

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,
Principal Bench, New Delhi
In
Original Application No. 110/2019**

In the Matter of: -

Dr. Ponguleti Sudhakara Reddy

Vs.

Applicant

State of Telangana

Respondent

Index

S. No.	Particulars	Page No.
1.	Report of the committee in compliance to Hon'ble NGT, PB order dated 20.02.2020 in the matter of O.A. No. 110/2019 titled as Dr. Ponguleti Sudhakara Reddy Vs. State of Telangana.	
2.	Annexure-I: A copy of Hon'ble NGT order dated 20.02.2020.	
3.	Annexure-II: Copy of the affidavit filed by Central Water Commission in the matter of I.A. No. 1572 and 1578 of 2006 and I.A. No. 2190/2008 in Writ petition (C) No. 202 of 1995.	
4.	Annexure-III: Copy of minutes of inter-state meeting held at CWC on 29.10.2007.	
5.	Annexure-IV: Copy of the backwater study carried out by CWC using Mike-11.	
6.	Annexure-V: The clarification given by CWC to the Department related Parliamentary Standing Committee on Home Affairs.	
7.	Annexure-VI: Contour-wise submergence of villages in Andhra Pradesh from Polavaram Irrigation project Head works.	



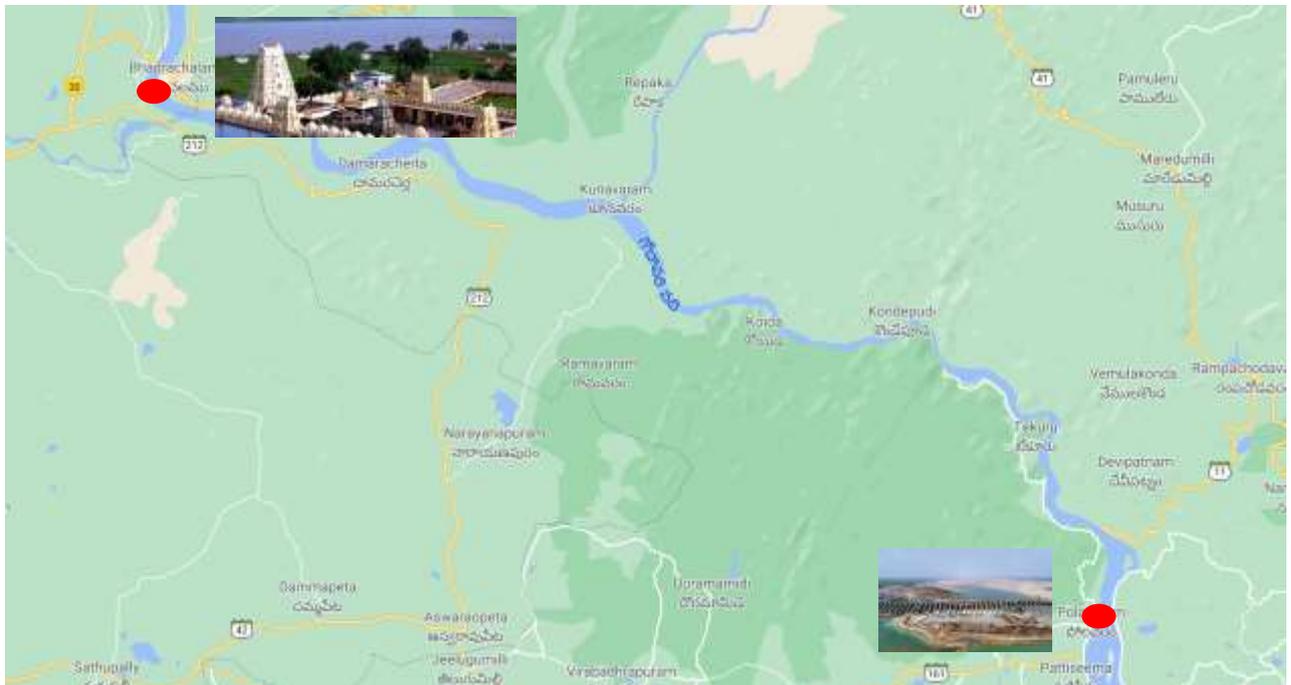
(N. K. Gupta)
Scientist 'E'

Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar
Delhi-110032

Place: Delhi

Date: 8th September, 2020

REPORT OF THE COMMITTEE COMPRISING OF CENTRAL POLLUTION CONTROL BOARD, ADDITIONAL PCCF, TELANGANA STATE POLLUTION CONTROL BOARD AND REPRESENTATIVES OF DISTRICT COLLECTOR, KHAMMAM IN THE MATTER OF O.A. NO. 110/2019(PB), IN COMPLIANCE TO HON'BLE NGT ORDERS DATED 20.02.2020.



Submitted to

**HON'BLE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, DELHI**

I Preamble

Hon'ble National Green Tribunal, Principal Bench has registered an application OA 110/2019 based on the complaint received by post from Dr. Ponguleti Sudhakar Reddy, MLC. The application is against Polavaram project regarding submergence in Bhadrachalam and displacement of hundreds of families without any plan for rehabilitation. The case came up for hearing before the Hon'ble Tribunal on 26.03.2019, 27.09.2019, 07.11.2019 and 20.02.2020. Hon'ble NGT, Principal Bench vide order dated 20.02.2020 has constituted a committee comprising of representatives of CPCB, Additional PCCF, Telangana State Pollution Control Board and District Collector, Khammam to examine the issues raised in the complaint. The main allegations made in the representation are as follows:

1. Submergence and effect on people is going to increase from 286 habitations to 371 habitations and 44,000 families to 1.05 lakhs families respectively. Project displace persons are about 60-70% are from backward tribes such as Koya, Kondreddy etc but there is no plan for their rehabilitation
2. Displacement of people in Telangana, Odisha and Chhattisgarh are not considered by Central Government and Andhra Pradesh.
3. The irrigation potential is increased from 7.2 lakhs acres to 15 lakh acres which requires increased storage of water in the reservoir which will result in more submergence.
4. Though Polavaram project is a national scheme, several changes were made without the consent of Central Government and upstream states. Hence this cause submergence and displacement of people in Telangana, Odisha and Chhattisgarh more particularly on Seetaramaswami temple, Bhadradri Kothagudem district

II Orders of the Hon'ble Tribunal

The Hon'ble NGT, Principal Bench vide order dated 20.02.2020 has directed as follows:

“Since this Tribunal has already constituted a four member joint Committee comprising of representatives of CPCB, Additional PCCF, State PCB and District Collector, Khammam in Original Application No. 857/2018, Dr. Pentapati Pulla Rao v. Union of India & Ors. concerning the same project, the same Committee may look into the grievance of the applicant and give a separate report by email at judicial-ngt@gov.in by the next date of hearing. The CPCB will be the nodal agency for compliance and coordination.”. Copy of the Hon'ble NGT order is placed as Annexure-I.

III Composition of the Committee

As directed by the Hon'ble Tribunal, the committee was constituted comprising of following members:

S.N	Name of The Member	Organization	Organization representing
1.	Sh. Venkateshwar Reddy	Executive Engineer, Irrigation Department, Kothagudem	District Collector, Bhadradri Kothagudem (Khammam)
2.	Sh. V. Ravi Shankar	Environmental Engineer Telangana State Pollution Control Board, Regional Office, Kothagudem	
3.	Dr. C. Palpandi	Scientist-C, Ministry of Environment Forest and Climate Change, Regional Office, Chennai	Additional PCCF
4.	Sh. G. Hanumantha Reddy	Senior Environmental Engineer, Telangana State Pollution Control Board, Zonal Office, Hyderabad	Telangana State Pollution Control Board
5.	Smt. Mahima T, Scientist-D	CPCB, Chennai (Nodal agency)	CPCB (Co-ordinator)

IV Scope of the Committee

The Committee has been vested with the mandate to examine the following aspects:

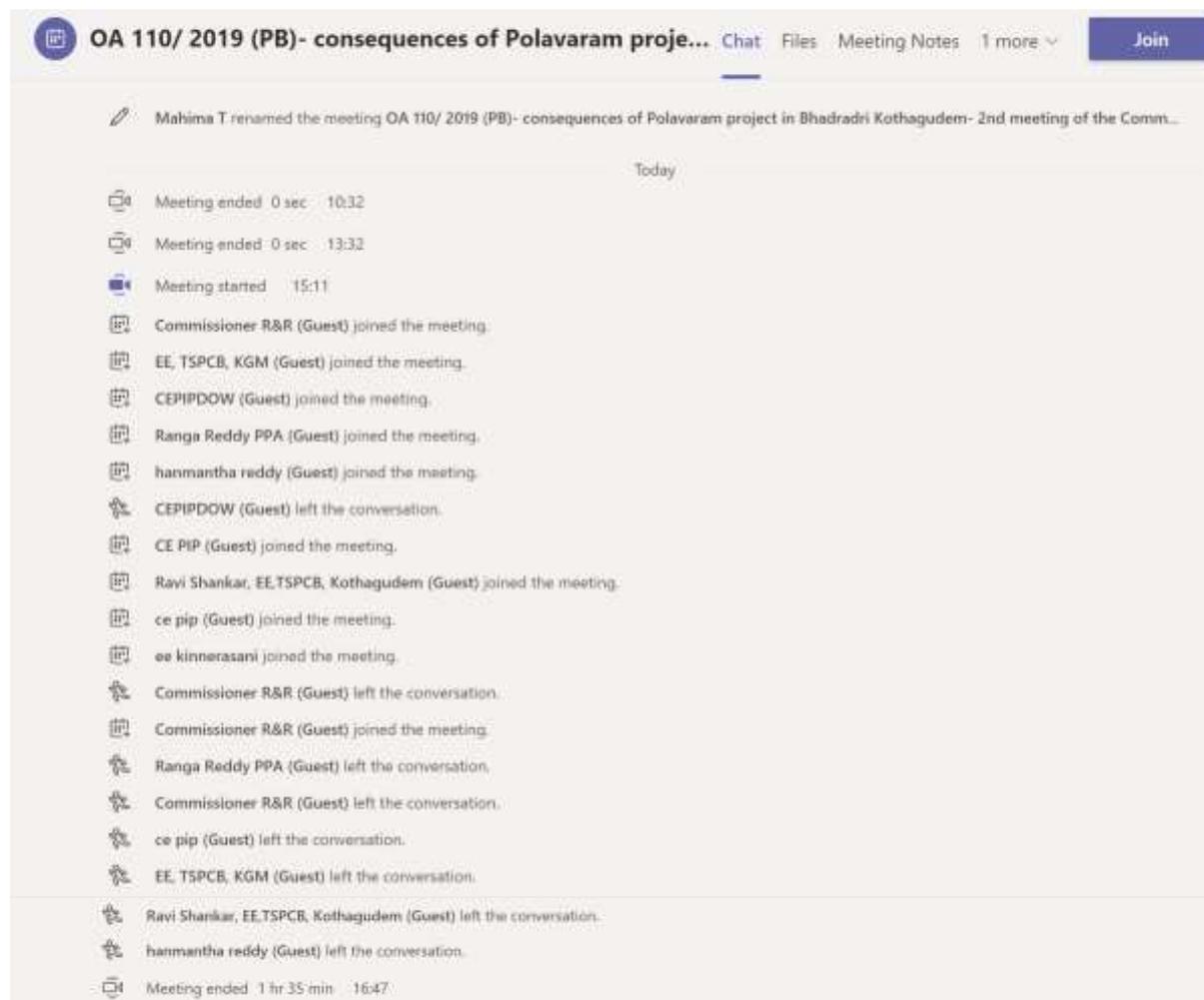
1. To verify whether Polavaram project Authority have increased the maximum flood discharge from 36 lakhs cusecs to 50lakhs cusecs and relevant studies carried out and parameters considered for the study.
2. To verify whether the irrigation potential is increased from 7.2 lakhs acres to 15 lakh acres which requires increased storage of water in the reservoir which will result in more submergence
3. To obtain data on the Total no. of Project affected villages cum habitations cum families.

