Central Electricity Authority—Member.

(2) The State Committee shall be constituted within a period of hundred and eighty days from the date of commencement of this Act, and reconstituted for every three years thereafter.

Functions of
State
Committee.

12. (1) The State Committee shall discharge such functions as specified in the Third Schedule as may be necessary to prevent dam failure related disasters under this Act as per guidelines, standards and other directions on dam safety issued by the Authority.

(2) The State Committee, in discharge of its functions, shall be assisted by such sub-committees as it may consider necessary, and the secretarial assistance to the State Committee as well as its sub-committees shall be provided by the concerned State Dam Safety Organisation.

Meetings of
State
Committee.

13. (1) The State Committee shall meet at such times and places and shall observe such rules of procedure in regard to the transaction of business at its meetings as may be prescribed by the State Government:

Provided that the State Committee shall meet twice in a year and one meeting shall be held before the onset of the monsoon season.

(2) The State Committee may invite the representative of the owner of any specified dam and such other experts in Dam Safety as it may consider appropriate, for the discharge of its functions.

(3) The expenditure incurred on the meetings of the State Committee shall be in the manner as may be prescribed by the State Government.

(4) The specialist members and other expert invitees who attend the meetings of the State Committee or its sub-committees shall be paid such fees and allowances as may be prescribed by the State Government.

CHAPTER V

STATE DAM SAFETY ORGANISATION

14. (1) The State Government shall, for the purposes of this Act, by notification, establish in the Department dealing with dam safety, a separate organisation, to be known as the State Dam Safety Organisation, within a period of hundred and eighty days from the date of commencement of this Act: Establishment of State Dam Safety Organisation.

Provided that in States having more than thirty specified dams, the State Dam Safety Organisation shall be headed by an officer not below the rank of Chief Engineer or equivalent, and in all other cases, the State Dam Safety Organisation shall be headed by an officer not below the rank of Superintendent Engineer or equivalent.

(2) The State Dam Safety Organisation shall be responsible to, and report to, the technical head of the Department dealing with Dam Safety.

(3) The organisational structure and work procedures of the State Dam Safety Organisation shall be such as may be prescribed by the State Government.

(4) The administrative and other expenses of the State Dam Safety Organisation shall be borne by the respective State Government.

15. (1) The State Government shall, having regard to the number of specified dams in that State, provide such number of officers and employees to the State Dam Safety Organisation as it may consider necessary for the efficient functioning of the said Organisation: Officers and employees of State Dam Safety Organisation.

Provided that the officers and employees shall have such qualifications and experience in the field of dam safety including dam-design, hydro-mechanical engineering, hydrology, geo-technical investigation, instrumentation, dam-rehabilitation or such other field as may be prescribed by the State Government.

(2) The functions and powers of the officers and employees appointed under sub-section (1) shall be such as may be prescribed by the State Government.

CHAPTER VI

DUTIES AND FUNCTIONS IN RELATION TO DAM SAFETY

16. (1) Every State Dam Safety Organisation shall,—

- (a) keep perpetual surveillance;
- (b) carry out inspections; and
- (c) monitor the operation and maintenance,

of all specified dams falling under their jurisdiction to ensure continued safety of such specified dams and take such measures as may be necessary to address safety concerns that are noticed with a view to achieve satisfactory level of dam safety assurance as per such guidelines, standards and other directions on dam safety as may be specified by the regulations.

(2) The State Dam Safety Organisation, for the purpose of enabling it to make decisions compatible with public safety, shall make or cause to be made such investigations and shall

Surveillance and inspection.

gather or cause to be gathered such data as may be required for proper review and study of the various features of the design, construction, repair and enlargement of dams, reservoirs and appurtenant structures under their jurisdiction.

Vulnerability and hazard classification of dams.

17. The State Dam Safety Organisation shall classify each dam under their jurisdiction as per such vulnerability and hazard classification criteria as may be specified by the regulations.

Maintenance of log books.

18. (1) 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.

(2) Every State Dam Safety Organisation shall furnish all such information to the Authority as and when required by them.

Records of dam failures and dam incidents.

19. (1) Every State Dam Safety Organisation shall report the event of any dam failure under their jurisdiction to the Authority, and furnish any information as and when required by them.

(2) Every State Dam Safety Organisation shall maintain the records of major dam incidents of each specified dams under their jurisdiction, and furnish all such information to the Authority as and when required by them.

Instructions on safety of specified dams.

20. (1) Every State Dam Safety Organisation shall render its instructions to the owner of a specified dam on the safety or the remedial measures required to be taken with respect to it.

(2) Every owner of the specified dam shall comply with the instructions issued by the State Dam Safety Organisation with regard to safety or remedial measures in relation to any specified dam owned by it.

Funds for maintenance and repairs.

21. Every owner of the specified dam shall earmark sufficient and specific funds for maintenance and repairs of the specified dam and to implement the recommendations of the State Dam Safety Organisation.

Technical documentation.

22. (1) Every owner of the specified dam shall compile all technical documentations concerning hydrology, dam foundation, structural engineering of dam, watershed upstream of dam, and nature or use of land downstream of dam along with information on all resources or facilities of economic, logistic or environmental importance which are likely to be affected due to dam failure.

(2) 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.

(3) 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.

Qualifications and experience of individuals responsible for safety of specified dams.

23. 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.

Jurisdiction of State Dam Safety Organisation and Authority.

24. (1) Without prejudice to the provisions of this Act, all specified dams, shall fall under the jurisdiction of the State Dam Safety Organisation of the State in which such dam is situated in matters relating to dam inspections, analysis of information, investigation reports or recommendations regarding safety status, and remedial measures to be undertaken

to improve dam safety; and in all such matters, full co-operation shall be extended by the owner of the specified dam:

Provided that where a specified dam is owned by a Central Public Sector Undertaking or where a specified dam is extended over two or more States, or where the specified dam in one State is owned by another State, then the Authority shall be construed as the State Dam Safety Organisation for the purposes of this Act:

Provided further that in all such dams where the Authority takes up the role of State Dam Safety Organisation, the Governments of the States within the jurisdiction of which such dams are located shall have access to all information relating to these specified dams as available with the Authority.

(2) The authorised representative of the Authority or concerned State Dam Safety Organisation for the purposes of making any inspection or investigation necessary for the implementation of the provisions of this Act, may enter upon any part of the specified dam or its site as and when required and apply such investigation methods, as may be considered necessary.

(3) After making inspection or investigation under sub-section (2), the representative referred to in that sub-section is of the opinion that certain remedial measures are required to be taken, he shall report such remedial measures to the officer-in-charge of such specified dam and to the concerned State Dam Safety Organisation.

(4) The Authority and concerned State Dam Safety Organisation, in cases of specified dams being found to be distressed on account of their age, degeneration, degradation, structural or other impediments, shall suggest such remedial measures on such operational parameters (including maximum reservoir level, maximum spillway discharge and maximum discharges through other outlets) as it may consider necessary.

(5) Nothing contained in sub-sections (1), (2), (3) and (4) shall absolve the owner of specified dam or any other authority or person from any of the responsibilities or obligations entrusted upon it under the provisions of this Act and the provisions of sub-sections (1), (2), (3) and (4) shall be in addition to, and not in derogation of, any other provision of this Act.

25. All the costs to be incurred by the Authority or State Dam Safety Organisation on any form of investigation done including payment given to any consultant or expert, shall be borne by the owner of the specified dam. Cost of investigation.

26. (1) 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, as the case may be: Construction or alteration of dams.

Provided that the Authority may disqualify any agency which violates any of the provisions of this Act or the rules or regulations made thereunder.

(2) Every agency referred to in sub-section (1) shall, for the purpose of designing or evaluating the safety of the specified dam, make use of the relevant standard codes and guidelines of the Bureau of Indian Standards, and furnish the reasons, if any departure is made in the design or dam safety evaluation.

(3) 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.

(4) Every agency referred to in sub-section (1) shall for the purpose of approval of dam design demonstrate the safety of the design, operational parameters and policies as per the provisions of relevant codes and guidelines to the Central Government or the State Government, as the case may be.

(5) Every agency referred to in sub-section (1) shall, for the purpose of dam construction, undertake such quality control measures, as may be specified by the regulations.

(6) The construction of any specified dam or the alteration or enlargement of any existing specified dam shall be undertaken with the approval of such competent authority, as may be specified by notification by the Central Government or the State Government, as the case may be.

Initial filling
of reservoirs.

27. (1) Before initial filling of any reservoir of a specified dam, the agency responsible for its design shall draw the filling criteria and prepare an initial filling plan, with adequate time for monitoring and evaluating the performance of the dam and its appurtenant structures.

(2) Before initial filling of the reservoir is taken up, the State Dam Safety Organisation shall inspect or cause to be inspected the specified dam either through its own engineers or by an independent panel of experts, who shall also examine the initial filling programme and prepare a detailed report thereof duly certifying the fitness of dam for filling.

Operation and
maintenance.

28. (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 are posted at each such dam.

(2) Every owner of the specified dam shall ensure that a well-documented operation and maintenance manual is kept at each of the specified dams and are followed at all times.

Responsibility
of owner of
specified dam.

29. Nothing contained in this Act shall be construed to absolve an owner of a specified dam of the duties, obligations or liabilities incidental to the construction, operation, maintenance and supervision of the dam or reservoir.

CHAPTER VII

SAFETY, INSPECTION AND DATA COLLECTION

Dam safety
unit.

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.

Inspection.

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;

(b) station, at each of the specified dam site throughout the monsoon period, such engineers and other technical personnel, as may be decided, in consultation with the State Dam Safety Organisation:

Provided that the engineers and other technical personnel shall be required to be stationed at their respective dam sites during entire period of emergency following any other natural or man-made calamity that may create distress conditions in the dam; and

(c) forward the inspection report by the dam safety unit to the State Dam Safety Organisation, which shall analyse the report and submit comments on the deficiency and remedial measures, if any, to the owner of the specified dam.

Instrumentations
to be installed
in every
specified dam.

32. (1) Every owner of a specified dam shall have a minimum number of such instrumentations at each specified dam, and installed in such manner as may be specified by the regulations for monitoring the performance of such dam.

(2) Every owner of the specified dam shall maintain a record of readings of the instrumentations referred to in sub-section (1) and forward the analysis of such readings to the State Dam Safety Organisation, in the form, manner and at such interval as may be specified by the regulations.

33. (1) Every owner of a specified dam shall establish a hydro-meteorological station in the vicinity of each specified dam capable of recording such data as may be specified by the regulations. Establishment of hydro-meteorological station.

(2) Every owner of the specified dam shall collect, compile, process and store data referred to in sub-section (1) at a suitable location.

34. (1) In the case of every specified dam, having a height of thirty metres or above or falling under such seismic zone, as may be specified by the regulations, the owner of the specified dam shall establish a seismological station in the vicinity of each such dam for recording micro and strong motion earthquakes and such other data as may be specified by the regulations. Installations of seismological station.

(2) Every owner of a specified dam shall collect, compile, process and store data referred to in sub-section (1) at such suitable location and in such manner as may be specified by the regulations.

CHAPTER VIII

EMERGENCY ACTION PLAN AND DISASTER MANAGEMENT

35. (1) Every owner of a specified dam, in respect of each specified dam, shall,— Obligation of owner of specified dam.

(a) establish well designed hydro-meteorological network and an inflow forecasting system;

(b) establish an emergency flood warning system for the probable flood affected areas downstream of the dam;

(c) test or cause to be tested periodically the functioning of systems referred to in clauses (a) and (b);

(d) install such scientific and technical instruments which are invented or adopted from time to time for the purpose of ensuring the dam safety and the life and property of people downstream;

(e) make available the information relating to maximum anticipated inflows and outflows including flood warning and an adverse impact of the same, if any, on persons and property towards the upstream or downstream of the dam, to the concerned district authorities and also make available the information in public domain; and

(f) render necessary assistance to the Authority in establishment and running of the early warning system for the exchange of real time hydrological and meteorological data and information related to the operation of reservoirs.

(2) Every owner of a specified dam, for each of its dam shall, carry out risk assessment studies at such interval as may be specified by the regulations and the first such study shall be made within five years from the date of commencement of this Act.

36. (1) Every owner of a specified dam, in respect of each of specified dam, shall,— Emergency action plan.