V Committee Meeting

The committee convened its first meeting online on 06.08.2020. Sh. Venkateshwar Reddy, Executive Engineer, Irrigation department briefed about the complaint and also informed the committee about impacts the state of Telangana is anticipating post completion of the

Polavaram project and when it is in full-fledged operation. During the first meeting, it was clear to the committee that the state of Telangana is anticipating the impacts of submergence of Bhadrachalam town and Sh. Seetharamaswamy temple due to alleged increase in the maximum flood discharge from 36 lakhs cusecs to 50 lakhs cusecs of Polavaram project. Sri G. Hanumantha Reddy, SEE, TSPCB, and Sri V. Ravi Shankar, EE, TSPCB have reported that apprehensions and issues raised by the Irrigation Department, Kothagudem are to be addressed by the Polavaram Project Authority particularly in submergence area and in surroundings of Bhadrachalam town due to flood to be caused by proposed increase of flood discharge by the proposed Polavaram project.

In order to clarify the apprehensions & allegations made in the representation and whether MFL is increased from 36 lakh cusecs to 50 lakh cusecs, the committee convened second meeting with PPA, WRD, Govt of AP, R& R Commissioner on 24.08.2020. WRD, Govt of AP made a presentation to the committee and explained the salient details of the Polavaram project. The committee discussed about the impacts likely to arise in Bhadrachalam town post completion of the project. The members present during the second meeting is as follows:



VI About Polavaram Project

Polavaram Project (also known as Indira Sagar Polavaram project) is a multi-purpose National Project on the Godavari River in the West Godavari District and East Godavari District in Andhra Pradesh with an assessed Culturable Command Area of 2.91 lakh hectares and power generation potential of 960 Mega Watt (MW). It also has a provision for supply of 23.44 thousand Million Cubic Feet (TMC) water as delinking water supply to Vishakhapatnam Steel Plant. An inter basin transfer of 80 TMC water annually to Krishna river basin is also envisaged.

The total capacity of reservoir is 194TMCft at FRL 150 ft MSL and active capacity is 175 TMCft at 25.4m MSL at crest level of spillway and inactive capacity is 19 TMCft (below 25.4 m MSL). Catchment area is 307,800 km² (118,800 sq mi) and maximum water depth is 32.08 m at FRL 150 ft MSL.

Table 1: salient features of spillway and reservoir

Hydraulic details of Spillway		
Sl.No	item	Specifications
1	Length of spillway	1118.90m (end to end including NOF & key blocks)
2	Type of gates	Radial crest gates
3	No. of gates	48
4	Size of gates	16m x 20m
5	Maximum flood discharge	1.02 lakh Cumecs (36 lakh cusecs)
6	PMF	1,41,435 Cumecs (Approximately 50 lakh cusecs)
7	Sill level Crest level	+25.72m
8	Full reservoir level	+45.72m
9	Radial gates	48 no.s
10	Size	16m x 20m (W x H)
11	Road bridge over spillway	9.675m wide & level +54.00m
Details of Reservoir		
12	Total capacity	194 TMCft at FRL 150 ft MSL
13	Active capacity	175 TMCft (at 25.4m MSL crest level of spillway)
14	Inactive capacity	19 TMCft (below 25.4 m MSL)
15	Catchment area	307,800 KM ²
16	Surface area	600 KM ² (230 sq mi)
17	Maximum water depth	32.08 m at FRL 150 MSL

Stilling basin		
18	Total length	110m
19	Invert level	+9.25m
20	Invert level of end sill	+14.00m
21	Maximum water level in basin	+33.49m

The project comprises of the following:

1. 2310 meter long Earth & rock fill dam with gross storage of 5.91 BCM at FRL +150 ft and an 897.50 Km long gated spillway
2. A left main canal (LMC) system with 181.50 KM long main canal
3. A Right main canal system (RMC) with 174 Km long main canal
4. Power house of capacity 960 MW.

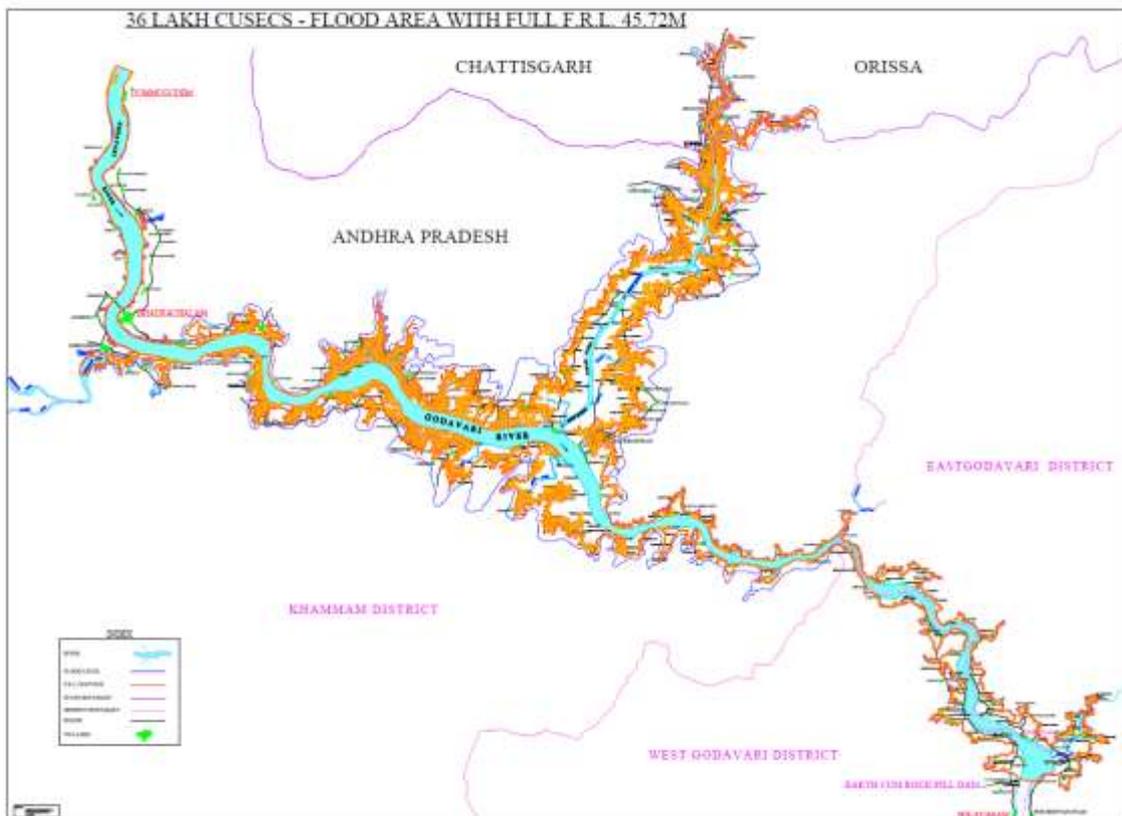
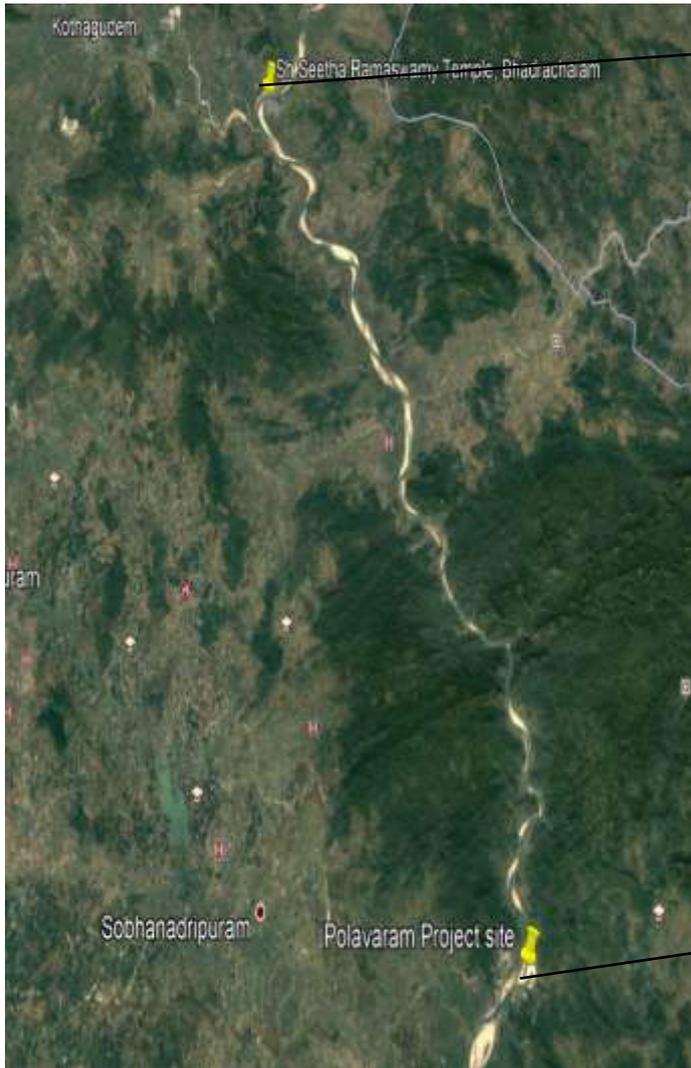


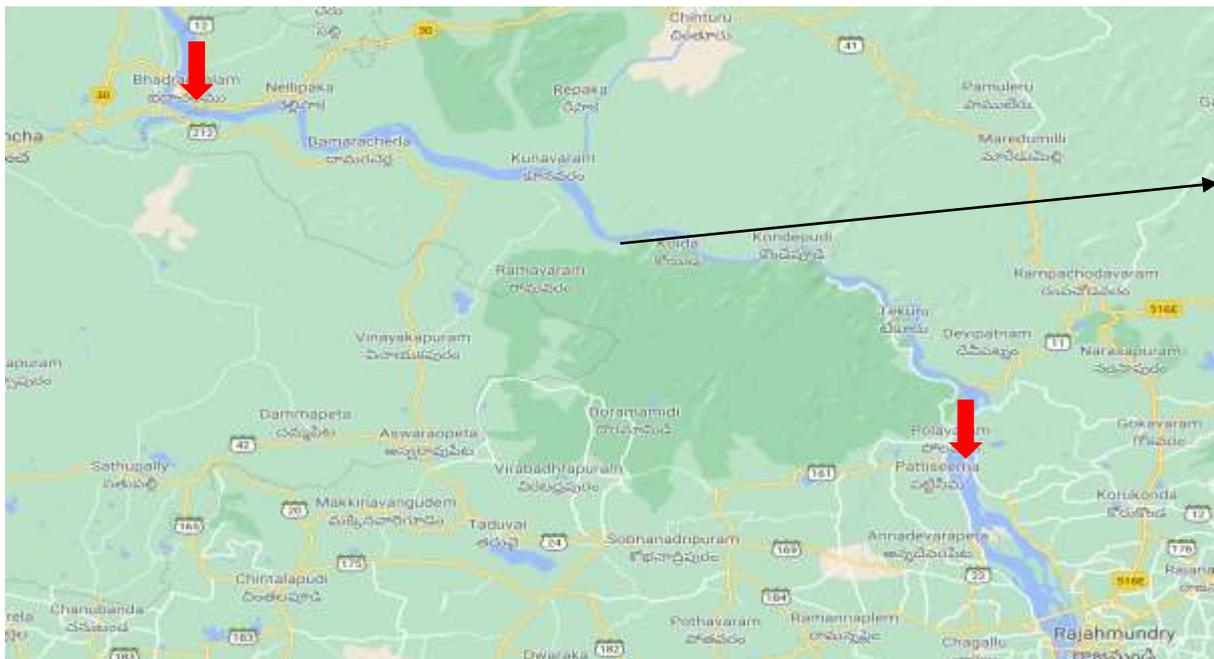
Figure 1: Inundation map of the Polavaram project



Bhadrachalam temple is at an average elevation of about 62m and town is at average elevation of 55m



Polavaram project site is at elevation of about 45.72m at FRL lower than Bhadrachalam



River Godavari

Figure 2: Satellite images Bhadrachalam and project site

VII Summary of Allegations made in the application and anticipated Impacts by State of Telangana in Bhadrachalam and Clarifications given by Polavaram Project Authority and Water Resource Department, Govt of AP, Review of available documents by the committee and observations of the committee

The state of Telangana is anticipating impacts from Polavaram project to occur in Kothagudem district and the committee members Sh. Venkateshwar Reddy and Sh. Ravishankar are representing District Collector Kothagudem. The committee first listed out the issues or impacts anticipated by state of Telangana and then interacted with Polavaram Project Authority, WRD, Govt of A.P, R & R Commissioner and reviewed the documents such as backwater study carried out by CWC, relevant portions of interstate agreement, relevant portions of AP reorganization Act, 2014 where state of Telangana has accorded consent for Polavaram project, affidavit filed by CWC, clarifications given by CWC to parliamentary standing committee. The Committee has summarized the issues raised in complaint, other issues not mentioned in the complaint but anticipated to occur in Telangana, discussions and review of documents in sections VIIa to VIII.

VII.a Issue 1: The scope of the Polavaram Project has been revised after obtaining sanction from CWC and EC from MoEF & CC. Several changes were made without the consent of Central Government and upstream states

Clarification given by WRD, Govt of AP:

- a. The Polavaram Irrigation Project is being constructed strictly in accordance with the provisions of Interstate agreement Dt. 02.04.1980 and with GWDT Award 1980. The scope of the Project (FRL/MWL +45.72 Mts., Gross storage capacity at FRL 194.60 TMC and the ayacut under the project 7.20 Lakh acres) have not been changed during construction.
- b. Hon'ble Supreme Court of India on the specific request of the state of Odisha, during hearing of OS.4/2007, appointed a committee of CWC officials along with an external expert Shri M. Gopala Krishnan to study whether the dam in question is being constructed as per the GWDT Award-1980 or not The CWC team and independent expert Sri M. Gopala Krishnan appointed by Hon'ble Supreme Court visited the Project site, held discussion with the technical team of the states of Odisha, Andhra Pradesh, Karnataka and Chhattisgarh on 23rd and 24th of May 2011 and submitted

their report to Hon'ble Supreme Court and in their report made the following observation:

- “The team comprising the members of the Central Water Commission including Supreme Court nominated External Expert as an associate is fully satisfied that the planning of the Polavaram Project and limited construction activities seen so far at the Polavaram dam site are in tune with approved project and GWDT provisions”.

Observations of NGT Committee:

Copy of the affidavit filed by Central Water Commission in the matter of IA No. 1572 and 1578 of 2006 and IA No. 2190/2008 in Writ petition (C) No. 202 of 1995 is placed as Annexure-II where CWC has clarified that “ the matter of design of the dam and its operation schedule is left to the Central Water Commission which it shall decide keeping in view all the agreements between the parties, including the agreement dated 2nd April, 1980 as far as practicable; and if there is to be any change in the operation schedule as indicated in the Agreement dated 2nd April, 1980 it shall be made only after consultation with the States of Andhra Pradesh, Madhya Pradesh and Orissa. The design aspects shall, however be left entirely to the Central Water Commission.

The committee is of the opinion that the scope of the Project has not been changed.

VII.b Issue 2: Increase in maximum flood discharge from 36 Lakhs Cusecs to 50 Lakh Cusecs

Clarification given by WRD, Govt of AP:

- a. The Spillway of Polavaram Irrigation Project is to be designed for a flood discharging capacity of 36.0 Lakh Cusecs (which is corresponding to 1 in 500 year return period flood) in accordance with the provisions of the Interstate Agreement Dt. 02.04.1980 and GWDT Award 1980.
- b. But as per provisions of BIS Code-11223-1985 spillway shall be checked for safety of the structure for a flood discharge corresponding to PMF. Accordingly, the structural safety of the Spillway of PIP has been checked for the PMF of 1,41,535 Cumecs (i.e.50 Lakh Cusecs).
- c. As per the Rashtriya Bhar Ayog(RBA), 1980 the recommended floods are 1 in 100 years return period flood for protection of urban areas and 1 in 25 years return period for rural areas.

- d. However as per Inter State agreement Dt. 02.04.1980 and GWDT award 1980, the Back Water Studies for PIP are to be carried out for a flood of 36 Lakh Cusecs. Accordingly, the Back water Studies were carried out for a flood of 36 Lakh Cusecs at a pond level not exceeding RL +140 ft., (+42.67 Mts.) as specified in the interstate agreement.
- e. Besides this, it was also ensured that the Operation schedule prescribed in the above Interstate Agreement dated 02.04.1980 has been fulfilled in the present design of Spillway.
- f. The CWC, submitted an affidavit before the Hon'ble Supreme Court, New Delhi in I.A.No.1572 and 1578 of 2006 and submitted as follows.
- The agreement dated 02.04.1980 between the States of Andhra Pradesh, Madhya Pradesh & Orissa has been made a part of the Award. As per agreement the Polavaram Project spillway should be designed for a flood discharge capacity of 36 lakh cusecs at Pond level of +140 ft. (+42.67 Mts.) & draws a spillway regulation schedule for discharge upto 36 lakh cusecs.
 - As per criteria laid down in BIS (Bureau of Indian Standard) code 11223-1995 "fixing the Spillway Capacity of the Dam", Polavaram Dam comes under the category of large dam and is required to be designed for Probable Maximum Flood (PMF). CWC has estimated PMF for Polavaram Project as 141535 Cumecs (about 50 lakh cusecs) and recommended it as the design flood for the project. This is required to ensure safe passage of flood-during an extreme event and thereby ensuring safety of the Dam. While recommending the design flood, CWC also indicated limitation of the study & made suggestions for review of design flood for upstream projects as is the usual practice.
 - However, PMF is not to be used for estimation of submergence due to backwater effects. The Rashtriya Bhar Ayog (RBA) 1980 has recommended for 1 in 100 year return period flood for protection of urban area and 1 in 25 year return period flood for rural areas. Therefore, the backwater studies carried out for a discharge of 36 lakh cusecs which corresponding to 1 in 500 year return period flood is much on higher side than norms of RBA.
- g. The Project Authority has carried out the study using Standard Step Method, CWC also carried also carried out an independent study using MIKE 11 model which is technically superior. On comparison of the results of the two studies, it has been noted

that the study conducted by the Project Authority shows higher backwater profile by about 3 meter Orissa / Chhattisgarh territory which is more on the conservative side.

- h. The Polavaram Irrigation Project has been envisaged to feed irrigation water to an ayacut of 7.2 Lakh Acres. There is no change in the ayacut proposed to be irrigated under the Project.
- i. During the inter-state meeting held at Central Water Commission on 29.10.2007, CWC has clarified that
- j. “In accordance with BIS code on fixation of spillway capacity the design inflow flood adopted for the dam is PMF (about 50 lakh cusecs) and not 36 lakh cusecs which was 1 in 500 year return flood. This has been done from the view point of safety of the proposed dam and with this there is no violation of the Godavari award. The FRL has been kept as 150 ft. in accordance with award of tribunal. Changing the design flood to 50 lakh cusecs (PMF) and still using 36 lakh cusecs flood for backwater studies does not violate the provisions of the award”.
- k. Copy of minutes of inter-state meeting held at CWC on 29.10.2007 is placed as Annexure-III. Copy of the backwater study carried out by CWC using Mike-11 is placed as Annexure-IV. The clarification given by CWC to the Department related Parliamentary Standing Committee on Home Affairs is placed as Annexure-V and it reads as follows:
 - l. “As per GWDT award 1980, back water studies were carried out by CWC for 36 lakh cusec discharge and no such studies were carried out for 50 lakh cusec discharge. Keeping the safety of dam in view, CWC revised the design flood from 36 lakh cusecs to 50 lakh cusec as per criteria laid down in Bureau of Indian Standard code IS 11223- Guidelines for fixing Spillway capacity. The design flood is meant only for fixing the size of spillway gates and not to be used for backwater studies.
- m. AS per BIS code 12094-2000 titled “Guidelines for planning and design of river Embankments (Levees), 1 in 25 year return period flood in case of predominantly agricultural areas and 1 in 100 year return period flood for townships/ industrial areas are to be adopted for design of embankments. In this case, 1 in 25 year flood is 22 lakh cusec and 1 in 100 year flood is 29 lakh cusec. As per existing provisions of maximum designed flood to be adopted for backwater is a 1 in 100 year flood but in spite of the above, a flood of 36 lakh cusec (500 year frequency) has been considered which is on the conservative side. Therefore, backwater study carried out for 36 lakh

cusec is much on conservative side and studies with 50 lakh cusec discharge is not required.”

Observations of NGT Committee

The Committee based on the clarifications furnished by CWC is of the opinion that the dam is designed for 50 lakh cusec for safety reasons and 36 lakh cusecs to be considered for backwater studies. Hence, no further backwater studies are envisaged by the committee.

VII c Issue 3: Displacement of people in Telangana, Odisha and Chhattisgarh are not considered by Central Government and Andhra Pradesh

Clarification given by WRD, Govt of A.P and R & R Commissioner

Polavaram project Authority and WRD, Govt of A.P have considered the impacts and displacement of people in Telangana, Odisha and Chhattisgarh and extent of impacts assessed by the Polavaram project Authority and WRD, Govt. of A.P is summarized in table 2.

Table 2: Extent of land and families affected by Polavaram project as assessed by Polavaram project Authority

Sl. No	State	Extent of land affected	Total No. of project affected families	No. of Persons affected	Remarks
1	Odisha	648.05 Ha of land in 8 revenue villages of Malkangiri district	1002	6316 persons	As per the information provided by WRD, Govt of AP during meeting and based on the documents provided by them.
2	Chhattisgarh	795.59 Ha of land in 4 revenue villages of Dantwada district	2335	11766	
3	Telangana	136 villages, 211 hamlets and seven mandals of Khammam district (exempting 12 villages of Burgampadu mandal) were classified as submergence area and transferred to the residual state of Andhra Pradesh during AP re-organization Act, 2014. Hence the case of displacement of people in state of Telangana does not arise.			

As per the interstate agreement on 02.04.1980 among the states of Andhra Pradesh, Madhya Pradesh and Odisha and final order of GWDT, the states of Odisha and Chhattisgarh can exercise option either for protective embankments along river Sabari and Sileru with adequate drainage sluices to protect the lands and properties likely to be affected in their territories due to construction of Polavaram irrigation project at the cost of the project or for compensation for the areas and properties going to be affected in those states.