(a) prepare emergency action plan before allowing the initial filling of the reservoir and thereafter update such plans at regular intervals;

(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.

(2) The emergency action plan referred to in sub-section (1) shall,—

(a) set out the procedures to be followed for the protection of persons and property upstream or downstream of the specified dam in the event of an actual or imminent dam failure or to mitigate the effects of the disaster;

(b) include therein,—

(i) 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 dam failure, along with probable areas, population, structures and installations likely to be adversely affected due to 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;

(iv) such other matters which may have regard to the geographical conditions, size of the dam and other relevant factors as may be necessary.

(3) The emergency action plan under this section shall be put into action as and when conditions arise which are hazardous or likely to be hazardous to a specified dam or potentially hazardous to public safety, infrastructure, other property or to the environment.

(4) Every owner of the specified dam shall, while preparing and updating the emergency action plan, undertake a consultation process with all disaster management agencies and other Departments of the State entrusted with disaster management and relief in the area likely to be affected and owners of other dams in the immediate vicinity likely to be affected, so as to bring coordination and transparency and allay any unwarranted fear on dam safety issues.

Assistance to other disaster management authorities.

37. Without prejudice to the provisions of this Act or liability of the owner of the specified dam and other organisations and authorities under this Act, every owner, organisation and authority shall render necessary assistance, if so required by any authority under any law for the time being in force to meet or mitigate any disaster or emergency arising out of the specified dams.

CHAPTER IX

COMPREHENSIVE DAM SAFETY EVALUATION

Comprehensive dam safety evaluation.

38. (1) The owner of a specified dam shall make or cause to be made comprehensive dam safety evaluation of each specified dam through an independent panel of experts constituted as per regulations for the purpose of determining the conditions of the specified dam and its reservoir:

Provided that the first comprehensive dam safety evaluation for each existing specified dam shall be conducted within five years from the date of commencement of this Act, and thereafter the comprehensive dam safety evaluation of each such dam shall be carried out at regular intervals as may be specified by the regulations.

(2) The comprehensive dam safety evaluation shall consist of, but not be limited to,—

(a) review and analysis of available data on the design, construction, operation, maintenance and performance of the structure;

(b) general assessment of hydrologic and hydraulic conditions with mandatory review of design floods as specified by the regulations;

(c) general assessment of seismic safety of specified dam with mandatory site specific seismic parameters study in certain cases as specified by the regulations;

- (d) evaluation of the operation, maintenance and inspection procedures; and
- (e) evaluation of any other conditions which constitute a hazard to the integrity of the structure.

39. The comprehensive dam safety evaluation referred to in section 38 shall be compulsory in the case of,—

Compulsory evaluation in certain cases.

- (a) major modification to the original structure or design criteria;
- (b) discovery of an unusual condition at the dam or reservoir rim; and
- (c) an extreme hydrological or seismic event.

40. (1) The owner of a specified dam shall report the results of the dam safety evaluation undertaken under section 38 or section 39 to the State Dam Safety Organisation.

Reports of comprehensive evaluation.

(2) The reports referred to in sub-section (1) shall include, but not be limited to,—

- (a) assessment of the condition of the structure based on the visual observations and available data on the design, hydrology, construction, operation, maintenance and performance of the structure;
- (b) recommendations for any emergency measures or actions, if required, to assure the immediate safety of the structure;
- (c) recommendations for remedial measures and actions related to design, construction, operation, maintenance and inspection of the structure, if required;
- (d) recommendations for additional detailed studies, investigations and analysis, if required; and
- (e) recommendations for improvements in routine maintenance and inspection of dam, if required.

(3) Where the safety evaluations undertaken under section 38 or section 39, results in recommendations for a remedial action, the State Dam Safety Organisation shall pursue with the owner of the specified dam to ensure that remedial measures are carried out in time, for which the owner shall provide adequate funds.

(4) Where there is any unresolved matter emerging between an independent panel of experts referred to in sub section (1) of section 38 and the owner of the specified dam, the matter shall be referred to the State Dam Safety Organisation, and, in case no agreement is arrived at, the matter shall be referred to the Authority which shall render its advice and send recommendations to the State Government concerned for implementation.

CHAPTER X

OFFENCES AND PENALTIES

41. Whoever, without reasonable cause,—

Punishment for obstruction, etc.

(a) obstructs any officer or employee of the Central Government or the State Government, or a person authorised by the National Committee or the Authority or the State Committee or the State Dam Safety Organisation in the discharge of his functions under this Act; or

(b) refuses to comply with any direction given by or on behalf of the Central Government or the State Government or the National Committee or the Authority or the State Committee or the State Dam Safety Organisation under this Act,

shall be punishable with imprisonment for a term which may extend to one year or with fine, or with both, and if such obstruction or refusal to comply with directions results in loss of lives or imminent danger thereof, shall be punishable with imprisonment for a term which may extend to two years.

Offences by
Departments
of
Government.

42. (1) Where an offence under this Act has been committed by a Department of the Government, the head of the Department shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly unless he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a Department of the Government and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any officer, other than the head of the Department, such officer shall be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Offence by
companies.

43. (1) Where an offence under this Act has been committed by a company or body corporate, every person who at the time the offence was committed, was in charge of, and was responsible to, the company, for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the contravention and shall be liable to be proceeded against and punished accordingly:

Provided that nothing in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company, and it is proved that the offence was committed with the consent or connivance of, or is attributable to any neglect on the part of any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also, be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation.—For the purpose of this section—

(a) “company” means any body corporate and includes a firm or other association of individuals; and

(b) “director”, in relation to a firm, means a partner in the firm.

Cognizance
of offences.

44. (1) No court shall take cognizance of any offence punishable under this Act, except on a complaint made by the Central Government or the State Government or a person authorised in this behalf by the National Committee or the Authority or the State Committee or the State Dam Safety Organisation, as the case may be.

(2) No court inferior to that of a Metropolitan Magistrate or a Judicial Magistrate of the first class shall try any offence punishable under this Act.

CHAPTER XI

MISCELLANEOUS

Annual
report of
safety status
of specified
dam.

45. (1) Every State Dam Safety Organisation shall prepare annual report, within three months of the expiry of the preceding financial year, of its activities and safety status of specified dams in the State and such report shall be forwarded to the Authority and State Government and that Government shall cause the same to be laid before each House of the State Legislature, where it consists of two Houses or where such Legislature consists of one House, before that House.

(2) Every State Dam Safety Organisation and every owner of a specified dam shall provide to the Authority, documentation of the projects, report of enquiries into failure and any other data, as and when required in such format and in such manner as may be decided by the Authority.

(3) The Authority, shall prepare a consolidated annual report of the dam safety activities in the country and submit the same to the Central Government within six months of the

expiry of the preceding financial year and that Government shall cause the same to be laid before each House of Parliament.

(4) The Authority shall forward its annual report on the safety status of specified dams to the National Disaster Management Authority and also make available such report in public domain.

(5) The State Dam Safety Organisation of each State shall forward their annual report to the concerned State Disaster Management Authority and also make available such report in public domain.

46. Every owner of the dam other than specified dams shall undertake such measures as may be necessary to ensure dam safety and shall comply with such measures as may be specified by the regulations.

Safety measures in respect of dams other than specified dams.

47. Where a dam, including a dam created due to landslides or glacial moraine, is located outside the territory of India and the Authority *suo motu* or on receipt of information from any person or organisation or authority or source *prima facie* is of the opinion that measures are required to be taken to ensure safety of such dams and failure of which may endanger the life and property of people located in India, it shall in writing submit an intimation thereof to the Central Government indicating therein the likely damages which may arise due to failure of such dams and the safety measures required to be taken in respect of such dam and the Central Government shall take all suitable measures to mitigate any possible threat.

Safety measures in respect of dams located outside territory of India.

48. The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

Act to have overriding effect.

49. (1) If the Central Government is satisfied that it is necessary or expedient so to do, it may, by notification, amend the First Schedule, the Second Schedule or the Third Schedule and thereupon the Schedules, shall be deemed to have been amended accordingly.

Power to amend Schedules.

(2) A copy of every notification made under sub-section (1) shall be laid before each House of Parliament as soon as may be after it is made.

50. The Central Government may give such directions, as it may consider necessary, to the State Government where that Government is the owner of the specified dam and to the owner of a specified dam in any other case for the effective implementation of the provisions of this Act.

Power of Central Government to give directions.

51. No act or proceedings of the National Committee, the Authority and the State Committee shall be invalid merely by reason of—

Vacancies, etc., not to invalidate proceedings of National Committee on Dam Safety Authority and State Committee on Dam Safety.

(a) any vacancy in, or any defect in the constitution of, the Authority; or

(b) any defect in the appointment of a person acting as a member of the Authority; or

(c) any irregularity in the procedure of the Authority not affecting the merits of the case.

52. (1) The Central Government may, by notification, make rules to carry out the provisions of this Act.

Power of Central Government to make rules.

(2) In particular, and without prejudice to the foregoing power, such rules may provide for all or any of the following matters, namely:—

(a) the time and place of the meetings of the National Committee and the procedure to be followed at such meetings under sub-section (1) of section 7 and the expenditure incurred on the meetings of the National Committee under sub-section (3) of section 7;

(b) the qualifications and experience of the officers and other employee of the Authority in the field of dam safety or such other field under sub-section (1) of section 10;

(c) the functions, powers, and terms and conditions of service of other officers and other employees of the Authority under sub-section (2) of section 10;

(d) any other matter which is to be, or may be, prescribed or in respect of which provision is to be made by the Central Government by rules.

Power of State Government to make rules.

53. (1) The State Government may, by notification, make rules to carry out the provisions of this Act.

(2) In particular, and without prejudice to the foregoing power, such rules may provide for all or any of the following matters, namely:—

(a) the times and places of the meetings of the State Committee and the procedure to be followed at such meetings under sub-section (1) of section 13;

(b) the expenditure incurred on the meetings of the State Committee under sub-section (3) of section 13;

(c) the fee and allowances paid to the specialist members or expert invitees of the State Committee or its sub-committees under sub-section (4) of section 13;

(d) the organisational structure and work procedure of State Dam Safety Organisation under sub-section (3) of section 14;

(e) the qualifications and experience of the officers and other employees of the State Dam Safety Organisation in the field of dam safety or such other field under sub-section (1) of section 15;

(f) the functions, powers, and terms and conditions of service of the employees of the State Dam Safety Organisation under sub-section (2) of section 15;

(g) the dam safety measures in respect of dams other than specified dams under section 46;

(h) any other matter which is to be, or may be, prescribed or in respect of which provision is to be made by the State Government by rules.

(3) Every rule made by a State Government under this Act shall be laid, as soon as may be after it is made, before the State Legislature, where it consists of two Houses, or where such legislature consists of one House, before that House.

Power to make regulations by Authority.

54. (1) The Authority on the recommendations of the National Committee may make regulations consistent with this Act and the rules made thereunder to carry out the provisions of this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such regulations may provide for all or any of the following matters, namely:—

(a) the guidelines, standards and other directions for achieving the satisfactory level of dam safety assurance under sub-section (1) of section 16;

(b) the vulnerability and hazard classification criteria of specified dams under section 17;

(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;

- (f) the quality control measures for the purpose of dam construction under sub-section (5) 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;
- (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;
- (j) the form, manner and time interval for forwarding the analysis of readings to the State Dam Safety Organisation under sub-section (2) of section 32;
- (k) the data requirements of hydro-meteorological stations in the vicinity of specified dams under sub-section (1) of section 33;
- (l) the data requirements of seismological stations in the vicinity of specified dams under sub-section (1) of section 34;
- (m) the suitable location and manner of collection, compliance, process and storage of data under sub-section (2) of section 34;
- (n) the time interval of risk assessment studies to be carried out under sub-section (2) of section 35;
- (o) time interval for updating the emergency action plan under clause (b) of sub-section (1) of section 36;
- (p) the time interval for the comprehensive safety evaluation of specified dams under sub-section (1) of section 38;
- (q) the mandatory review of design flood of existing specified dams under clause (b) of sub-section (2) of section 38;
- (r) the mandatory site specific seismic parameter studies of existing specified dams under clause (c) of sub-section (2) of section 38;
- (s) the measures necessary to ensure dam safety by every owner of dam other than specified dams under section 46;
- (t) any other matter which is to be specified or in respect of which provision is to be made by the Authority.