Observations of the NGT Committee

The Polavaram project is nearing completion. Though assessment of project affected area and persons in Odisha & Chhattisgarh is carried out but either rehabilitation plan or construction of protective embankments is only proposed and not undertaken by project authority since the states of Odisha & Chhattisgarh are yet to give their consent for either one of the options.

State of A.P may pursue with the state of Odisha and Chhattisgarh and obtain their consent for either one of the options. Polavaram project Authority, GWDT and CWC may also look into the issue and assist the states in choosing the most beneficial & safest option among the two.

Further as per information furnished by R & R Commissioner, the total no. of villages affected by project only in Andhra Pradesh (including the seven mandals of Telangana transferred to A.P) is 371. Contour-wise submergence of villages in Andhra Pradesh from Polavaram Irrigation project Head works is enclosed as Annexure-VI. The rehabilitation of project affected people as per Land Acquisition Rehabilitation and Resettlement Act, 2013 in West Godavari district in A.P is under progress while in East Godavari district socio economic survey and the eligibility list of project affected families is yet to be prepared. As per the information gathered by the committee the project affected families in A.P mainly belong to backward communities.

The committee submits that the WRD and R & R Commissioner shall expedite the matter and the project affected families in AP may rehabilitated as per LARR Act, 2013 within a time period of six months.

VII.d *Issue 4: Increase in the Irrigation potential from 7.2 lakhs acres to 15 lakh acres which requires increased storage of water in the reservoir which will result in more submergence*

Clarification given by WRD, AP: The Polavaram irrigation project is envisaged to feed irrigation water to an ayacut of 7.2 lakh acres. There is no change in the ayacut proposed to be irrigated under the project.

Observation of Committee: The committee agrees with the clarification given by WRD, A.P

VII.e Issue 5: Bhadrachalam town is located in left bank of Godavari. If FRL is maintained in Polavaram dam for some days post completion of the project, entire drainage water of Bhadrachalam town may be stagnated and may require lifting by motors.

VII.f Issue 6: Opposite to Bhadrachalam town on right side, local streams are joining Godavari, these streams are likely to be stagnated if water is maintained in the reservoir at FRL of 45.72m which may lead to some submergence locally for short periods.

VII.g Issue 7: Kinnerasani river joins on right side of Bhadrachalam town which may stagnate and may lead to submergence of area on maintaining FRL in Polavaram reservoir for some days post completion of the project.



Figure 3: Satellite image showing Kinnerasani river joining river Godavari

Clarification given by WRD, AP: The Full reservoir level (FRL) of Polavaram project is +150 Ft i.e. +45.72m whereas the average level of Bhadrachalam town is +55m.

Observations of NGT Committee

Polavaram Project Authority or WRD has not examined the issues 5,6 & 7 which are anticipated to occur by State of Telangana. The authority shall involve both the states examine the issues and devise appropriate safeguard measures.

VII.h Issue 8: More than 100 villages and important heritage sites of religious significance and heavy water plant etc which will face severe submergence in Telangana due to all effects including backwaters of the Polavaram project

VII.i Issue 9: To conduct public hearing in the affected districts of Telangana as per Environment Protection act.

Clarification given by Polavaram Project Authority and WRD, A.P

As per the clarification given by CWC to the Department related Parliamentary Standing Committee on Home Affairs:

“Water levels estimated in back water studies carried out by CWC using MIKE 11 model for 36 lakh cusecs discharge at various locations including Bhadrachalam is given in table 3. The level of Bhadrachalam temple is 62m, which clearly indicates that due to Polavaram project there will not be any additional danger of submergence to Bhadrachalam town/ temple.”

Table 3: Water levels estimated by CWC using Mike-11 model

Location	Polavaram dam site	Bhadrachalam	Dummugudem
Without Polavaram dam	32.94 m	56.47 m	64.00 m
With Polavaram dam	42.67 m	56.87m	64.09m

As per AP Re-Organization Act, in section 2, clause 90 “The Consent for Polavaram project shall be deemed to have been given by the successor State of Telangana”.

Observations of NGT Committee

CWC has carried out backwater study for 36 lakh cusecs using Mike-11 model and based on this study the project affected villages in Telangana were transferred to Andhra Pradesh during AP reorganization in 2014. Further CWC has clarified that The level of Bhadrachalam temple is 62m, which clearly indicates that due to Polavaram project there will not be any additional danger of submergence to Bhadrachalam town/ temple.

Before according Environmental Clearance to the project by MOEFCC, public hearing was conducted by APPCB on 10.10.2005 at Polavaram (West Godavari district), Gummalladoddi

(East Godavari district), Gannavaram (Krishna district), Visakhapatnam (Visakhapatnam district) and Bhadrachalam (Khammam district) and thereafter MOEFCC has accorded EC to the project on 25.10.2005.

Polavaram Project Authority has informed the committee that Govt. of Telangana has filed OS 1 of 2019 on 19.3.2019 in Supreme Court of India in the matter of concerns of the State of Telangana on same issues related to submergence. The matter is sub-judice and p Hon'ble Supreme Court. In view of the above, the Committee humbly submits to Hon'ble NGT to take decision on transferring the case to Hon'ble Supreme Court pl.

VIII Overall Conclusions of the committee

1. The Committee submits to Hon'ble NGT that similar matter OS 4/2006 on impacts on upstream states and backwater studies and OS 1 of 2019 in the matter of concerns of the State of Telangana is sub-judice & pending in Hon'ble Supreme Court. In view of the above, the committee humbly submits to Hon'ble NGT to kindly take a decision on transferring the case to Hon'ble Supreme Court pl.
2. The GWDT award clearly mentions that" the matter of design of the dam and its operation schedule shall be left to the CWC which they shall decide keeping in view all the agreements between the parties including the agreements of 2nd April 1980" The committee submits that as long as, the Polavaram project Authority and WRD, Govt. of AP abide by & are compliant with the Interstate agreement of 2nd April, 1980 (among states of Andhra Pradesh, Madhya Pradesh and Odisha) and final GWDT (Godavari Water Dispute Tribunal) award 1980, sanction from CWC and EC from MOEFCC, further examining and studying the impacts of the project do not arise. Polavaram project is a national project and the States have already consented for the project
3. Issues related to stagnation of drainage and stagnation of local streams & Kinnerasani river which may cause flash-submergence locally are anticipated to occur by State of Telangana post completion of the project if water is maintained at FRL for some days in the reservoir. But Polavaram Project Authority or WRD, Govt of AP have not examined these issues and within a period of six months, the issues may be examined and proper safeguard measures may be devised.

4. Since CWC has clarified that design capacity of dam for 50 lakh cusecs is done from the safety point of view and using 36 lakh cusecs flood for backwater studies does not violate the provisions of the award. So the backwater studies carried out by Polavaram project Authority in upstream states for 36 lakh cusecs may be considered as adequate and further backwater studies at this point may not be envisaged since the project is nearing completion.
5. The Polavaram project Authority cum WRD, Govt of A.P may take complete responsibility for any adverse impacts solely arising out of the project in future days. The Authority may pursue with the states of Telangana, Chhattisgarh and Odisha on the anticipated impacts in their respective states, examine the issues and take proper remedial actions & safeguard measures to mitigate the impacts that are likely to arise.
6. The Polavaram irrigation project is envisaged to feed irrigation water to an sanctioned ayacut of 7.2 lakh acres and there is no increase in the ayacut to 15 lakh acres as alleged in the complaint.
7. As per the interstate agreement on 02.04.1980 and final GWDT award the states of Odisha & Chhattisgarh have to give their consent and exercise either one of the option for construction of protective embankment or rehabilitation of affected people. Though the Polavaram project is nearing completion and it is assessed that 6316 persons in Odisha and 11766 persons in Chhattisgarh will be affected but either rehabilitation plan or construction of protective embankments is only proposed and actual work is not yet undertaken by project authority since the states of Odisha & Chhattisgarh are yet to give their consent for either one of the options. State of A.P may pursue with the state of Odisha and Chhattisgarh and obtain their consent for either one of the options. Polavaram project Authority, GWDT and CWC may also look into the issue and assist the states in choosing the most beneficial & safest option among the two.
8. As per information furnished by R & R Commissioner, the total no. of villages affected by project only in Andhra Pradesh (including the seven mandals of Telangana transferred to A.P) is 371 villages in two districts of West Godavari and East Godavari. The rehabilitation of project affected people as per Land Acquisition, Rehabilitation & Resettlement Act 2013 in West Godavari district is under progress

while in East Godavari district socio economic survey and the eligibility list of project affected families is yet to be prepared. The committee submits that the WRD and R & R Commissioner shall expedite the matter and the project affected families in AP may rehabilitated as per LARR Act, 2013 within a period of six months.

9. The Committee submits to Hon'ble NGT that main issue is apprehensions about the project. In order to clarify all the apprehensions about the project and to address key issues the Polavaram Project Authority (PPA), Central Water commission, Godavari Water Dispute Tribunal & Water Resource Department, Andhra Pradesh jointly within a period of two months may convene a meeting with upstream states namely Telangana, Odisha and Chhattisgarh. During the meeting the upstream States may clarify their apprehensions and put forth the anticipated impacts due to Polavaram project and the same may be examined by PPA & WRD, AP and to devise appropriate mitigative measures to safeguard the dam and as well as interests of upstream states.



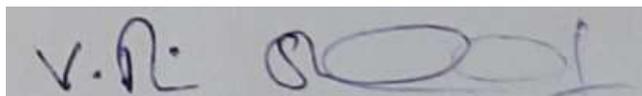
Dr. C. Palpandi
Scientist-C, Ministry of Environment
Forest and Climate Change, Regional
Office, Chennai



G. Hanumantha Reddy
Senior Environmental Engineer Telangana State
Pollution Control Board, Zonal Office,
Hyderabad



Venkateshwar Reddy
Executive Engineer, Irrigation
Department Kothagudem



V. Ravi Shankar
Environmental Engineer, Telangana State
Pollution Control Board
Regional Office Kothagudem



Mahima T
Scientist-D
Central Pollution Control Board
Regional Directorate, Chennai

Item No. 06

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 110/2019

Dr. Ponguleti Sudhakara Reddy

Applicant(s)

Versus

State of Telangana

Respondent(s)

Date of hearing: 20.02.2020

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S.P WANGDI, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER
HON'BLE MR. SIDDHANTA DAS, EXPERT MEMBER

For Applicant(s):

Mr. Sravan Kumar, Advocate

ORDER

Grievance in this application is about adverse consequences of the Polavaram Project for lift irrigation scheme. According to the applicant, the project may result in displacement of hundreds of families without there being any plan for rehabilitation.

Since this Tribunal has already constituted a four member joint Committee comprising of representatives of CPCB, Additional PCCF, State PCB and District Collector, Khammamin *Original Application No. 857/2018, Dr. Pentapati Pulla Rao v. Union of India & Ors.* concerning the same project, the same Committee may look into the grievance of the applicant and give a separate report by email at judicial-ngt@gov.in by the next date of hearing. The CPCB will be the nodal agency for compliance and coordination.

A copy of this order be sent to CPCB, Additional PCCF, State PCB and District Collector, Khammam by email for compliance.

The Committee will be at liberty to involve Collectors of such other Districts which may be relevant or any other Expert.

List again on 04.05.2020.

Adarsh Kumar Goel, CP

S.P Wangdi, JM

Dr. Nagin Nanda, EM

Siddhanta Das, EM

February 20, 2020
Original Application No. 110/2019
AK



-142-

IN THE SUPREME COURT OF INDIA
CIVIL ORIGINAL JURISDICTION

I.A. NO. 1572 AND 1578 OF 2006 AND
I.A. NO. 2190/2008

IN
WRIT PETITION (C) NO.202 OF 1995

IN THE MATTER OF:

T.N. Godavarman ... Petitioner

VERSUS

Union of India and others ... Respondents

AFFIDAVIT ON BEHALF OF CENTRAL WATER
COMMISSION DIRECTORATE, PROJECT
APPRAISAL (SOUTH)

I, U.K. Ghosh, Director of Project Appraisal
(South), Central Water Commission, Govt. of India,
Sewa Bhawan, R.K. Puram, New Delhi, do hereby
solemnly affirm and declare as under:-

1. In my official capacity I am conversant with the facts in issue involved in this case and therefore I am competent to swear this affidavit.
2. The report on flooding aspect of Indira Sagar (Polavaram) Project of Andhra Pradesh has been prepared and approved by the Chairman, CWC and is

annexed herewith as ANNEXURE R-1. Copy of agreement dated 2nd April 1980 executed between the States of Andhra Pradesh, Madhya Pradesh and Orissa in relation to clearance of Polavaram project is annexed herewith as ANNEXURE R-2.

VERIFICATION:

DEPONENT

Verified at New Delhi on this _____ day of June, 2008 that the contents of this affidavit paras 1 and 2 are true to my knowledge based on the relevant records of the case, no part of it is false and nothing material has been concealed.

DEPONENT

-140-

ANNEXURE R-1

Report of Central Water Commission, New Delhi on Flooding Aspect of Indira Sagar (Polavaram) Project - Andhra Pradesh.

(As per directions from Hon'ble Supreme Court in respect of I.A. Nos. 1572 & 1578 and I.A. No. 2190 with Contempt Petition (C) No.114 of 2007)

1.0 The modified Detailed Project Report (DPR) of 2005-06 of Indira Sagar Project (Polavaram) of Andhra Pradesh on Godavari river was received in CWC during October-December 2005. The project proposal comprises of the following:

- i) 2310 meter long Earth & Rock Fill dam with gross storage of 5.91 BCM at FRL+150 ft., and, an 897.50 km long gated spillway.
- ii) A left main canal (LMC) system with 181.50 km long main canal.
- iii) A Right main canal system (RMC) with 174 km long main canal.

-139-

- iv) Power House with appurtenant works for installed capacity of 960 MW (12x80 MW).

The project benefits envisaged are as under:-

- (i) Irrigation Facilities for a Command Area of about 2.91 lakh ha. With annual irrigation of about 4.36 lakh ha.
- (ii) Diversion of 80 TMC of water of Krishna basin through Right Main Canal.
- (iii) To supply 23.44 TMC of water to Visakapatnam city through Left Main Canal for Steel plant and the township.
- (iv) Hydro Power generation with installed capacity of 960 MW.

2.0 The project has inter-state ramification since the submergence area of the reservoir is spread beyond Andhra Pradesh State boundary into Chhattisgarh and Orissa States to some extent. Besides, some additional areas in both the States of Chhattisgarh & Orissa will be affected due to backwater effect during floods temporarily.

3.0 The issue of Indira Sagar (Polavaram) Project has been dealt under the provision of Clause VI of Godavari Water Dispute Tribunal 1980 Award. The relevant extract is as under:

- (i) the Polavaram Project shall be cleared by the Central Water Commission as expeditiously as possible for FRL/MWL+150 feet;
- (ii) the matter of design of the dam and its operation schedule is left to the Central Water Commission which it shall decide keeping in view all the Agreements between the parties, including the Agreement dated the 2nd April, 1980 as far as practicable; and
- (iii) if there is to be any change in the operation schedule as indicated in the Agreement dated the 2nd April, 1980 It shall be made only after consultation with the States of Andhra Pradesh, Madhya Pradesh and Orissa. The design aspects shall, however, be left entirely to the Central Water Commission.

-137-

(2) The State of Andhra Pradesh shall observe all safeguards, including the safeguards mentioned in sub-Clause (I) above, regarding the Polavaram Project, as directed by the Central Water Commission.

4.0 The Agreement dated 2.4.1980 between the States of Andhra Pradesh, Madhya Pradesh & Orissa (copy enclosed) has been made a part of the Award. It, inter alia, provides that the Polavaram project spillway should be designed for a flood discharge capacity of 36 lakh cusecs at Pond level of + 140 ft. & draws a spillway regulation schedule for discharge upto 36 lakh cusecs.

As per criteria laid down in BIS (Bureau of Indian Standard) code 11223-1995 "Fixing the Spillway Capacity of the Dam", Polavaram dam comes under the category of large dam and is required to be designed for Probable Maximum Flood (PMF). CWC has estimated PMF for Polavaram Project as 141535 cumecs (about 50 lakh cusecs) and recommended it as the design flood for the project. This is required to ensure safe passage of flood during an extreme event and thereby ensuring safety of the Dam. While recommending the design

136-

flood, CWC also indicated limitation of the study & made suggestions for review of design flood for upstream projects as is the usual practice.

5.0 However, PMF is not to be used for estimation of submergence due to backwater effects. The Rastriya Barh Ayog (RBA) 1980 has recommended for 1 in 100 year return period flood for protection of urban area and 1 in 25 year return period flood for rural areas. Therefore the backwater studies carried out for a discharge of 36 lakh cusecs which corresponding to 1 in 500 year return period flood is much on higher side than norms of RBA.

The Project Authority has carried out the study using Standard Step Method, CWC also carried out an independent study using MIKE 11 model which is technically superior. On comparison of the results of the two studies, it has been noted that the study conducted by the Project Authority shows higher backwater profile by about 3 meter Orissa/Chhattisgarh territory which is more on the conservative side.

It may be mentioned that in the inter-state meeting taken by Chairman, CWC on 28.9.2006 it was

135-

agreed by the basin states to conduct joint surveys in connection with back-water studies. Till date, the joint survey works have not been carried out.

As per interstate agreement of 2nd April, 1980 Andhra Pradesh Govt. is to construct and maintain flood embankments with adequate drainage sluices, or else compensation is to be paid by the State Govt. of Andhra Pradesh for land and property likely to be affected above RL+150 ft. in Orissa and Chhattisgarh. The option can be exercised by the affected states at the time of construction of the project. So far the two states have not indicated their option.

The project authority has made provision for flood embankments with drainage sluices in the detailed project report. It may be mentioned in this context that flood embankments are a widely used structural measure for flood protection both, in India and abroad as well. They provide a reasonable degree of protection.

6.0 Conclusion

- (i) As per the criteria laid down in BIS code 11223-1995 the design flood for spillway of Polavaram

- 134 -

Project should be Probable Maximum Flood (about 50 lakh cusecs in the present case). The same has been recommended for designing the spillway. This is a safety requirement for the dam as per codal provision.

- (ii) The Backwater studies have been carried out by the project authorities & checked independently by CWC for a discharge of 36 lakh cusecs, which corresponds to 1 in 500, the return period flood. Joint survey for conformation of back-water study, as agreed upon in the inter-state meeting taken by Chairman, CWC on 28.9.2006, is yet to be carried out by the State Govt. of Andhra Pradesh, Orissa and Chattisgarh.
- (iii) The flood embankments proposed in the Project report are designed to provide protection against a flood of 36 lakhs cusec which is equivalent to one in 500 year return period flood, whereas, as recommended by the Rashtriya Barh Ayog, 1980. The design norms being followed in India are one in 25 year return period flood for rural/agricultural

areas and one in 100 year return period flood for urban areas.

True Copy

- 132 -
ANNEXURE R-2

Agreement dated 2nd April, 1980 between the States of Andhra Pradesh, Madhya Pradesh and Orissa.

To enable clearance of Polavaram Project, the following is agreed to:

1. The Polavaram Project spillway shall be designed for a flood discharging capacity of 36 (thirty six) lakh cusecs at pond level of RL + 140 (one hundred and forty) feet and not less than 20 (twenty) lakh cusecs at pond level of RL+130 (One hundred and thirty) feet.
2. The pond level shall not be kept higher than RL + 145 (one hundred and forty five) feet in the month of June if the inflow into the Polavaram reservoir exceeds 3 (three) lakh cusecs.
3. On receipt of flood warning from the upper sites and/or due to anticipated inflows into the reservoir requiring regulation, the pond levels shall be regulated as follows:-
 - (a) The pond level of RL+145 (one hundred and forty five) feet shall be lowered progressively

as the inflows exceeds 3 (three) lakh cusecs so as to restrict the pond level to RL + 140 (one hundred and forty) feet for an inflow of 10 (ten) lakh cusecs.

- (b) for inflows higher than 10 (ten) lakh cusecs the pond level shall be further lowered, so that it does not exceeds RL + 130 (one hundred and thirty) feet for an inflow of 20 (twenty) lakh cusecs.
- (c) for inflows higher than 20 (twenty) lakh cusecs all the gates shall be opened fully.
- (d) the pond level can be built up progressively in the receding floods to RL + 140 (one hundred and forty) feet if the inflow drops down to 10 (ten) lakh cusecs and to RL + 145 (one hundred and forty five) feet if the inflow drops down to 3 (three) lakh cusecs or less, but during the months of July and August, the pond level shall not exceed RL + 145 (one hundred and forty five) feet.

(e) On or after first September, whenever the inflow in the Polavaram Reservoir is 1 (one) lakh cusecs or less, the storage at Polavaram can be built up beyond RL + 145 (one hundred and forty five) feet, subject to aforementioned depletions at 9a) to (c) in the case of higher inflows.

4. In order to protect the lands and properties above RL + 150 (one hundred and fifty) feet in the territory of the State of Orissa likely to be affected due to construction of Polavaram Project, protective embankments with adequate drainage sluices, shall be constructed and maintained at the cost of Plavaram Project. However, the State of Orissa may exercise an option at the time of construction of Polavaram Project for compensation to land and property likely to be affected above RL + 150 (one hundred and fifty) feet as agreed to in the case of State of Madhya Pradesh in paragraph 5 (five) below.

5. In respect of the properties in the territory of State of Madhya Pradesh likely to be affected above RL + 150 (one hundred and fifty) feet, because of the

construction of the Polavaram Project, the State of Andhra Pradesh shall:-

- (a) pay compensation towards all buildings with their appurtenant lands situated above RL + 150 (one hundred and fifty) feet, which will be affected due to all effects including backwater effect and rehabilitate the oustees, etc. on the same pattern as below RL + 150 (one hundred and fifty) feet at the project cost; or
- (b) construct and maintain at the cost of the State of Andhra Pradesh, the necessary protection embankments with adequate pumping arrangements and/or drainage sluices.

The said option for alternatives (a) or (b) being exercised by the State of Madhya Pradesh at the time of the construction of Polavaram Project depending upon the location of each affected site.

- (c) For damages or injury to lands beyond RL + 150 (one hundred and fifty) feet in the territory of the State of Madhya Pradesh, in

any event, the State of Andhra Pradesh shall pay full compensation for such damage or injury as may be assessed by the District Collector of the said District of the State of Madhya Pradesh.

(d) The State of Andhra Pradesh agrees to fix permanent Bench Marks connected to G.T.S. Bench Marks in the territory of the State of Madhya Pradesh for RL + 150 (one hundred and fifty) feet as well as for the backwater effect, in both cases at an interval of approximate one kilometer all along the periphery of the Polavaram reservoir.

Sd/-

2.4.80

Representative
For the State of
Andhra Pradesh

Sd/- H.V. Mahajani

2.4.80

Representative
for the State of
Madhya Pradesh

Sd/- H.L. Lath

2.4.80

Representative
for the State of
Orissa.