55. Every rule and every regulation made by the Central Government under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or regulation or both Houses agree that the rule or regulation should not be made, the rule or regulation shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule or regulation.

Rules and regulations to be laid before Parliament.

56. (1) If any difficulty arises in giving effect to the provisions of this Act, the Central Government may, by order, published in the Official Gazette, make such provisions not inconsistent with the provisions of this Act, as may appear to be necessary or expedient for removing the difficulty:

Power to remove difficulties.

Provided that no order shall be made under this section after the expiry of three years from the date of commencement of this Act.

(2) Every order made under this section shall, as soon as may be after it is made, be laid before each House of Parliament.

THE FIRST SCHEDULE

[See section 6(1)]

FUNCTIONS OF NATIONAL COMMITTEE ON DAM SAFETY

1. For the purposes of maintaining standards of dam safety and prevention of dam failure related disasters, evolve dam safety policies and recommend necessary regulations as may be required;
2. act as a forum for exchange of views on techniques to be adopted for remedial measures to relieve distress conditions in specified dams and appurtenant structures;
3. analyse the causes of major dam incidents and dam failures and suggest changes in the planning, specifications, construction, operation and maintenance practices in order to avoid recurrence of such incidents and failures;
4. evolve comprehensive dam safety management approach as an integration of dam safety evaluation, risk assessment and risk management for the desired level of safety assurance; and also explore compensations, by means of insurance coverage for the people affected by dam failures;
5. render advice on any specific matter relating to dam safety which may be referred to it by the Central Government or the State Government, as the case may be;
6. make recommendations on a request by the Central Government on safety measures in respect of dams located outside the territory of India;
7. make recommendations on the rehabilitation requirements of ageing dams;
8. provide strategic supervision for such dam rehabilitation programmes that are executed in States through central or externally aided funding;
9. identify areas of research and development for dam safety and recommend for provision of funds;
10. make recommendations on the coordinated reservoir operations of cascading dams; and
11. any other specific matter relating to dam safety which may be referred to it by the Central Government.

THE SECOND SCHEDULE

[See section 9(1)]

FUNCTIONS OF NATIONAL DAM SAFETY AUTHORITY

1. For the purpose of maintaining standards of dam safety and prevention of dam failure related disasters, discharge such functions as related to implementation of the policies made by the National Committee including making regulations on the recommendations of the National Committee;

2. resolve any issue between the State Dam Safety Organisations of States or between a State Dam Safety Organisation and any owner of a specified dam in that State;

3. provide the state-of-the-art technical and managerial assistance to the State Dam Safety Organisations;

4. maintain a national level database of all specified dams in the country, including serious distress conditions, if any, noticed therein;

5. maintain liaison with the State Dam Safety Organisations and the owners of the specified dams for standardisation of dam safety related data and practices, and related technical or managerial assistance;

6. lay down guidelines and check-lists for the routine inspection and detailed investigation of the specified dams and appurtenant structures;

7. maintain the records of major dam failures in the country;

8. examine, as and when necessary, either through its own engineers or through a panel of experts, the cause of any major dam failure, and submit its report to the National Committee;

9. examine whenever required, either through its own engineers or through a panel of experts, the cause of any major public safety concern in respect of any specified dam, and issue appropriate instructions relating to further investigations, operational parameters or remedial measures;

10. lay down the uniform criteria for vulnerability and hazard classification of the specified dams in the country, and review such criteria as and when necessary;

11. give directions regarding maintenance of log books or database;

12. give directions regarding qualifications and experience requirements of individuals responsible for safety of the specified dams;

13. accord accreditations to the agencies that may be entrusted with the investigation, design, construction and alteration of the specified dams;

14. disqualify any agency for taking up investigation, design, construction or alteration of the specified dams, if it violates any of the regulations made under this Act;

15. give directions regarding qualification and experience requirements of individuals responsible for investigation, design and construction of the specified dams;

16. give directions regarding quality control measures to be undertaken during construction of the specified dams;

17. lay down guidelines for preventive measures in the areas vulnerable to landslides in the vicinity of a specified dam under construction;

18. give directions regarding competent levels of engineers in the dam safety units of the specified dams on the basis of vulnerability and hazard classification of such dams;

19. give directions regarding instrumentation requirements and manner of their installation for monitoring the performance of the specified dams;

20. give directions regarding data requirements of hydro-meteorological stations in the vicinity of the specified dams;
21. give directions regarding data requirements of seismological stations in the vicinity of the specified dams;
22. give directions regarding time interval for the risk assessment studies of the specified dams on the basis of vulnerability and hazard classification of such dams;
23. give directions regarding time interval for updating the emergency action plans of the specified dams on the basis of vulnerability and hazard classification of such dams;
24. give directions regarding constitution of independent panel of experts for comprehensive dam safety evaluation of the specified dams;
25. give directions regarding time interval for the comprehensive safety evaluation of the specified dams on the basis of vulnerability and hazard classification of such dams;
26. lay down guidelines for review of design floods of existing the specified dams;
27. lay down guidelines for review of site specific seismic parameter studies of the specified dams;
28. establishment of an early warning system incorporating appropriate framework for the exchange of real time hydrological and meteorological data and information related to operation of reservoirs by the owner of a dam;
29. promote general education and awareness in relation to dam safety;
30. provide secretarial assistance to the National Committee and its sub-committees;
31. provide coordination and overall supervision of dam rehabilitation programmes that are executed in States through central or externally aided funding; and
32. any other specific matter relating to dam safety which may be referred to it by the Central Government.

THE THIRD SCHEDULE

[See section 12(I)]

FUNCTIONS OF STATE COMMITTEE ON DAM SAFETY

1. For the purpose of maintaining standards of dam safety and prevention of dam failure related disasters, discharge such functions as may be necessary as per the guidelines, standards and other directions issued by the Authority;
2. review the work done by the State Dam Safety Organisation;
3. establish priorities for investigations in case of specified dams under distress condition;
4. in cases where investigations with respect to safety of any specified dam in the State had already been undertaken, to order further investigations in relation to safety of such specified dam and assign responsibilities for execution including the use of non-departmental resources, and association of independent experts where necessary;
5. recommend the appropriate measures to be taken in relation to the safety of the specified dam which is under distress condition;
6. establish priorities among projects requiring remedial safety works;
7. review the progress on measures recommended in relation to dam safety;
8. assess potential implication of reservoir filling of a specified dam in the State on any upstream State, and coordinate mitigation measures with such upstream States;
9. assess potential implication of failure of a specified dam in the State on any downstream State, and coordinate mitigation measures with such downstream States;
10. assess probability of cascading dam failure, and coordinate mitigation measures with all concerned, including bordering States;
11. recommend provision of funds for the purpose of planned and appropriately phased rehabilitation of ageing dams in the State;
12. provide strategic supervision for such dam improvement and rehabilitation programmes that are executed through State funding; and
13. any other specific matter relating to dam safety which may be referred to it by the State Government.

DR. REETA VASISHTA,
Secretary to the Govt. of India.

Gajwel, Siddipet District.

ANNEXURE-6

**GOVERNMENT OF TELANGANA
IRRIGATION AND CAD DEPARTMENT**

From

Sri B. Hari Ram, *B.Tech., F.I.E.*,
Engineer-in-Chief (Irrigation),
2nd Floor, Integrated Office Complex,
Sangapoor Road, Gajwel,
Siddipet District - 502 278.

To

The Director,
National Geophysical Research Institute,
Uppal Road, Hyderabad-500007.
Telangana, India.

Lr.No.SE/IC/GJL/DCE/DEE-4/AEE-1/SKMS/2023-24/369 Date: 21.02.2024

Sir,

Sub: Kaleshwaram Project - Formation of Sri Komaravelli Mallanna Sagar Reservoir with a Capacity of 50 TMC - Formation of Earth Bund with all associated components from km 0.000 to km 22.600 along with its structures- Conducting detailed seismic studies with planned profile orientations for Sri Komaravelli Mallanna Sagar- Reg.

Ref: 1. EE/KP Const Divn No.1 Siddipet Lr.No.755 Dt:03.10.2017.
2. Chief Scientist, NGRI, Hyd Report Dt:23.08.2018.
3. SE IC Gajwel Lr.No.SE/IC/GJL/DSE/SKMS/2023-24/ 104, Dt:
20.02.2024

Sri Komaravelli Mallanna Sagar Reservoir is a huge reservoir with 50 TMC capacity proposed with FRL of +557.000 m in order to provide sufficient water storage system in Kaleshwaram Project to meet operational flexibilities and to cater irrigation requirements of Khariff season for the base period of 120 days and to meet other contemplated demands of the project like 30 TMC drinking water to Hyderabad and Secunderabad twin cities and 16 TMC of water for industrial use etc., throughout the year. For the formation of Sri Komaravelli Mallanna Sagar involves huge quantum of work. This prestigious project commenced in the year 2017.

The Superintending Engineer Irrigation Circle, Gajwel vide reference 3rd cited has submitted that as per the advice of Chief Engineer I&CAD dept, Central designs organization, Hyderabad, the Executive Engineer has addressed the Director, CSIR-NGRI, Hyderabad vide reference 1st cited for conducting the site-specific seismic studies while according the approval of drawings pertaining to Sri Komaravelli Mallanna Sagar Reservoir. Subsequently, the Chief Scientist, NGRI, Hyderabad along with his team has visited the site and conducted Ground Penetration Radar (GPR) studies. As per the results, the Chief Scientist, NGRI has submitted a Preliminary Seismo-tectonic and GPR studies Appraisal (Overview) around Mallannasagar Project vide reference 2nd cited.

The NGRI recommended to conduct detailed survey with planned profile orientations which was not taken up due to farmer agitations and large number of court cases pertaining to land acquisition and rehabilitation of the 12 number of submergence villages of Sri Komaravelli Mallannasagar. As per the instruction of Government the Irrigation and CAD Department commenced the work and progressed the same.

However, the excavation of the Cut-off Trench (COT) is taken up along the center line of the bund alignment based on the bore hole data. COT is excavated up to hard strata as per COT guidelines issued Chief Engineer, CDO, Hyderabad. On completion of excavation, geologist from Geological Survey of India (GSI) has inspected regularly and conducted mapping of COT strata. The geologist from GSI has also suggested the actual COT depth, grouting depth and its pattern based on the mapping.

It is to inform that, as per I.S.Code 1893-Part-1 Sri Komaravelli Mallannasagar Reservoir falls under Seismic Zone-II category (lowest seismicity level). During the design of earth bund, basic horizontal seismic coefficients ($\alpha_0=0.02$ as per Table-2 of I.S:1893-1984) is considered and designed accordingly by Chief Engineer, Central Designs Organization, Hyderabad.

Further it is to inform that, the formation of earthen bund for Sri Komaravelli Mallanna Sagar is nearing completion and initial filling of reservoir has been started since August-2021. The reservoir is being filled in a phased manner as per I.S code 15472-2004. The water was released into SKMS reservoir through Package-12 pump house with minimum of 0.60 to 0.80 TMC per day and no other sudden inflows are expected in SKMS.

The first spell of filling SKMS reservoir started from August-2021 and filled upto 4.68TMC and in September-2021 filled upto 10.64 TMC at an average rate of 0.30 TMC per day. After initial filling the health of reservoir was observed by measuring seepage in the toe drain, it is observed that the seepages are within the allowable limits.

Government constituted an Expert committee vide G.O.Rt No.341 Dt:22.09.2021 comprising of ENC (Retd.), CEs(Retd.) and Director General (Retd.), GSI to assess the performance of SKMS reservoir during the initial filling. The Expert committee inspected the site on 29.09.2021. The Expert committee has submitted the report based on their observations which were mainly on drainage and disposal of rain water and seepage water through drains. The Expert Committee expressed that the Earth Bund of SKMS is in good condition. The observations/recommendations mentioned are being followed for proper functioning and maintenance of reservoir.

Sri Mandapalli Raju, former Director General, Geological Survey of India and member in Expert Committee had visited the site on 04.10.2021 and reviewed the GSI reports and

suggestions given by the GSI during execution of COT of dam. He also examined the seepage all along the bund and opined that the seepage noticed is considered as not any alarming issue and concluded that the health of the dam is in good condition and also concluded that *"An assessment of construction practices adopted with the backdrop of terrain evaluation, the earth dam formed and reservoir formed thereby in the name of Sri Komaravelli Mallanna Sagar Reservoir is sound and competent"*.