Sd/- P. Ramachandra Reddy
Advocate General
for the State of
Andhra Pradesh

Sd/- M.K. Ramamurthy
Senior Counsel
for the State of
Madhya Pradesh

Sd/- G.B. Patnaik)
Govt. Advocate
Orissa.

True Copy

APPENDIX - IV

No. 6/125/2007-PA(S)/ 14
 Government of India
 Central Water Commission
 Project Appraisal(S) Dte.

....

Room No. 410(S), Sewa Bhawan, R.K. Puram,
 New Delhi-66, Dt. 16/11 November, 2007

Sub:- Meeting on Indira Sagar (Polavaram) Project, A.P.

An interstate meeting to review the status of the joint survey and other issues was convened by Chairman, Central Water Commission on 29.10.2007 at CWC, New Delhi with the representatives from Andhra Pradesh, Orissa and Chhattisgarh. The summary record of discussions of the above meeting is forwarded herewith.

o/c

N.M. Saha
 (N.M. Saha)
 Director (PA-S)

Encl : As above.

Copy to :-

1. PPS to Chairman, CWC.
2. Shri Sutirtha Bhattacharya, Secretary, (Projects), Govt. of Andhra Pradesh
3. PPS to CE, PAO, CWC.
4. Shri S.M. Sood, Chief Engineer, IMO, CWC.
5. Shri S.K. Sengupta, Chief Engineer, DSO, CWC.
6. Shri T.P. Singh, Chief Engineer, Design, NW&S, CWC.
7. Shri O.P. Khanda, Chief Engineer (KGBO), CWC, Hyderabad.
8. Shri R.C. Jha, Chief Engineer, M&ER, CWC, Bhubaneswar.
9. Shri M. Venkateshwar Rao, Chief Engineer, Polavaram Project, GoAP.
10. Shri D. Rama Raju, Chief Engineer, GoAP.
11. Shri Subodh Shrivastava, Chief Engineer, MRP, Govt. of Chhattisgarh.
12. Shri C.V. Prasad, Chief Engineer, Project Planning and Formulation, WRD, Govt. of Orissa.
13. Shri T.M. Venugopalan, Director, ISM, CWC.
14. Shri J. Chandrashekhar Iyer, Director, CMDD (NW&S), CWC.
15. Shri H.K. Sahu, Director, Gates (NW&S), CWC.
16. Shri G. Thakur, Director, PA-N, CWC.
17. Shri S.K. G. Pandit, Director, BCD (NW&NWS), CWC.
18. Shri Y.K. Sharma, Director, IP-S, CWC.

Summary Record of the Interstate Meeting held on 29.10.2007 at Central Water Commission (CWC), New Delhi regarding Indirasagar (Polavaram) Project

An interstate meeting to review the status of the joint survey and other issues on Polavaram project was convened by Chairman, Central Water Commission on 29.10.2007 at CWC, New Delhi. The list of officers who attended the meeting is at Annexure- I.

At the outset Chairman, CWC welcomed the officers present in the meeting and gave a brief background. Chairman, CWC expressed concern and mentioned that even after the lapse of more than one year there is no progress on the work of joint survey as decided during the last meeting on 28.09.2006. The objective of the joint survey was to assess the extent of submergence due to backwaters of Polavaram project. He further requested the representatives of Orissa and Chattisgarh to intimate their programme for the joint survey.

Representatives of Chattisgarh informed that though money for the survey has been deposited by Andhra Pradesh (AP) but the survey could not be carried out due to law and order problems.

Representatives of Orissa informed that since Government of Orissa has taken a view that no submergence in the territory of Orissa should take place beyond El. 150 ft, as such the need for joint survey for the purpose of assessment of extent of submergence is not considered necessary by them. He suggested following proposals to avoid submergence in the territory of Orissa State.

- (a) Lower the height of the dam.
- (b) Shifting of dam axis upstream to such a location where the design flood can be reduced to 36 lakh cusecs.

Representative of Government of Andhra Pradesh while responding to the views of both Orissa and Chattisgarh mentioned that we have to abide by the Godavari Tribunal award and have to work within the ambit of the award.

Chairman, CWC while agreeing with the views of Andhra Pradesh clarified that any changes outside the ambit of award may not be possible. Orissa & Chattisgarh were requested either to examine the provision of embankments or opt for a rehabilitation and resettlement package as per provision in the award.

Representatives of Orissa and Chattisgarh mentioned that since they have not received the copies of detailed project report they are not aware of various technical parameters of the project. Secretary, Government of Andhra Pradesh informed that though copies of the detailed project report have already been made available to both Chattisgarh & Orissa, fresh copies will again be sent to them.

After brief discussions, Chairman, CWC suggested that one set of DPR can be sent to Resident Commissioners of both the States at Delhi by Andhra Pradesh and the second set

be sent through CWC for which copies may be made available by Andhra Pradesh to CWC. Chairman, CWC proposed that both the States may submit their views on the detailed project report within 30 days of receipt of the same.

(ii) Issue of Design flood

It was clarified that in accordance with the BIS code on fixation of spillway capacity the design inflow flood adopted for the dam is PMF (about 50 lakh cusecs) and not 36 lakh cusecs which was 1 in 500 year return flood. This has been done from the view point of safety of the proposed dam and with this there is no violation of the Godavari Award. The FRL has been kept as 150 ft. in accordance with the Award of the Tribunal.

Representatives of Orissa sought some clarifications on the calculation of PMF and expressed the need for considering the observed data instead of using synthetic unit hydrograph for different basin/sub-basins besides contribution from Sabri and Sileru limbs.

Director, Hydrology (South), CWC clarified that the studies have been carried out by using the observed data to the extent available and using standard procedure within the limitations of data availability. As regards review of the studies for upstream projects it was clarified that these studies can be taken up independently for making further improvements. However for the purpose of according clearance to Polavaram Project, the present flood studies carried out are adequate.

It was clarified that carrying out hydrological review is a regular exercise for projects. However new projects are not kept under hold for the purpose and these studies can be incorporated appropriately later.

(iii) Back Water Studies

Representative of Orissa expressed that the back water studies be carried for PMF conditions. Director, Hydrology (South) mentioned that as per existing provision the maximum design flood adopted for back water studies is a 100 year flood.

It was clarified that in spite of the above a flood of 36 lakh cusecs (500 year flood) will be considered for back water studies as per Godavari Tribunal Award. Changing the design flood to about 50 lakh cusecs (PMF) and still using 36 lakh cusecs flood for back water studies does not violate the provisions of the award. ✓

Representative of Orissa expressed concern of back waters in two limbs of Godavari (Sabri and Sileru) covering state of Orissa. To this it was clarified by CWC that the design flood at project site is a cumulative effect of flood of all reaches of river and the back water studies carried out independently by CWC also confirms the studies carried out by Government of Andhra Pradesh.

Chief Engineer; DSO suggested extension of the backwater studies to the point where the backwater effects die down. He mentioned that at and near the confluence of two rivers the flood is basically spatially varied flow and to get the profile for the same, both the energy and momentum equations of open channel flow need to be solved as in MIKE 11.

The standard step method used for working out the backwater profile in the DPR is not applicable in such cases. It was further clarified that CWC had used MIKE 11 while verifying the backwater studies independently. Studies may need to be carried out both with and without embankments subsequently during construction. However, for the purpose of technical examination the studies carried out are considered adequate.

(iv) Legal Aspects

Representatives of Orissa mentioned that they are approaching Hon'ble Supreme Court. He mentioned that the environmental clearance granted by Ministry of Environment & Forest earlier was with spillway design flood of 36 lakh cusecs and not for the PMF. Chairman, CWC clarified that till such time any specific directions are issued by Hon'ble Supreme Court the process of appraisal of project will continue.

Representative of Government of Andhra Pradesh mentioned that they will follow the process of law and mentioned that provision of embankments has been agreed upon by both the States and reiterated that Government of Andhra Pradesh is committed to the maintenance of these embankments. He further requested Chairman, CWC for accord of technical clearance at the earliest as the provision of awards have not been violated.

Chairman, CWC suggested the basin States to convene a meeting at Chief Minister's level to narrow down the differences.

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

⊕

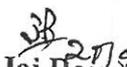
Government of India
Central Water Commission
F. E. & S. A. Directorate
712(S), Sewa Bhawan, R.K.Puram, New Delhi-110066.

Sub : Back water study for Polavaram project, Andhra Pradesh

Reference is invited to PA(S) Dte. letter No. 6/125/2007-PA(S)/1247 dt. 07.09.2007 vide which the input data for Back Water Studies of Polavaram Project was forwarded to this Directorate. Based on the input data supplied, the desired back water studies have been completed using MIKE11 model and a copy of study report is enclosed herewith.

Encl: As above

Yours faithfully,


(J. Jai Raju)
Director (FE&SA)

c/c

Director PA(S), CWC
CWC U.O. No. 6/2/2007/FE&SA /1010

dt. 20/9/2007

Backwater study for Polavaram dam (Andhra Pradesh)

1.0 Introduction

The backwater study of Polavaram Project was earlier carried out by Andhra Pradesh Engineering Research Laboratories, Hyderabad using standard step method. For an independent confirmation of the result it was desired by Director, Project Appraisal (S), CWC that the study should be carried out by Central Water Commission. Accordingly, a set of input data comprising of cross sections of Godavari, Sabari and Sileru rivers upstream of Polavaram dam and rating curve of spillway submitted by Govt. of Andhra Pradesh were forwarded to this Directorate for a fresh back water study. The study has been carried out using One dimensional mathematical model MIKE11 which simulates unsteady / steady flows in the network of open channel. The MIKE11 model developed by Danish Hydraulic Institute Denmark basically solves the two partial differential equations of open channel flow originally derived by Barre De Saint Venant in 1871 using 6-point Abbott finite difference scheme. The equations are:

i. Conservation of mass (continuity) equation

$$(\partial Q / \partial X) + \partial(A + A_0) / \partial t - q = 0$$

ii. Conservation of momentum equation

$$(\partial Q / \partial t) + \{ \partial(Q^2 / A) / \partial X \} + g A \{ (\partial h / \partial X) + S_f + S_c \} = 0$$

where,

Q = discharge;

A = active flow area;

A₀ = inactive storage area;

h = water surface elevation;

q = lateral outflow;

x = distance along waterway;

t = time;

S_f = friction slope;

S_c = expansion contraction slope and

g = gravitational acceleration.

2.0 Input data and assumptions

The input data supplied to this Directorate and assumptions taken for back water computations are as follows:

1. Cross sections of Godavari river from Polavaram dam site upto Dummugudem (144.645 km u/s of Polavaram dam site)
2. Cross sections of Sabari river from Kunavaram (Confluence point of Godavari and Sabari rivers) upto 55.29 km u/s
3. Cross sections of Sileru river from Kunta (Confluence point of Sabari and Sileru rivers) upto 14 km u/s
4. Manning's roughness coefficient of 0.035 as given in back water study report of Andhra Pradesh Engineering Research Laboratories, Hyderabad has been increased to 0.040 for Godavari river and 0.045 for Sabari and Sileru rivers for MIKE11 model set up. As per USGS Water Supply Paper 2339 the Manning's $n = (n_b + n_1 + n_2 + n_3 + n_4)m$

Where, n_b = a base value of n for a straight, uniform, Smooth channel in natural materials

n_1 = a correction factor for effect of surface irregularities

n_2 = a correction factor for for variations in shape and size of channel cross sections

n_3 = a value for obstructions

n_4 = a value for vegetation and flow conditions

m = meandering correction factor

Considering the above the suitable "n" value has been adopted for MIKE11 model set up for back water study.

5. Flood discharge of 36 lakh cusec (101940 cumec) the 500 year return period flood at Polavaram dam site.

(4)

The same has been distributed and impinged at different locations of model setup as follows:

- i) 95144 cumec at Dummugudem (144.645 km u/s of Polavaram dam site) in Godavari river
- ii) 4474 cumec in Sabari river at 55.29 km u/s of Confluence point of Godavari and Sabari rivers
- iii) 2322 cumec in Sileru river at 14 km u/s of Confluence point of Sabari and Sileru rivers

6. The flood disposal level at Polavaram dam site for a flood discharge of 36 lakh cusec has been taken as 42.67 m as per the agreement dated 2nd April 1980 between the States of Andhra Pradesh, Madhya Pradesh and Orissa

3.0 Back water study and results

Based on the above data the MIKE11 model set up was completed and studies have been carried out to estimate the water surface profile for flood peak of 101940 cumec for the following two conditions:

1. Water surface profile in the natural condition of Godavari river.
2. Water surface profile after construction of Polavaram dam at Godavari river.

The MIKE11 model setup for back water study is given in Plate-1. The maximum water level obtained at different locations of Godavari river for the above two conditions is given in Table-1. The bed profile and water level profile without and with Polavaram dam, for Godavari, Sabari and Sileru rivers are given in Plate-2, 3 and 4 respectively.

The notations of river branches and chainage given in table may be read as follows:

SILERU-KUNTA U/S 0.00 : It means the reach of Sileru river upstream of Kunta with cross section chainage as "0" m as per MIKE11 model set up. This is the upper most cross section of Sileru river, 14 km u/s of Sabari-Sileru confluence at Kunta.

SILERU-KUNTA U/S 1250.00 : It means the reach of Sileru river upstream of Kunta with cross section chainage as "1250 m" d/s the cross section at chainage "0" m

SILERU-KUNTA U/S 14000.00 : It means the reach of Sileru river upstream of Kunta with cross section chainage as "14000 m" d/s the cross section at chainage "0" m. This is the cross section at confluence point of Sileru and Sabari river at Kunta.

Same way all other locations of Sileru river may be read.

SABARI-KUNTA U/S 0.00 : It means the reach of Sabari river upstream of Kunta with cross section chainage as "0" m as per MIKE11 model set up. This is the upper most cross section of Sabari river, 21.73 km u/s of Sabari-Sileru confluence at Kunta.

SABARI-KUNTA U/S 2980.00 : It means the reach of Sabari river upstream of Kunta with cross section chainage as "2980 m" d/s the cross section at chainage "0" m

SABARI-KUNTA U/S 21730.00 : It means reach of Sabari river upstream of Kunta with cross section chainage as "21730 m" d/s the cross section at chainage "0" m. This is the cross section at confluence point of Sileru and Sabari river at Kunta.

Same way all other locations of Sileru river may be read.

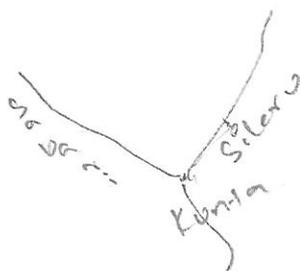
SABARI-KUNTA-KUNAVARAM 1210.00 : It means the reach of Sabari river between Kunta and Kunavaram and the chainage of cross section is "1210 m" d/s of Kunta.

SABARI-KUNTA-KUNAVARAM 19310.00 : It means the reach of Sabari river between Kunta and Kunavaram with cross section chainage as "19310 m" d/s of Kunta.

Same way all other locations of Sileru river between Kunta and Kunavaram may be read.

GODAVARI-DUMMUGUDEM-BHADRACHALAM 1200.00 : It means the reach of Godavari river between Dummugudem and Bhadrachalam with cross section chainage as "1200 m" d/s of Dummugudem.

Same way all other locations of Godavari river between Dummugudem and Bhadrachalam may be read.



GODAVARI-BHADRACHALAM-KUNAVARAM 1830.00 : It means the reach of Godavari river between Bhadrachalam and Kunavaram with cross section chainage as "1830 m" d/s of Bhadrachalam.

Same way all other locations of Godavari river between Bhadrachalam and Kunavaram may be read.

GODAVARI-KUNAVARAM-POLAVARAM DAM 4830.00 : It means the reach of Godavari river between Kunavaram and Polavaram dam with cross section chainage as "4830 m" d/s of Kunavaram.

Same way all other locations of Godavari river between Kunavaram and Polavaram dam may be read.

3.0 Comparison of water level obtained at Salient Locations

A comparison of water levels estimated at different locations of river reaches using MIKE11 model with the water levels estimated by Govt. of Andhra Pradesh using computer program of standard step method is given below:

Location		Polavaram Dam site	Kunavaram	Bhadra-chalam	Dummu-gudem	Kunta	Sabari Last c/s	Sileru Last c/s
CWC Studies (using MIKE11 Model)	Without Polavaram dam	32.94 m	49.84 m	56.47 m	64.00 m	49.92 m	54.80 m	54.56 m
	With Polavaram dam	42.67 m	51.52 m	56.87 m	64.09 m	51.57 m	54.91 m	54.71 m
A.P. Studies (using standard step method)	Without Polavaram dam	28.92 m	52.80 m	57.95 m	64.18 m	52.85 m	54.98 m	55.12 m
	With Polavaram dam	42.07 m	54.04 m	58.32 m	64.29 m	54.08 m	55.51 m	55.55 m

From the above table it can be seen that the water level estimated by Govt. of Andhra Pradesh at confluence points of the rivers at Kunavaram and Kunta is about 3 m more in comparison to CWC estimate. This is due to non applicability of standard step method at confluence of two rivers.

In standard step method the energy equation of open channel flow is solved to get the profile of gradually varied flow. At and near the confluence of two rivers the flow is basically spatially varied flow and to get the profile for spatially varied flow both the energy *as well as the momentum equations of open channel flow need to be solved*, as in

(7)

case of MIKE11. Hence, the computer program of standard step method simply solving the energy equation can not be used to estimate the water surface profile at and near the river confluence.

Further, since in standard step method the u/s water levels are estimated based on the previously estimated d/s water levels along the river reach, the water levels estimated u/s of confluence will also have the error of confluence estimate.

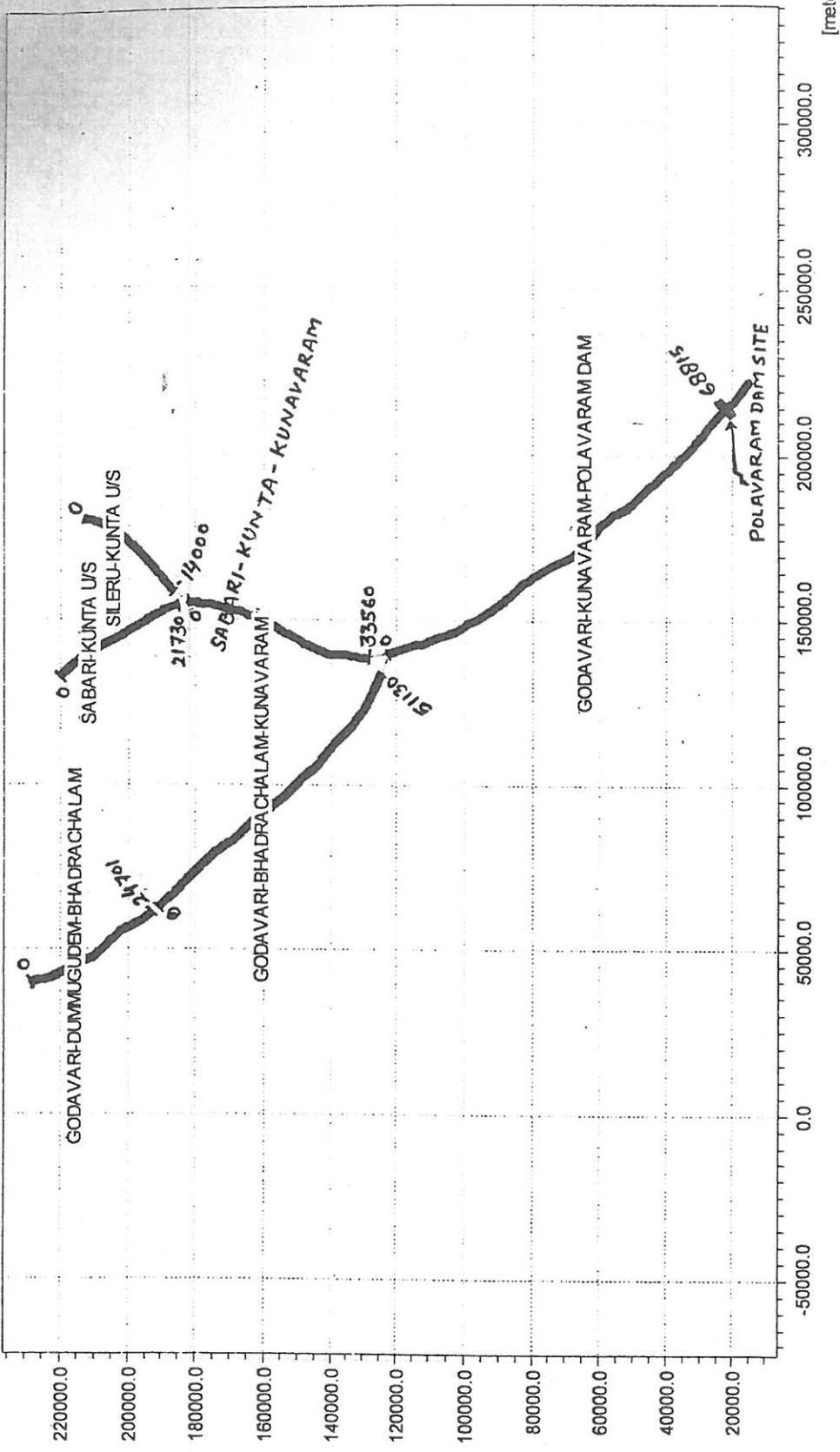
The difference in water level at Polavaram dam site without Polavaram dam is basically due to assumption in boundary conditions. In MIKE11 model set up the d/s boundary condition has been assumed about 10 km d/s of the dam site so that the water level calculated by the model is independent of the conditions prevailing at the boundary.

4.0 Limitations

- i. The water levels estimated along the different reaches of the river may vary due to approximation in Manning's resistance number, which needs to be estimated from actual topography and vegetal cover along the river reach.
- ii. Other limitations associated with solution algorithm of Saint Venant's equations also apply.