A Technical committee was constituted vide G.O.Rt No.49 Dt:28.01.2021 comprising of ENC (General), ENC (I), Gajwel, CE O/o ENC(General), Professor of IIT, Hyd, Head of Geo-Technical Dept of O.U, Hyd, Scientist CWPRS, Pune and Sr.Engineering Geologist of GSI to resolve technical issues, issues related to designs, stability analysis of SKMS reservoir. The Scientist (Geo-Technical Expert) from CWPRS, Pune, member of the technical committee has inspected the SKMS site on 13.10.2022. Three cross sections of the bund were analyzed viz. Section-1 of Height 59.60 m at Km.15.600 (maximum height section), Section-II of Height 51.00 m from Km.18.625 to Km.19.925 and Section-III of Height 49.00 m from Km.16.300 to Km.16.700.

After detailed analysis, a detailed report on "Geotechnical studies for seepage and stability analysis of zoned earth dam of Sri Komaravelli Mallanna Sagar reservoir" have been furnished. In the report, the Section.10.0 Conclusions and Recommendation point 'c' states that "Results of stability analysis indicate that all three cross-sections are safe from slope stability point of view" and point 'd' states that "Pseudo-static earthquake analysis indicates that all three sections are safe for steady seepage and reservoir full conditions".

The then Hon'ble Chief Minister has inaugurated the SKMS reservoir on 23rd February-2022. The second spell of filling started from 23rd February-2022 to March-2022 and about 6.00 TMC have been filled additionally. The reservoir is filled up to level of +537.550m for a capacity of 16.180 TMC, where head of water is 2/3rd of max. head of 57.6m up to FRL +557.000m at maximum height of bund. The seepages are measured periodically by field engineers and are within the limits. Water is released from SKMS to Kondapochamma Sagar Reservoir, Package-12 canal, for Mission Bhagiratha and also releasing water to Kudelli vagu to fill Upper Manair Dam, even today the seepages are steady, healthy and within the limits. The same process will be followed for filling 50 TMC for full capacity as described above in phased manner.

It is to further inform that the NGRI has reported that it has carried out GPR survey at site and as per the latitude and longitude of the location it falls nearby FRL at 557.000 and away from the bund alignment of the SKMS reservoir, where the ground level is almost +557.000m. The water column at the location where GPR survey conducted by NGRI is **zero** for the reservoir full capacity of 50 TMC (+557.000 m)

During the performance audit of Kaleshwaram Project, the Comptroller and Auditor General of India has pointed out the aspect of seismic studies and as per their report for the year 2024 has recommended to conduct detailed seismic studies for Sri Komaravelli Mallanna Sagar.

It is further submitted that future filling will be in phased manner and it is also noticed that the location where NGRI has done GPR survey falls near FRL contour of the SKMS reservoir and away from the bund alignment.

Hence, I kindly request the Director, NGRI, Hyderabad to furnish the expert opinion on seismic studies for Sri Komaravelli Mallanna Sagar.

Yours faithfully


21/02/24

Engineer-in-Chief (Irrigation),
Gajwel, Siddipet District.

ABE-1


DEE-4

A.L.
DCE

Copy to the Superintending Engineer, Irrigation Circle, Gajwel for information and necessary action.


21/02/24

Engineer-in-Chief (Irrigation),
Gajwel, Siddipet District.

ABE-1


DEE-4

A.L.
DCE



सी.एस.आई.आर. - राष्ट्रीय भूभौतिकीय अनुसंधान संस्थान 59

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)

पो.ब. सं. 724 उप्पल रोड, हैदराबाद-500 007, तेलंगणा, भारत

CSIR - NATIONAL GEOPHYSICAL RESEARCH INSTITUTE

(Council of Scientific & Industrial Research)

Post Bag # 724, Uppal Road, Hyderabad - 500 007, T.S., INDIA



ANNEXURE-7

डॉ. प्रकाश कुमार, एफ.एन.ए.एस्सी
निदेशक

Dr. Prakash Kumar, FNASc
Director

February 29, 2024

To

The Engineer-in Chief
2nd Floor, Integrated Office Complex
Sangapoor Road, Gajwel,
Siddipet District 502278

Sub: Kaleshwaram Project – Formation of Sri Komaravelli Mallanna Sagar
Reservoir- Seismic study -Reg.

Ref: Lr. No. SE/IC/GJL/DCE/DEE-4/AEE-1/SKMS/2023-24/369 dated 21-2-
2024

Dear Sir,

With reference to the letter cited, it is recommended to carry out continuous seismic monitoring of the reservoir as per CWC guidelines. CSIR-NGRI has submitted a detailed proposal to Mallanna Sagar Reservoir authorities in this regard.

In addition, it is also recommended to carry out a seismic safety audit of the structure by a team of Civil Engineering / Structural Engineering experts.

Best Regards,

(Dr. Prakash Kumar)



डॉ. प्रकाश कुमार - निदेशक

Dr. Prakash Kumar - Director

सी.एस.आई.आर. - राष्ट्रीय भूभौतिकीय अनुसंधान संस्थान
CSIR - National Geophysical Research Institute
उप्पल रोड, हैदराबाद - 500 007, तेलंगणा, भारत
Uppal Road, Hyderabad-500 007, Telangana, India

[P.T.O.]

ANNEXURE – 8

	PROFORMA FOR APPROVAL OF CONTRACT R&D PROJECT	
1. Project		
a) Title : Seismic Monitoring of Sri Komaravelli Mallanna Sagar Reservoir, Telangana		
b) Number & Accounting Code :		
c) Type (Sponsored/Collaborative/Grant-in-aid) :		
2. Client / Customer		
a) Name and Address	The Executive Engineer, Irrigation Division No.6, Gajwel, Siddipet District. Telangana PIN 502278	
b) Category* (Type & size) (*Govt.Dept./Agency/Voluntary/ Cooperative Agency, Research Organization, Foreign Firm/Agency, Public/Private Sector, Large/Medium/ Small / Cottage Unit)	Govt. Dept	
c) Status	New	
d) If it is 'repeat', please provide a brief statement of past experience	NA	
3. Objectives, Scope and Duration of the project :		
Objectives: Seismic Monitoring of Sri Komaravelli Mallanna Sagar Reservoir, Telangana		
<u>Scope</u>		
<ul style="list-style-type: none"> ▪ Monitoring of Seismicity of the region ▪ Delineation of seismically active faults/lineaments ▪ Determination of Peak Ground Acceleration (PGA) levels of the dam structure during the occurrence of near field earthquakes. 		
Duration: No. of Years: 5 years	Date of Start	Date of Completion
	Date of work order	
4. Does the activity fall within the approved research areas of the laboratory:	Yes (Seismology)	
5. Present state of knowledge available with lab in the area including IPR position:		
<ul style="list-style-type: none"> ▪ CSIR-NGRI is a pioneering institute in seismic monitoring of Dams. ▪ It is operating seismic Networks around Koyna-Warna Reservoirs in Maharashtra for the past five decades. ▪ It also operating seismic stations at Nagarjunasagar, Srisailem and Sriramsagar reservoirs in 		

Andhra Pradesh and Telangana states, since 1981.

- An aftershock study was carried out by installing a four-station seismic network around Pulichintala Reservoir after an M4.6 magnitude earthquake that occurred on January 26, 2020 near the Pulichintala reservoir, felt in Andhra Pradesh and Telangana states.
- CSIR-NGRI operates a seismic network with 15 seismic stations in Andhra Pradesh and Telangana States to monitor the regional seismicity.
- CSIR-NGRI is monitoring the Dhamni and Bhatsa Dams in Maharashtra by installing four Strong Motion Accelerographs in Dhamni dam and Six Strong Motion Accelerographs in Bhatsa dam. These are continuously operated from November 2019. In addition to that, a five station Broadband Seismograph network is continuously operated to monitor seismicity in the Palghar region from January 2019 onwards.
- An aftershock study was carried out by installing a five-station seismic network after the M4.5 magnitude earthquake that occurred on June 20, 1988 near Idukki reservoir in Kerala state.
- A digital seismograph was procured for Kerala State Electricity Board for installation at Idukki dam and also training on the operation of the seismograph and seismic data analysis was provided in 2001.
- CSIR-NGRI is carrying out seismic monitoring of Periyar, Sholayar and Mettur dams maintained by Tamil Nadu Water Resources Department (TNWRD) and 16 other dams maintained by Tamilnadu Generation and Distribution Company (TANGEDCO) through a network of five Broadband Seismographs and twenty-eight Strong Motion Accelerographs in the dam structures in Tamilnadu state.
- CSIR-NGRI also operates more than ten different seismic networks comprising more than 200 seismic stations under various projects in India.

6. Specify the S&T inputs being provided by client:

<p>a) Programme of work with phasing, milestones and deliverables envisaged from CSIR-NGRI:</p>	<ol style="list-style-type: none"> 1. Procurement of Broadband Seismographs and Strong Motion Accelerographs. 2. Site preparation 3. Installation of one Broadband Seismograph (BBS) in the Dam premises and three more seismographs around the reservoir. 4. Installation of three Strong Motion Accelerographs (SMA) in the Earth bund structure and one in the free field. 5. Operation and Maintenance of seismological instruments. 6. Seismological Data collection. 7. Operation and maintenance of Central Recording Station at CSIR-NGRI, Hyderabad. 8. Monitoring the state of health of the seismic network periodically 9. Seismic Data Processing and Interpretation 10. Submission of preliminary earthquake report of significant events. 11. Submission of Annual event report.
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b) Vesting of Intellectual Property Rights:	Lies with CSIR-NGRI
---	---------------------

7. Project Team (S& T Staff) :

Name	Designation	PL / Co-PL / Member
i. Er. R. Vijayaraghavan	Chief Scientist	Project Leader
ii. Dr. M. Shekar	Principal Scientist	Co-Project Leader
iii. Dr. Nitin Sharma	Scientist	Member
iv. Dr. Pavan Kumar	Scientist	Member
v. Dr. G Suresh	Senior Tech. Officer (1)	Member
vi. Dr. D. Srinivas	Senior Tech. Officer (1)	Member

8. Financial Aspects

Particulars	Cost (₹. in Lakhs)
Project cost (five years period) (The project cost includes Manpower, TA /DA for field staff, Field expenses, Consumables, Laboratory share and Project Fee as per CSIR Guidelines)	285.126
GST 18%	51.323
Capital cost (The capital cost includes Field Seismic Equipment (five Broadband Seismographs, four Strong Motion Accelerographs and accessories) to be installed in and around Mallanna Sagar Reservoir and Data Processing and Storage Equipment to be installed at CSIR-NGRI, Hyderabad and Procurement and handling charges 5% as listed in Annexure I	197.876
Total cost	534.325

Schedule of payments to be received:

(Link the payments receivable to deliverables, specify the deliverables, vis-à-vis time frame and the amount of installment receivable from client)

Amount to be paid by Demand Draft / RTGS

1. Along with the work order- 25% of the project cost + GST + Capital cost
2. After submission of 1st Annual Event Report – 15 % of the project cost + GST
3. After submission of 2nd Annual Event Report – 15 % of the project cost + GST
4. After submission of 3rd Annual Event Report – 15 % of the project cost + GST
5. After submission of 4th Annual Event Report – 15 % of the

	project cost + GST 6. After submission of 5 th Annual Event Report – 15 % of the project cost + GST		
<ul style="list-style-type: none"> If any concession is provided on Project Fee, a note of justification may be enclosed. 			
9. Utilization of Intellectual Property / Knowledgebase generated :			
Licensing :			
a) Exclusive/Non-Exclusive			
b) Period			
c) Envisaged Fee/Charges			
i. Lumpsum (instalments, amount, time, mode)			
ii. Recurring royalty (Period and basis)			
Remarks :			
Project Leader	MLP-PL	BDG	CoFA/FAO
DECISION OF COMPETENT AUTHORITY Director / Management Council / DG, CSIR			

Copy to: 1. Project Leader
3. CoFA / FAO
5. CoSP/SPO

2. CoA / AO
4. BDG&PME
6. Director

Seismic Monitoring of Sri Komaravelli Mallanna Sagar Reservoir

Part A. Cost estimate of Field seismological equipment

Sl.No	Item	Quantity	Unit cost (₹.in Lakhs)	Total cost (₹. in Lakhs)
Imported				
1.	Broadband Seismometer	5 Nos.	11.00	55.000
2.	Data Acquisition System	5 Nos.	6.00	30.000
3.	Strong Motion Accelerograph	4 Nos.	6.00	24.000
Indigenous				
4.	Battery (12V-100AH)	56 Nos.	0.10	5.600
5.	Solar Panel 100W	16 Nos.	0.10	1.600
6.	Solar charge controller 20A	20 Nos.	0.10	2.000
7.	Power supply / Battery charger	20 Nos.	0.20	4.000
8.	Cellular Modem	8 Nos.	0.30	2.400
9.	Data Charges	60 months	0.05	3.000
10.	Consumables	1 Lot	2.00	2.000
Total				129.600
GST 18%				23.328
Customs Duty + Freight + Insurance (approx.) 15% for Imported Items Sl. Nos.1 to 3				16.350
Total A				169.278

Note: The cost of the field seismological equipment to be installed in and around the Mallanna Sagar Reservoir. It is proposed to install one Broadband seismograph in the dam premises and three more Broadband seismographs around Mallanna Sagar Reservoir (one spare unit) and also three strong motion accelerographs in the dam structure and one strong motion accelerograph at the free field site.

Part B. Cost estimate of Data Processing and Storage equipment

Sl.No	Item	Quantity	Unit cost (₹.in Lakhs)	Total cost (₹. in Lakhs)
Indigenous				
1.	Data Retrieval computer (Laptop computer)	1 No.	2.00	2.000
2.	Data Analysis computer (Desktop computer)	1 No.	2.00	2.000
3.	Data Analysis computer (Workstation computer)	1 No.	4.00	4.000
4.	Printer	1 No.	0.75	0.750
5.	External Storage media	10 Nos.	0.15	1.500
6.	Data Storage (NAS server)	1 No.	6.00	6.000
Total				16.250
GST 18%				2.925
Total B				19.175

Note: The cost of the Data Processing and Data storage equipment to be installed at CSIR-NGRI.

Total (A+B)	188.453
Procurement and handling charges 5%	9.423
Total Capital cost	197.876

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

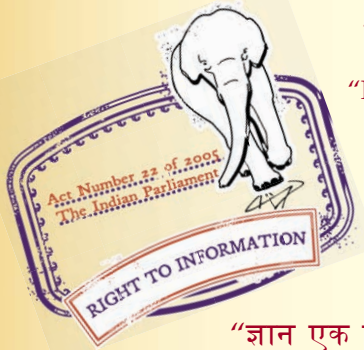
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 15472 (2004): Guidelines for planning and design of low level outlets for evacuating storage reservoirs [WRD 10: Reservoirs and Lakes]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

जलाशयों को खाली करने के लिए निम्न स्तर के निर्गमों की
योजना और डिजाईन के लिए मार्गदर्शिका

Indian Standard

**GUIDELINES FOR PLANNING AND DESIGN OF
LOW LEVEL OUTLETS FOR EVACUATING
STORAGE RESERVOIRS**

ICS 93.16

© BIS 2004

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Spillways Including Energy Dissipators Sectional Committee had been approved by the Water Resources Division Council.

Evacuation outlets are provided in dams for depletion of reservoirs for inspection, maintenance and repairs and for controlling the reservoir pool rise during initial filling of reservoirs. These outlets need not necessarily be always located in the spillways. They can be located in the main dam or in the abutment also.

The composition of the technical committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GUIDELINES FOR PLANNING AND DESIGN OF LOW LEVEL OUTLETS FOR EVACUATING STORAGE RESERVOIRS

1 SCOPE

This standard provides general guidelines for planning and design of evacuation outlets for evacuating the reservoirs.

2 GENERAL PROVISIONS

2.1 It is desirable to provide low level outlets of adequate capacity in all dams for the following purposes:

- a) Evacuation of the reservoir to a specified elevation for inspection, maintenance and repairs; and
- b) Controlling the rate of reservoir pool rise during initial filling of the reservoir.

2.2 For lowering the water level of the reservoir for inspection and repairs when necessary, the requirement would be to evacuate a major portion of the reservoir in such time that after the water level is lowered, sufficient time is available for repairs before the water level rises due to higher inflows. For such a consideration, the outlets should be at the lowest possible level and of sufficient number, size and capacity to evacuate the reservoir taking into account the concurrent inflows.

2.3 The low level outlets should be located and sized to provide discharging capacity sufficient to evacuate the reservoir in a reasonable time and to maintain the reservoir filling rates as specified in the initial filling criteria for the project.

2.4 The drawdown levels and the evacuation time should be set forth for projects on a case to case basis. For structural safety, the reduction in height of water, which gives relief, is important. For very large reservoirs this may mean very large capacity outlets for speedy evacuation.

2.5 The initial reservoir elevation to be used for performing reservoir evacuation computations depends upon the reservoir storage allocations and project needs. Normally the full reservoir level (FRL) is selected as the initial reservoir level for reservoir evacuation studies.

2.6 The volume corresponding to the dead storage capacity of the reservoir is not to be considered for evacuation purposes.

2.7 Suitable inflows in the reservoir should be assumed while computing the period of evacuation and for initial filling of the reservoir as per the following guidelines.

2.7.1 *For Reservoir Evacuation*

Inflows into the reservoir for analysis purposes should be the highest consecutive mean monthly inflows for the duration of the evacuation period.

2.7.2 *For Initial Filling of the Reservoir*

Inflows for initial filling should be based on a combination of base flow and a frequency flood event. If the selected frequency flood includes base flow, average monthly stream flow should not be added to the hydrograph. Base flow should be the average of the mean monthly stream flow for the anticipated filling period. Generally the selected frequency flood will have a return period of five times the filling period with a minimum return period of 5 years.

2.8 All water release facilities, for example, gated spillways, sluices, outlet works, penstocks, etc, should be considered to be available for evacuation for supplementing the low level outlets to the extent that their reliability can be considered as reasonably certain.

2.9 For normal evacuation purposes, the drawdown rate should be limited to the safe downstream carrying capacity of the river. In case of canal outlets, there should be a positive means of making releases into a natural water course through a bypass or a wasteway as it is possible that there may not be any irrigation requirement at that time. In case of power plants, more than one unit must be installed and made operational. Generally only 50 percent of the release capability of the turbines should be considered available because some units could be inoperational when their discharge capacity is needed.

Other factors like possible adverse flow conditions/cavitation in case of simultaneous operation of both spillway and sluices, if they are located in the spillway blocks, should also be kept in view.

3 DESIGN REQUIREMENTS

3.1 Location and sizing of low level outlets should be done in a systematic way, considering the following aspects:

- a) Emergency evacuation requirements of the project,
- b) Possibility of taking advantage of the outlet work in routing the inflow design flood as a supplement to the spillway arrangements, and
- c) Initial filling requirement.

3.2 In our country, reservoir sedimentation is a potential problem. Normally the evacuation outlets should be located above the predicted 100 year silt elevation or else a multilevel intake structure should be provided to prevent the outlet works from being plugged by sediment load during the life of the project. Any deviation from the above aspects based on site specific factors can be considered on case to case basis.

3.3 Low level outlets can be provided both as sluices and as depletion tunnels. These can be located either in the main dam or in the spillway or in the abutments. However it is to be ensured that these do not get blocked due to any possible landslides in the reservoir. Suitable energy dissipation arrangements are required to be provided for energy dissipation at the exit.

4 EVACUATION TIME

4.1 Guidelines on this aspect should generally take into account assessment of hazard potential and risk potential of the dam. However, in the Indian conditions where population growth in downstream areas is not controllable, the hazard potential at the initial stage and its subsequent increase cannot be assessed. In most cases the dams would come under high hazard category.

Similarly risk is very difficult to classify because of various combinations of adverse conditions that may be involved at a particular dam site and the type of dam.

Classification is also recommended to be based on the height of dams so far as determination of risk potential is concerned and dams with a height of more than 50 m are to be considered more important than those of height less than 50 m.

For evacuating storage reservoirs and sizing low-level outlets, three categories are suggested as given in the table below. These assume a general balance between hazard and risk and could be adjusted on the basis of detailed site specific studies.

Evacuation Time (in Days)

Sl No.	Depth of Evacuation (from Initial Pool Level)	Degree of Hazard or Risk		
		High	Significant	Low
i)	25	20	30	50
ii)	50	40	50	70
iii)	75	80	90	100

The above evacuation periods would generally be within the overall requirement to drawdown the reservoir within a period of one to four months allowing sufficient time for carrying out inspection and repairs before the water level rises due to higher inflows of monsoon.

In some exceptional case, it may not be technically possible and economically feasible to provide the required drawdown capability to meet the above criteria because of the size of the project (unusually small or large) or because of some special feature. In such a case, the criteria regarding drawdown level or the evacuation time could be altered to suit the site specific case if the results of studies so indicate.

4.2 Site specific sequence of operations to be followed for evacuation needs to be planned for every project. In case of gated spillways, reservoir can be lowered from initial pool level which is generally the full reservoir level, to the spillway crest level by suitably opening the spillway gates taking cognizance of the downstream channel capacity. Further lowering of the reservoir could be through the low level and other outlets. Actual details are however required to be planned on case to case basis.

5 INITIAL FILLING OF RESERVOIRS

Initial reservoir filling is the first test of a dam to perform its intended functions. As the sizing of the outlet works to meet the probable outflow requirements during initial filling has to be fixed during designs, the information on the desired rates of pool rise must also be available at the time the design requirements are established.

In order to monitor reservoir performance, the rate of filling should be controlled to allow in accomplishing a predetermined monitoring program. Low level outlets should be located and sized to provide discharge capacity sufficient to maintain the reservoir filling rates specified by the initial filling criteria to hold reservoir levels reasonably constant for elevations above 50 percent of the hydraulic height of the dam. Inflows in the reservoir should be assumed as per 2.7.2.

Reservoir filling criteria are established on a dam to dam basis. In general the objective as already stated above is to provide a planned program with adequate time for monitoring and evaluating performance of the

dam and its foundation as the reservoir is being filled for the first time.

The major factors to be considered in establishing initial filling criteria are as under:

- a) Type of dam — Concrete, masonry, earth or rockfill.
- b) Geology of the dam foundation and reservoir area including seismicity and landslide potential along the banks of the reservoirs.
- c) Hazard potential.
- d) Inflow characteristics — Controlled or uncontrolled.
- e) Hydrology — Flood patterns and seasonal base flows.
- f) Release provisions for project requirements, flood release and emergency evacuation.
- g) Type of instrumentation and provision for monitoring, instrument response time and evaluation time needed.
- h) Safe channel capacities downstream of the dam.
- j) Characteristics of reservoir storage.
- k) Construction schedule.

Filling rates for concrete/masonry dams are much less restrictive than for embankment dams.

Site specific initial filling programs should be prepared based on the factors enumerated above. **A general initial filling program in respect of embankment dams, which can be suitably modified as necessary, is as under:**

- a) **The first stage consists of filling the reservoir up to MDDL. This filling can be done without restraint as the hazard potential to the public and economic development downstream of the dam is low.**
- b) **The second stage consists of filling the reservoir from MDDL to the crest of spillway. For**

earth and rockfill dams this stage filling should be done in two parts.

The reservoir above MDDL should be gradually built at a rate not exceeding 3 m per fortnight and filling should be temporarily stopped at half the height between MDDL and crest of spillway, for a reasonable time in order to assess the behaviour of the structure on the basis of observed values and to take a decision about further storage and remedial measures in case of distress.

After a decision is taken to continue the filling, further building up of the storage should be done in gradual sub-stages of 2 to 3 m per fortnight depending upon the height of the dam and increase in storage capacity. The reservoir should then be temporarily held at the crest level of the spillway for a reasonable time for monitoring and evaluating the performance of the dam and to take a decision about further storage.

- c) **The third stage consists of filling above the crest of the spillway up to the full reservoir level (FRL).**

The rate of reservoir filling above crest of spillway should be restricted to sub-stages of 0.3 m in 48 h. The reservoir should be temporarily held at half the height between FRL and crest of spillway for sufficient time for monitoring and evaluating performance of dam and to take a decision about further storage/remedial measures, if any.

5.1 The instrumentation program and frequency of taking observations during initial filling of the reservoir including the periods for which the reservoir is held constant at specified levels should also be finalised simultaneously for structural monitoring of the structure at that time. The structural behaviour reports should be prepared for each stage of filling.

ANNEX A
(*Foreword*)
COMMITTEE COMPOSITION

Spillways Including Energy Dissipators Sectional Committee, WRD 10

<i>Organisation</i>	<i>Representative(s)</i>
Sardar Sarovar Narmada Nigam Ltd, Gandhinagar Bhakra Beas Management Board, Nangal Township	SHRI N. B. DESAI (<i>Chairman</i>) SUPERINTENDING ENGINEER EXECUTIVE ENGINEER (<i>Alternate</i>)
Bodhi Water Resources Dept, Bhopal	SHRI J. K. TIWARI SHRI R. K. CHACHONDIA (<i>Alternate</i>)
Central Design Organization, Gandhinagar Central Water & Power Research Station, Pune	SUPERINTENDING ENGINEER SHRI P. B. DEOLALIKAR SHRIMATI V. V. BHOSEKAR (<i>Alternate</i>)
Central Water Commission, New Delhi	DIRECTOR [CMDD-N&W] DIRECTOR [SSD&C] (<i>Alternate</i>)
Consulting Engineering Services (I) Ltd, New Delhi	SHRI V. K. KAPUR SHRI P. K. SANGHI (<i>Alternate</i>)
Gujarat Engineering Research Institute, Vadodara	SHRI V. S. BRAHMABHATT RESEARCH OFFICER (<i>Alternate</i>)
Hindustan Construction Company Ltd, Mumbai	SHRI R. G. VARTAK SHRI K. R. VISHWANATH (<i>Alternate</i>)
Indian Association of Hydrologists, New Delhi Indian Institute of Technology, Roorkee	SHRI PRITAM SINGH DIRECTOR [WRTDC] DR NAYAN SHARMA (<i>Alternate</i>)
Irrigation Department, Govt of Andhra Pradesh, Hyderabad	CHIEF ENGINEER SUPERINTENDING ENGINEER (DAMS) (<i>Alternate</i>)
Irrigation & Water Ways Directorate, Govt of West Bengal, Dist Darjeeling	SUPERINTENDING ENGINEER EXECUTIVE ENGINEER (<i>Alternate</i>)
Irrigation Department, Govt of Orissa, Bhubaneswar	CHIEF ENGINEER (D&R) DIRECTOR [HEAD WORKS] (<i>Alternate</i>)
Irrigation Department, Govt of Punjab, Chandigarh	CHIEF ENGINEER (RSDD) DIRECTOR SPILLWAY (RSDD) (<i>Alternate</i>)
Irrigation Department, Govt of Uttaranchal, Roorkee	CHIEF ENGINEER & DIRECTOR SUPERINTENDING ENGINEER (<i>Alternate</i>)
Irrigation Department, Govt of Karnataka, Karnataka Irrigation Department, Govt of Maharashtra, Nashik	DIRECTOR SUPERINTENDING ENGINEER (MD) EXECUTIVE ENGINEER (MD-5) (<i>Alternate</i>)
Jaiprakash Industries Ltd, New Delhi	SHRI D. G. KADKADE SHRI NARENDRA SINGH (<i>Alternate</i>)
Nathpa Jhakri Power Corporation, Shimla	SHRI R. S. CHAUHAN SHRI V. K. VERMA (<i>Alternate</i>)
National Hydroelectric Power Corporation Ltd, Faridabad	SHRI S. C. MITTAL SHRI SANTOSH KUMAR (<i>Alternate</i>)
Sardar Sarovar Narmada Nigam Ltd, Gandhinagar	SHRI G. L. JAVA SHRI S. J. DESAI (<i>Alternate</i>)
Wapcos (India) Ltd, New Delhi	SHRI S. R. NARAYANAN SHRI A. P. CHOUDHARY (<i>Alternate</i>)
BIS Directorate General	SHRI S. S. SETHI, Director & Head (WRD) [Representing Director General (<i>Ex-officio</i>)]

Member-Secretary
SHRIMATI ROSY DHAWAN
Joint Director (WRD), BIS

Bureau of Indian Standards

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This Indian Standard has been developed from Doc : No. WRD 10 (318).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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ANNEXURE-10

GOVERNMENT OF TELANGANA ABSTRACT

Municipal Administration and Urban Development Department – Engineering – HMWSSB – Hyderabad Drinking Water Source Augmentation and Musi River Rejuvenation – Godavari Drinking Water Supply Scheme Phase-II & Rejuvenation of Osmansagar and Himayatsagar with Godavari water from Kondapochammasagar to Mallannasagar – Allocation of 20 TMC water to draw from Mallanna Sagar – Orders – Issued.

MUNICIPAL ADMINISTRATION AND URBAN DEVELOPMENT (ENGG.) DEPARTMENT

G.O.Ms.No. 77

Dated: 05.07.2024

Read the following:-

1. Memo. No. 8202/Projects-IV/2016, I&CAD Department, Dated 02.12.2016.
2. Lr.No. ENC(I)/DCE-I/OT-2/AEE20/HMWSSB/2017, dt:22.07.2017.
3. Government Memo No.7785/C2/2017, MA&UD Department, Dated 24.08.2017.
4. From the MD, HMWSSB, Hyderabad, Lr.No. HMWSSB/MD /Godavari -Ph-II/KPS-OS/WaterAllocation/2024-25/172, dt: 10.05.2024.
5. U.O.No.3945/Proj-IV/A1/2024, I&CAD (Projects-IV) Department, Dated: 02.07.2024.

ORDER:

In the reference 4th read above, the Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board Hyderabad has informed that, from Godavari water 30 TMC allocation was made to Hyderabad Metropolitan Water Supply and Sewerage Board to provide drinking water supply to Hyderabad. Out of total 30 TMC allocation of Godavari water, already 10TMC is being drawn from Yellampally Barrage and balance 20TMC drawl was approved from Kondapochammasagar as per allocations made vide references 1st to 3rd read above.

2. The Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board Hyderabad, Hyderabad has further informed that, the Hyderabad Metropolitan Water Supply and Sewerage Board has formulated the proposals through M/s.WAPCOS to draw 15 TMC for Hyderabad Drinking Water Source Augmentation and Musi River Rejuvenation (Godavari Drinking Water Supply Scheme Phase-II & Rejuvenation of Osmansagar and Himayatsagar Reservoirs) and submitted the DPR to the Government.

3. A meeting was held on 24.04.2024 at Government level with I&CAD authorities and after detailed discussions, a decision was taken to allocate 20 TMC water for drawls to Hyderabad Metropolitan Water Supply and Sewerage Board from Mallannasagar instead of Kondapochammasagar stated to be as Mallannasagar has got 50 TMC storage comparing to 15 TMC storage of Kondapochammasagar.

4. Therefore, the Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board, Hyderabad has requested the Government to issue of revised allocation orders to Hyderabad Metropolitan Water Supply and Sewerage Board to draw 20 TMC water from Mallannasagar Reservoir at the earliest so as to enable Hyderabad Metropolitan Water Supply and Sewerage Board to submit the modified proposals accordingly.

5. Government, after careful examination of the matter, hereby re-allocate 20 TMC of water to Hyderabad Metropolitan Water Supply and Sewerage Board to draw from Mallannasagar Reservoir, with immediate effect.

PTO



::2::

6. The Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board, Hyderabad shall take further necessary action accordingly.

7. These orders issued with the concurrence of I&CAD (Projects-IV) Department vide their U.O. No. 3945/Proj-IV/A1/2024, Dated 02.07.2024.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

M. DANA KISHORE
PRINCIPAL SECRETARY TO GOVERNMENT

To
The Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board, Hyderabad.

Copy to:

The Engineer-in-Chief, Irrigation Department, T.G., Hyderabad.

The I&CAD (Projects-IV) Department, Dr. BR Ambedkar TG Secretariat.

OSD to Special Secretary to Hon'ble C.M.,

OSD to Principal Secretary to Government, MA&UD Department.

PS to Secretary to Government, I&CAD Department.

SF/SC.

//FORWARDED :: BY ORDER//


SECTION OFFICER

ANNEXURE-11

  											
S.No.	PIC	Dam Name	SDSO	Dam Owner	Dam Incharge	State	Large Dam	Dam Status	Created Date	Status	Action
1	TL169HH0190	Annapurna Reservoir	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	12/06/2024	Active	
2	TL169HH0191	Sri Ranganayaka Sagar Reservoir	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	12/06/2024	Active	
3	TL169HH0192	Sri Komaravelli Mallanna sagar	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	12/06/2024	Active	
4	TL169HH0193	Kondapochamma Sagar	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	12/06/2024	Active	
5	TL47LH0088	Devathlacheru, Yeldurthy	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	21/06/2024	Active	
6	TL47LH0112	Large Tank, Shamirpet	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	21/06/2024	Active	
7	TL47LH0147	Rai Rao Cheru, Narsapur	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	21/06/2024	Active	
8	TL47LH0159	Large tank, Komatoor	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	21/06/2024	Active	
9	TL47MH0001	Shanigram	Telangana	Telangana Irrigation and CAD Department	Telangana Irrigation and CAD Department	Telangana	Specified Dam	Completed and Operational	12/06/2024	Active	

Data of Specified Dams under ENC(Irrigation) Unit, Gajwel

Description	Sri Komaravelli Mallannasagar Reservoir
1. Reservoir	YES
a) Pumped Storage (Upper)	-
b) Pumped Storage (Lower)	-
c) Run of the River (Diversion)	-
d) Storage	YES
1.1. Concrete/ Masonry Dam	NA
a) Arch	-
b) Concrete Buttress	-
c) Concrete Gravity or RCC	-
d) Masonry Buttress	-
e) Masonry Gravity	-
f) Multiple Arch Masonry Buttress	-
g) Multiple Arch Concrete Buttress	-
h) Other	-
1.1.1. Spillway	NA
a) Ogee Spillway	-
b) Chute / Stepped Spillway	-
c) Tunnel Spillway	-
d) Shaft / Morning Glory Spillway	-
e) Sluice / Under-Sluice Spillway	-
f) Other	-
1.1.1.1. Energy Dissipation Structure	NA
a) Stilling Basin / Hydraulic Jump	-
b) Flip Bucket	-
c) Solid Roller Bucket	-
d) Slotted Roller Bucket	-
e) Other	-
1.1.2. Intake/ Outlet Structure (These intake/ outlet structures are those which are directly through the dam body or attached to dam body.)	NA
a) Any other purpose	-
b) Dam toe powerhouse	-
c) Environmental flow	-
d) Low level/ sluice outlet	-
e) Other	-
1.1.3. Gallery/ Shaft and Drainage (Concrete/ Masonry)	NA
a) other	-
b) foundation / drainage gallery	-
c) instrumentation / transverse gallery	-
d) access gallery	-
e) drainage shaft	-
f) elevation shaft	-
g) gate/ valve / pump operation gallery	-
h) inspection gallery	-
i) staircase gallery	-
j) sump wall	-

Description	Sri Komaravelli Mallannasagar Reservoir
k) ventilation shaft	-
1.1.4. Dam Block (Concrete/ Masonry)	NA
a) Overflow block	-
b) Non overflow block	-
c) Other	-
1.2.Embankment Dam	-
a) Others	-
b) CFRD	-
c) Earthfill	Yes
d) Rockfill	-
1.2.1. Dam reach	YES
a) Others	-
b) CFRD	-
c) Earthfill	Yes
d) Rockfill	-
1.2.2. Drain	YES
a) Chimney / inclined filter drain	Inclined Sand Filters
b) Closed cross drain	-
c) Closed longitudinal drain	-
d) Closed toe drain	-
e) Gallery drain	-
f) Horizontal drain	Horizontal Sand & Metal Filters
g) Open cross drain	Chute Drains
h) Open longitudinal drain	Longitudinal Chute Drains
i) Open toe drain	Toe-Drain
j) Other drain	-
1.2.3.Spillway	Yes
a) Ogee Spillway	YES
b) Chute / Stepped Spillway	-
c) Tunnel Spillway	-
d) Shaft / Morning Glory Spillway	-
e) Sluice / Under-Sluice Spillway	-
f) Other	-
1.2.3.1.Energy Dissipation	Yes
a) Flip bucket	-
b) Slotted roller	-
c) Solid roller bucket	-
d) Stilling basin / hydraulic jump	YES-STILLING BASIN
e) Other	-
1.2.4.Intake structure/outtake structure	Yes
a) Any other purpose	2 Nos Intake Structures-Delivery Cisterns
b) Dam toe powerhouse	-
c) Environmental flow	-
d) Low level/sluice outlet	YES
e) other	-
1.3.Saddle/ Dyke Dam	NA
a) Arch	-

Description	Sri Komaravelli Mallannasagar Reservoir
b) Concrete Buttress	-
c) Concrete Gravity or RCC	-
d) Masonry Buttress	-
e) Masonry Gravity	-
f) Multiple Arch Masonry Buttress	-
g) Other	-
1.3.1. Dam reach	NA
a) Others	-
b) CFRD	-
c) Earthfill	-
d) Rockfill	-
1.3.2. Drain	NA
a) Chimney / inclined filter drain	-
b) Closed cross drain	-
c) Closed longitudinal drain	-
d) Closed toe drain	-
e) Gallery drain	-
f) Horizontal drain	-
g) Open cress drain	-
h) Open longitudinal drain	-
i) Open toe drain	-
j) Other drain	-
1.3.3. Spillway	NA
a) Ogee Spillway	-
b) Chute / Stepped Spillway	-
c) Tunnel Spillway	-
d) Shaft / Morning Glory Spillway	-
e) Sluice / Under-Sluice Spillway	-
f) Other	-
1.3.3.1. Energy Dissipation	NA
a) Flip bucket	-
b) Slotted roller	-
c) Solid roller bucket	-
d) Stilling basin / hydraulic jump	-
e) Other	-
1.3.4. Intake structure/ outtake structure	NA
a) Any other purpose	-
b) Dam toe powerhouse	-
c) Environmental flow	-
d) Low level/sluice outlet	-
e) other	-
1.3.5. Dam block	NA
a) other	-
b) non overflow block	-
c) overflow block	-
1.4. Hydro Mechanical	YES
a) NA	
b) Other	Vertical Type Lift Gates for OT Sluices
1.4.1 Gates	YES
a) Other	-

Description	Sri Komaravelli Mallannasagar Reservoir
b) Sector or tainter gate	-
c) Caisson	-
d) Falling shutter	-
e) Fixed shutter	-
f) Mitre	-
g) Other	Vertical Type Lift Gates
h) Radial	-
i) Slide type	-
1.4.2 Hoist / cranes	YES
a) other	-
b) EOT	At Km.21.350 Sluice
c) Gantry crane	-
d) Hydraulic hoist	At Km.2.525, Km.21.350 Sluices
e) Monorail	-
f) Other	-
g) Rope drum hoist	At Km.2.525, Km.2.891, Km.4.800 & Km.21.350 Sluices
h) Screw hoist	-
1.4.3. Valves	NA
a) other	-
b) butterfly rotary valve	-
c) hollow jet valve	-
d) howell bungler valve	-
e) knife edge gate valve	-
f) needle valve	-
g) other gate valve	-
h) penstock protection valve	-
i) tube valve	-
1.4.4 Trash rock	YES
a) Fixed	At Km.21.350 Sluice
b) incline	-
c) Removable	-
d) Trash rack	-
e) Vertical	-
f) Other	-
1.4.5. River dam outlet	NA
a) Caisson	-
b) Falling shutter	-
c) Fixed wheel type	-
d) Mitre	-
e) Others	-
f) Radial	-
g) Sector or tainter gate	-
h) Slide type	-
1.4.6. Pump gallery	NA
a) Centrifugal	-
b) Other	-
c) Submersible	-
1.5 Access Road	-
a) Asphalt	-
b) Concrete	-

Description	Sri Komaravelli Mallannasagar Reservoir
c) Gravel	YES
d) Other	-
e) Unpaved	-
1.6. Instrumentation	Yes -Instrumentation Locations- Km.2.80, Km.4.80, Km.9.20, Km.11.620, Km.15.60, Km.19.050
a) Geodetic instrumentation	Yes 1.45 NAs Settlement Plates fixed.
b) Geotechnical instrumentation	Yes 1.378 NAs Peizometers of Vibrating Wire type Installed. 2.29 NAs EPC Installed. 3.38 NAs V-NATches installed.
c) Hydro meteorological instrumentation	-
d) Other (Specify)	-
f) Seismic instrumentation	-
1.7 Emergency Preparedness	YES
1.7.1 NA	
1.7.2 Other	Preparation of EAP entrusted to CWPRS, Pune
1.8 Intake/ Outlet Structure (With Power Component) (These intake/ outlet structures are those which are neither directly through the dam body nor attached to dam body. These are off taking from reservoir)	NA
1.8.1 Water Conveyance	-
a) other	-
b) circular tunnel	-
c) d shaped tunnel	-
d) horse-shoe tunnel	-
e) lined channel / canal	-
f) other	-
g) pipeline	-
h) unlined channel / canal	-
1.8.1.1. Desiltation chamber	NA
a) other	-
b) surface basin	-
c) underground chamber	-
1.8.1.2 Surge chamber	NA
a) other	-
b) surface basin	-
c) underground chamber	-
1.8.1.3 Power house	NA
a) other	-
b) surface	-
d) underground chamber	-
1.8.1.4 Turbine	NA
a) Francis	-
b) Kaplan	-
c) other	-

Description	Sri Komaravelli Mallannasagar Reservoir
d) Pelton wheel	-
e) reversible pump	-
1.8.1.5 Pumps	NA
a) centrifugal	-
b) other	-
c) positive displacement	-
d) submersible	-
e) vertical turbine	-
1.9 Intake/ Outlet Structure (Without Power Component) (With Power Component) (These intake/ outlet structures are those which are neither directly through the dam body nor attached to dam body. These are off taking from reservoir)	NO
a) Pipeline or channel	-
b) Irrigation (to tunnel	-
c) Other	-
d) Power (to tunnel	-
e) Water supply (to tunnel	-

The seepage discharges observed through V-notches on downstream side all along the bund on 08/08/2024 and 07/10/2024 are tabulated below:

Sl. No	Reach	Influence		V-Notch Location	Effective Length	Seepage	
						08/08/2024 (+531.330 m) 8.80 TMC	07/10/2024 (+541.060 m) 21.12 TMC
						Cum/d/m	Cum/d/m
1	Reach-1	Km.5.130	Km.6.500	Km.6.500	1370	0.032	0.125
2		Km.6.500	Km.7.000	Km.7.000	500	0.021	0.046
3		Km.7.200	Km.7.500	Km.7.500	300	0.013	0.013
4		Km.8.550	Km.8.000	Km.8.000	550	0.064	0.236
5	Reach-2	Km.8.550	Km.8.500	Km.8.500	50	0.000	0.000
6		Km.8.550	Km.9.050	Km.9.050	500	0.019	0.110
7		Km.9.530	Km.9.050	Km.9.350	480	0.325	0.426
8		Km.10.050	Km.9.530	Km.9.530	520	0.155	0.215
9	Reach-2	Km.10.050	Km.10.650	Km.10.590	600	0.250	0.324
10		Km.10.650	Km.11.000	Km.11.000	350	0.301	0.489
11	Reach-2	Km.11.000	Km.12.000	Km.11.800	1000	0.060	0.134
12		Km.12.000	Km.12.200	Km.12.200	200	0.275	0.335
13		Km.12.200	Km.12.500	Km.12.230	300	0.150	0.316
14	Reach-3	Km.12.500	Km.13.250	Km.13.000	750	0.259	0.428
15		Km.14.375	Km.13.250	Km.13.500	1125	0.133	0.231
16		Km.14.925	Km.14.375	Km.14.600	550	0.100	0.332
17		Km.14.925	Km.15.665	Km.15.665	740	0.231	0.314
18		Km.16.325	Km.15.675	Km.15.675	650	0.114	0.247
19		Km.16.325	Km.16.485	Km.16.485	160	0.000	0.344
20	Km.16.650	Km.16.540	Km.16.540	110	0.000	0.000	
21	Reach-4	Km.16.875	Km.17.425	Km.17.175	550	0.000	0.064
22		Km.17.425	Km.18.450	Km.18.450	1025	0.000	0.008
23		Km.18.460	Km.18.714	Km.18.460	254	0.000	0.033
24		Km.18.714	Km.18.840	Km.18.840	126	0.000	0.066
25		Km.19.050	Km.18.855	Km.18.855	195	0.026	0.093
26		Km.20.655	Km.19.050	Km.19.050	1605	0.010	0.070

The V-notch readings are being observed daily, the data is recorded and analysed. As per the "GEOTECHNICAL SEEPAGE AND STABILTY STUDIES FOR ZONED EARTH DAM OF MALLANNASAGAR RESERVOIR" by Central Water & Power Research Station (CWPRS), Pune the permissible seepage through earth dam of height more than 40 m should be ideally less than 0.4 m³/day/m and in any case not more than 0.8 m³/day/m. Seepages observed through all the V-Notches are within the permissible limits.

**GOVERNMENT OF TELANGANA
IRRIGATION AND CAD DEPARTMENT**

From

Sri.S.Venkateshwar Rao, B.E.,
Executive Engineer,
Irrigation Division No.6
Gajwel, Siddipet District.

To

The Director
Central Water and Power Research
Station, Khadakwasla Pune. Maharashtra.
411024.

Lr.No.EE/Irrg/D6/DB/2024-25/ 306

Date: 21.10.2024.

Sir,

Sub: I&CAD Dept-Preparation of Emergency Action Planning for Sri Komaravelli Mallanna Sagar Reservoir, Telangana-Submission of Demand Draft (D.D) No.552000 Dated:21.10.2024-Reg

Ref: 1. Engineer-in-Chief (I), Gajwel Dam
Lr.No.ENC(I)/GJL/DCE/DEE4/AEE1/SKMS/Vol.II/2024/365 Dt:20.04.2024.
2. CWPRS Lr.No.TC/DMP/2024/251/169 Dt:06.03.2024.

With reference to the subject cited, it is to submit that The Engineer-in-Chief(I), Gajwel has requested the CWPRS, Pune for Preparation of Emergency Action Plan for Sri Komaravelli Mallannasagar reservoir vide reference 1st cited. In response, the CWPRS, Pune vide reference 2nd cited have submitted the proposal for the Preparation Emergency Action Plan and requested to deposit an amount of Rs.12,63,520/-.


In this regard, I am herewith submitting the Demand Draft (D.D) No.552000 Dated:21.10.2024 of Rs.12,63,520/- in favour of Director, CWPRS, Pune payable at Pune towards Preparation Emergency Action Plan of Sri Komaravelli Mallannasagar reservoir.

Hence, it is requested to acknowledge the receipt of this letter along with Demand Draft.

Encls:

1. Demand Draft (D.D) No.552000
Dated:21.10.2024 of Rs.12,63,520/-

Yours Faithfully


Executive Engineer
Irrigation Division No.6
Gajwel
21/10/24

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21102024
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OR ORDER

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K. MANJULA
K. SAKSHI KUMAR
PF No. 5539730
BRANCH MANAGER

Court Street Br-20107 SRD

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ANNEXURE-14

Guidelines for Preparing Operation and Maintenance Manual for Dams

Doc. No. CDSO_GUD_DS_03_v1.0

January 2018



Central Water Commission
Ministry of Water Resources,
River Development & Ganga Rejuvenation
Government of India



Government of India
Central Water Commission
Central Dam Safety Organization

Guidelines for Preparing Operation
and Maintenance Manual for Dams

January 2018

Dam Safety Rehabilitation Directorate
3rd Floor, New Library Building
R. K. Puram
New Delhi - 110066

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GOVERNMENT OF TELANGANA
ABSTRACT

COMMISSIONS – Commission of Inquiry under the Commissions of Inquiry Act, 1952 (Central Act 60 of 1952) – Appointment of Justice Sri Pinaki Chandra Ghose, Former Judge of Supreme Court of India to conduct Judicial Inquiry on certain allegations of irregularities and embezzlement of public funds by corrupt practices in constructing the barrages of Medigadda, Annaram and Sundilla of Kaleshwaram Project – Orders – Issued.

IRRIGATION AND CAD (Projects-IV) DEPARTMENT

G.O.Ms.No.6,

Dated:14/03/2024

ORDER:

The Hon'ble Supreme Court of India has time and again held that Government contracts involve expenditure out of the public exchequer. Therefore, the moneys expended must not be spent arbitrarily. The procurements should be made at best price and the process should be transparent. The State does not have absolute discretion while spending public money. All government actions including government contracts awarded by the State must be tested on the touchstone of Article 14 and the process must not be discriminatory.

2. In the year 2015, the Government of Telangana proposed to construct the Kaleshwaram Lift Irrigation Project at an estimated cost of approximately 81,911 Cr. to irrigate a new ayacut of 19.63 lakh acres besides stabilization of ayacuts under existing projects, and supply of water to industries and drinking water purposes. Kaleshwaram Project envisages construction of 3 Barrages across river Godavari at Medigadda, Annaram & Sundilla, and lifting water in reverse direction through a system of large pumps, pressure mains and gravity canals into the existing Yellampally Project. From there onwards, Kaleshwaram Project is almost similar to Dr.B.R.Ambedkar Pranahita-Chevella Sujala Sravanthi Project with enhanced capacities of Reservoirs and distributary system.

3. The works of Construction of Medigadda Barrage were entrusted to M/s.L&T-PES JV with final estimate of the Barrage approved for Rs.4613.00 Crores. Annaram barrage works were entrusted to AFCONS-VIJETHA-PES JV with final estimate approved for Rs. 2734.81 Crores. Sundilla barrage works were entrusted to M/S NAVAYUGA- GMW JV and final estimate was approved for Rs. 2111.10 Crores.

4. Kaleshwaram project was planned to be entirely based on loans raised by a newly formed SPV, The Kaleshwaram Irrigation Project Corporation Ltd. (KIPCL). Loans to a tune of Rs. 87,449.16 Crores were sanctioned from Banks and Financial Institutions of Govt. of India resulting in principal repayment and interest commitment of Rs. 12,826 Crores to Government per year.

5. Since the project envisages lifting of a huge quantity of water through multiple stages, the cost of power burden if the project is run at full capacity works out at a prohibitive cost of Rs. 10,374.56 Crores per annum.

6. On 21.10.2023, some of the piers of Medigadda Barrage sank into the river bed.

7. On 22.10.2023, National Dam Safety Authority (NDSA) constituted a committee to examine the reasons for sinking of the piers of Medigadda (Lakshmi) Barrage. The NDSA committee inspected Medigadda Barrage on 24.10.2023 and communicated the report to Government on 01.11.2023. The broad findings of the Committee are *inter alia* as follows

- i) The Committee reported that the Piers had sunk due to a combination of issues involving lacunae and negligence in planning, design, quality control and Operation and maintenance (O&M) of the barrage.
- ii) The Committee further opined that the distress condition developed is adversely affecting the functionality of the barrage. The barrage under the present condition is rendered useless until fully rehabilitated.
- iii) The Committee was of the view that, filling the reservoir in the present condition would worsen the barrage's health and should not be resorted to.
- iv) The Committee observed that the two barrages constructed upstream of Medigadda under the Kaleshwaram Project, viz: Annaram and Sundilla barrages, have similar design and construction methodologies, making them prone to similar failure modes.

8. It is also apparent from the Report that after the inauguration of the Project no operations and maintenance was carried out by either the private Agency or by the concerned Department. In fact such acts are even against the Standard Clauses which were in relation to the maintenance of a Dam.

9. It has also come to light through certain reports that during the construction of the dam, certain deviations were approved without appropriate inspection notes. It appears that even the Defect Liability Period was changed even when work was pending. The facts which have surfaced by the way of Reports indicate that the Government Departments and even the private agency were negligent in undertaking their responsibilities towards *inter alia* construction and repair and upkeep of the dam which has resulted into damages. It is *prima facie* indicated that certain deliberate *omissions and commissions* on part of functionaries have happened which has resulted into the present situation.

10. The deviations in the Standard contract and the manner in which certain aspects of the project construction of certain blocks were undertaken indicate that interests of general public and state exchequer has been compromised to favour a select few.

11. From the content of the report, and the visible evidence of the damage that has occurred to the structure, it appears that certain irregularities, lack of proper care to ensure quality work, gross negligence in execution and monitoring of the work, and other malpractices, lacunae have taken place in the construction of the barrages at Medigadda, Annaram and Sundilla, leading to major losses to the public exchequer.

12. The casual approach towards the upkeep and safety of the dam itself compels the Government to look into the entire conspectus of events and get to the root of the matter.

13. Therefore, Government of Telangana is of the opinion that it is necessary to appoint a Commission of Inquiry to inquire into the events and circumstances connected with the construction of the barrages at Medigadda, Annaram and Sundilla into the said allegations of irregularities resulting in huge losses to the public exchequer.

14. The following Notification shall be published in an Extraordinary issue of the Telangana State Gazette, dated: 14/03/2024.

NOTIFICATION - I

WHEREAS Government of Telangana is of the opinion that it is necessary to appoint a Commission of Inquiry to inquire into the events and circumstances connected with the construction of the barrages at Medigadda, Annaram and Sundilla into a definite matter of public importance herein after specified.

2. Now, THEREFORE, in exercise of powers conferred by Section 3 of the Commissions of Inquiry Act, 1952 (Central Act No.60 of 1952), the Government of Telangana hereby appoint Justice Sri Pinaki Chandra Ghose, Former Judge of Supreme Court of India, as Commission of Inquiry to conduct Judicial Inquiry on certain allegations of irregularities and embezzlement of public funds by corrupt practices in constructing the barrages of Medigadda and Annaram Reservoirs of Kaleshwaram Project.

3. The above Commission of Inquiry shall have the following Terms of Reference for inquiry:

- i. To enquire into the negligence, irregularities and lacunae in Planning, Designing and Construction of Medigadda, Annaram and Sundilla Barrages.
- ii. To enquire into the manner of award and execution of Contract including but not limited to deviations in the contract and following of the strict financial discipline in the execution of such Contract.
- iii. To enquire into the negligence and lacunae in Operation & Maintenance of three barrages by the agencies concerned and the Department, thereby leading to major damage to the structure.
- iv. To enquire into the Quality Control & Monitoring aspects, negligence and other malpractices by the agencies/ contractors and the Department
- v. To enquire, identify and fix up responsibilities for any authority/ official who extended undue favours to the Agencies/ contractors in terms of allowing unjustified EOTs (extension of time), wrong Completion of work certificates, premature releasing of Bank Guarantees, and such other matter.
- vi. The Commission shall fix responsibilities for the lapses identified by it during its enquiry into the above matters and financial implications on the lapses identified.
- vii. Any other matter that might be referred by the Government at a later date.

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4. The Commission will hold its sittings at Hyderabad and will complete its Inquiry and report to State Government by 30th June, 2024.
5. The Engineer-in-Chief (General) Irrigation & CAD Dept. shall make arrangements for the remuneration, office accommodation, mobility, staff, communication and other necessary infrastructure to conduct the said Inquiry.
6. All the officers concerned shall hand over immediately all requisite documents and material evidence to the Commission of Inquiry.

NOTIFICATION - II

Whereas, the Government of Telangana are of the opinion having regard to the nature of the inquiry to be made by the Commission and other circumstances of the case that all the provisions of Sub-Sections (2), (3), (4) and (5) of Section 5 of the Commission of Inquiry Act, 1952, should be made applicable to the Commission appointed in the Notification - I above.

2. Now, Therefore, in exercise of the powers conferred by sub-section (1) of Section 5 of the said Act, the Government of Telangana hereby direct that all the provisions of the sub-sections (2), (3), (4) and (5) of Section 5 of the Commissions of Inquiry Act, 1952 shall apply to the Commission.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

**RAHUL BOJJA
SECRETARY TO GOVERNMENT**

To
The Commissioner of Printing, Stationery & Stores Purchase (Pub.Wing),
Hyderabad (for publication of the Notification in an extraordinary issue of
Telangana State Gazette,
Dated: 14/03/2024 and to supply 100 copies of the same).

Justice Sri Pinaki Chandra Ghose,
Former Judge of Supreme Court of India.

Copy to:

The Registrar General, High Court for the State of Telangana, Hyderabad.
The Director General of Police, Telangana State, Hyderabad.
The Addl. DGP (Intelligence), Telangana State, Hyderabad.
The Director, Information & Public Relations Dept., Telangana, Hyderabad.
The Engineer in Chief (General), I & CAD Department
The Chief Engineers concerned through E in C (General), I & CAD Dept.
The I & CAD Department.
The Finance Department.
The Law Department.
The Accountant General (A&E), Telangana, Hyderabad.
The Pay and Accounts Officer, Telangana, Hyderabad.
The PS to CS / Prl. Secy. to CM / Secretary, I & CAD Dept/ Secretary(Poll.),
General Administration (Spl. L&O)Department.
SF/SC.

// FORWARDED : : BY ORDER //


SECTION OFFICER

ANNEXURE-17

GOVERNMENT OF TELANGANA ABSTRACT

COMMISSIONS – Appointment of Justice Sri Pinaki Chandra Ghose, Former Judge of Supreme Court of India to conduct Inquiry on Medigadda, Annaram and Sundilla Barrages of Kaleshwaram Project –Extension of term for two months (i.e., from 1st November 2024 to 31st December 2024) – Notification – Issued.

IRRIGATION AND CAD (Projects-IV) DEPARTMENT

G.O.Ms.No.29

Dated: 12-11-2024
Read the Following

1. G.O.Ms.No.6, I & CAD (Projects-IV) Department, Dated:14.03.2024.
 2. G.O.Ms.No.14, I & CAD (Projects-IV) Department, Dated: 29.06.2024.
 3. G.O.Ms.No.20, I & CAD (Projects-IV) Department, Dated: 28.08.2024.
- &&&&

ORDER:-

In the G.O. 1st read above, Government have appointed Justice Pinaki Chandra Ghose, Former Judge of Supreme Court of India as Commission of Inquiry to conduct Inquiry on certain allegations of irregularities in constructing the barrages of Medigadda, Annaram and Sundilla of Kaleshwaram Project and to complete its inquiry and report to State Government by 30th June 2024.

2. In the G.O. 2nd read above, the term of the Commission of Inquiry has been extended till 31st August 2024. Further, in the G.O. 3rd read above, the term of the Commission of Inquiry has been extended till 31st October 2024.

3. Government after examination, hereby issues the following Notification to be published in an Extraordinary issue of the Telangana State Gazette, dated: 12 -11-2024.

NOTIFICATION

The term of the Commission of Inquiry constituted vide G.O.Ms.No.6, I & CAD (Projects-IV) Department, Dated: 14.03.2024, is hereby extended for two months from 1st November 2024 to 31st Decemebr 2024. The Commission will hold its sittings at Hyderabad and will complete its Inquiry and submit report to State Government by 31st December, 2024.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

RAHUL BOJJA
SECRETARY TO GOVERNMENT

To

The Commissioner of Printing, Stationery & Stores Purchase (Pub.Wing), Hyderabad
(for publication of the Notification in an extraordinary issue of Telangana State
Gazette, Dated:12.11.2024 and to supply 100 copies of the same).

The Justice Sri Pinaki Chandra Ghose, Former Judge of Supreme Court of India.

Copy to:

The Registrar General, High Court for the State of Telangana, Hyderabad.

The Director General of Police, Telangana State, Hyderabad.

The Addl. DGP (Intelligence), Telangana State, Hyderabad.

The Prl. Secy. to Chief Minister

The Director, Information & Public Relations Dept., Telangana, Hyderabad

(P.T.O.)

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The Engineer in Chief (General), I & CAD Department
The Chief Engineers concerned through E in C (General), I & CAD Dept.
The Finance Department.
The Law Department.
The Accountant General (A&E), Telangana, Hyderabad.
The Pay and Accounts Officer, Telangana, Hyderabad.
The PS to Chief Secretary to Government
The PS to Hon'ble Minister for I&CAD, Food & Civil Supplies
The PS to Secretary to Government, I & CAD Department
The PS to Secretary to Government (Poll.), GAD Department
The P.A. to Special Secretary to Government, I&CAD Department.
General Administration (Spl. L&O) Department.
SF/SC.

// FORWARDED : : BY ORDER //

S Shirvesha
SECTION OFFICER