Standard - POLA-WITH DAM-040.res11

[meter]



[meter]

Plate-1 : MIKE11 model set up for back water studies of Polavaram dam

Table-1(a) : Water level profile table of Sileru river u/s of Kunta with and without Polavaram dam

Chainage (m) d/s of uppermost cross section of Sileru river as per MIKE11 set up	Chainage (km) u/s of Sabari-Sileru confluence at Kunta (as per data supplied)	Discharge (cumec)	Bed level (m)	Water surface profile level (m) without Polavaram dam	Water surface profile level (m) with Polavaram dam
SILERU-KUNTA U/S 0.00	14.00	2322	46.54	54.56	54.71
SILERU-KUNTA U/S 560.00	13.44	2322	45.78	53.11	53.46
SILERU-KUNTA U/S 1250.00	12.75	2322	44.73	52.32	52.94
SILERU-KUNTA U/S 2000.00	12.00	2322	43.61	51.63	52.49
SILERU-KUNTA U/S 2750.00	11.25	2322	42.07	51.02	52.14
SILERU-KUNTA U/S 4000.00	10.00	2322	42.22	50.65	51.94
SILERU-KUNTA U/S 4250.00	9.75	2322	40.84	50.61	51.92
SILERU-KUNTA U/S 5000.00	9.00	2322	38.62	50.47	51.83
SILERU-KUNTA U/S 5760.00	8.24	2322	39.19	50.35	51.79
SILERU-KUNTA U/S 6500.00	7.50	2322	35.80	50.28	51.75
SILERU-KUNTA U/S 7250.00	6.75	2322	38.51	50.16	51.69
SILERU-KUNTA U/S 8000.00	6.00	2322	36.96	50.10	51.66
SILERU-KUNTA U/S 8750.00	5.25	2322	36.17	50.04	51.64
SILERU-KUNTA U/S 9487.00	4.513	2322	34.71	50.00	51.62
SILERU-KUNTA U/S 10273.00	3.72	2322	35.54	49.94	51.58
SILERU-KUNTA U/S 11000.00	3.00	2322	32.74	49.94	51.59
SILERU-KUNTA U/S 11750.00	2.25	2322	32.33	49.92	51.57
SILERU-KUNTA U/S 12500.00	1.50	2322	28.90	49.92	51.57
SILERU-KUNTA U/S 13250.00	0.75	2322	30.20	49.92	51.57
SILERU-KUNTA U/S 14000.00	0	6796	29.47	49.92	51.57
(Sabari-Sileru confluence at Kunta)					

Table-1(b) : Water level profile table of Sabari river u/s of Kunta with and without Polavaram dam

Chainage (m) d/s of uppermost cross section of Sabari river as per MIKE11 set up	Chainage (km) u/s of Sabari-Sileru confluence at Kunta (as per data supplied)	Discharge (cumec)	Bed level (m)	Water surface profile level (m) without Polavaram dam	Water surface profile level (m) with Polavaram dam
SABARI-KUNTA U/S 0.00	21.73	4474	48.08	54.80	54.91
SABARI-KUNTA U/S 565.00	21.165	4474	47.63	53.93	54.10
SABARI-KUNTA U/S 1464.00	20.266	4474	44.51	52.11	52.80
SABARI-KUNTA U/S 2230.00	19.5	4474	41.63	51.58	52.51
SABARI-KUNTA U/S 2980.00	18.75	4474	41.95	51.27	52.33
SABARI-KUNTA U/S 3650.00	18.08	4474	40.80	51.16	52.27
SABARI-KUNTA U/S 4480.00	17.25	4474	39.54	50.95	52.13
SABARI-KUNTA U/S 5580.00	16.15	4474	38.04	50.55	51.91
SABARI-KUNTA U/S 5980.00	15.75	4474	38.49	50.51	51.90
SABARI-KUNTA U/S 6730.00	15	4474	37.51	50.38	51.82
SABARI-KUNTA U/S 7480.00	14.25	4474	37.81	50.25	51.75
SABARI-KUNTA U/S 8230.00	13.5	4474	37.40	50.18	51.71
SABARI-KUNTA U/S 8980.00	12.75	4474	37.30	50.15	51.70
SABARI-KUNTA U/S 9730.00	12	4474	35.66	50.08	51.66
SABARI-KUNTA U/S 10480.00	11.25	4474	34.65	50.04	51.64
SABARI-KUNTA U/S 11230.00	10.5	4474	33.30	50.03	51.64
SABARI-KUNTA U/S 11980.00	9.75	4474	33.17	50.02	51.63
SABARI-KUNTA U/S 12730.00	9	4474	33.72	50.01	51.62
SABARI-KUNTA U/S 13480.00	8.25	4474	33.22	49.99	51.61
SABARI-KUNTA U/S 14230.00	7.5	4474	32.03	49.97	51.60
SABARI-KUNTA U/S 14980.00	6.75	4474	30.66	49.96	51.60
SABARI-KUNTA U/S 15790.00	5.94	4474	29.28	49.96	51.60
SABARI-KUNTA U/S 16480.00	5.25	4474	32.32	49.95	51.59
SABARI-KUNTA U/S 17230.00	4.5	4474	30.14	49.95	51.59
SABARI-KUNTA U/S 17980.00	3.75	4474	30.90	49.94	51.58
SABARI-KUNTA U/S 18730.00	3	4474	31.28	49.93	51.58
SABARI-KUNTA U/S 21730.00	0	6796	29.47	49.92	51.57

Table-1(c) : Water level profile table of Sabari river between Kunta and Kunavaram with and without Polavaram dam

Chainage (m) d/s of Sabari-Sileru confluence at Kunta as per MIKE11 set up	Chainage (km) u/s of Godavari-sabari confluence at Kunavaram (as per data supplied)	Discharge (cumec)	Bed level (m)	Water surface profile level (m) without Polavaram dam	Water surface profile level (m) with Polavaram dam
SABARI-KUNTA-KUNAVARAM 0.00	33.56	6796	29.47	49.92	51.57
SABARI-KUNTA-KUNAVARAM 1210.00	32.35	6796	30.04	49.90	51.56
SABARI-KUNTA-KUNAVARAM 1690.00	31.87	6796	28.92	49.89	51.56
SABARI-KUNTA-KUNAVARAM 2210.00	31.35	6796	29.05	49.89	51.55
SABARI-KUNTA-KUNAVARAM 2810.00	30.75	6796	29.50	49.89	51.56
SABARI-KUNTA-KUNAVARAM 3560.00	30	6796	28.98	49.88	51.55
SABARI-KUNTA-KUNAVARAM 6560.00	27	6796	27.68	49.86	51.54
SABARI-KUNTA-KUNAVARAM 9560.00	24	6796	27.32	49.86	51.54
SABARI-KUNTA-KUNAVARAM 11810.00	21.75	6796	27.10	49.85	51.54
SABARI-KUNTA-KUNAVARAM 15560.00	18	6796	24.95	49.85	51.53
SABARI-KUNTA-KUNAVARAM 17060.00	16.5	6796	24.59	49.85	51.53
SABARI-KUNTA-KUNAVARAM 18560.00	15	6796	25.39	49.84	51.53
SABARI-KUNTA-KUNAVARAM 19310.00	14.25	6796	25.13	49.84	51.53
SABARI-KUNTA-KUNAVARAM 21360.00	12	6796	24.45	49.84	51.53
SABARI-KUNTA-KUNAVARAM 23060.00	10.5	6796	23.85	49.84	51.53
SABARI-KUNTA-KUNAVARAM 24560.00	9	6796	24.17	49.84	51.53
SABARI-KUNTA-KUNAVARAM 26060.00	7.5	6796	23.34	49.84	51.53
SABARI-KUNTA-KUNAVARAM 27560.00	6	6796	22.22	49.84	51.53
SABARI-KUNTA-KUNAVARAM 29060.00	4.5	6796	22.94	49.84	51.53
SABARI-KUNTA-KUNAVARAM 30560.00	3	6796	22.24	49.84	51.53
SABARI-KUNTA-KUNAVARAM 32810.00	0.75	6796	20.32	49.84	51.52
SABARI-KUNTA-KUNAVARAM 33560.00	0	95144	20.35	49.84	51.52
(Confluenec of Godavari and Sabari rivers at Kunavaram)					

Table-1(d) : Water level profile table of Godavari river between Dummugudem and Bhadrachalam with and without Polavaram dam

Chainage (m) d/s of Dummugudem as per MIKE11 set up	Chainage (km) u/s of Godavari-sabari confluence at Kunavaram (as per data supplied)	Discharge (cumec)	Bed level (m)	Water surface profile level (m) without Polavaram dam	Water surface profile level (m) with Polavaram dam
GODAVARI-DUMMUGUDEM-BHADRACHALAM 0.00					
(e/s of Godavari river at Dummugudem)					
GODAVARI-DUMMUGUDEM-BHADRACHALAM 450.00	75.831	95144	39.35	64.00	64.09
GODAVARI-DUMMUGUDEM-BHADRACHALAM 1200.00	75.381	95144	41.27	63.97	64.06
GODAVARI-DUMMUGUDEM-BHADRACHALAM 1950.00	74.631	95144	42.81	63.51	63.61
GODAVARI-DUMMUGUDEM-BHADRACHALAM 2700.00	73.881	95144	42.13	63.27	63.37
GODAVARI-DUMMUGUDEM-BHADRACHALAM 3450.00	73.131	95144	41.42	62.92	63.03
GODAVARI-DUMMUGUDEM-BHADRACHALAM 4200.00	72.381	95144	42.06	62.74	62.85
GODAVARI-DUMMUGUDEM-BHADRACHALAM 4950.00	71.631	95144	40.38	62.42	62.54
GODAVARI-DUMMUGUDEM-BHADRACHALAM 5700.00	70.881	95144	40.55	62.03	62.15
GODAVARI-DUMMUGUDEM-BHADRACHALAM 6390.00	70.131	95144	27.97	61.99	62.13
GODAVARI-DUMMUGUDEM-BHADRACHALAM 7200.00	69.441	95144	36.94	61.44	61.58
GODAVARI-DUMMUGUDEM-BHADRACHALAM 7950.00	68.631	95144	39.56	61.45	61.60
GODAVARI-DUMMUGUDEM-BHADRACHALAM 8700.00	67.881	95144	36.46	61.22	61.37
GODAVARI-DUMMUGUDEM-BHADRACHALAM 9450.00	67.131	95144	38.44	61.04	61.19
GODAVARI-DUMMUGUDEM-BHADRACHALAM 10200.00	66.381	95144	37.40	60.69	60.85
GODAVARI-DUMMUGUDEM-BHADRACHALAM 10950.00	65.631	95144	34.01	60.29	60.47
GODAVARI-DUMMUGUDEM-BHADRACHALAM 11700.00	64.881	95144	31.40	60.12	60.30
GODAVARI-DUMMUGUDEM-BHADRACHALAM 12450.00	64.131	95144	29.13	59.76	59.95
GODAVARI-DUMMUGUDEM-BHADRACHALAM 13200.00	63.381	95144	37.00	59.26	59.47
GODAVARI-DUMMUGUDEM-BHADRACHALAM 13950.00	62.631	95144	37.74	59.18	59.40
GODAVARI-DUMMUGUDEM-BHADRACHALAM 14700.00	61.881	95144	37.57	59.03	59.26
GODAVARI-DUMMUGUDEM-BHADRACHALAM 14700.00	61.131	95144	37.06	58.83	59.07

GODAVARI-DUMMUGUDEM-BHADRACHALAM	15450.00	60.381	95144	34.34	58.54	58.79
GODAVARI-DUMMUGUDEM-BHADRACHALAM	16200.00	59.631	95144	35.66	58.47	58.73
GODAVARI-DUMMUGUDEM-BHADRACHALAM	16950.00	58.881	95144	36.20	58.21	58.48
GODAVARI-DUMMUGUDEM-BHADRACHALAM	17700.00	58.131	95144	34.88	58.06	58.34
GODAVARI-DUMMUGUDEM-BHADRACHALAM	18450.00	57.381	95144	35.41	57.80	58.09
GODAVARI-DUMMUGUDEM-BHADRACHALAM	19200.00	56.631	95144	35.47	57.68	57.98
GODAVARI-DUMMUGUDEM-BHADRACHALAM	19950.00	55.881	95144	34.63	57.49	57.80
GODAVARI-DUMMUGUDEM-BHADRACHALAM	20700.00	55.131	95144	34.40	57.24	57.57
GODAVARI-DUMMUGUDEM-BHADRACHALAM	21450.00	54.381	95144	34.30	57.23	57.56
GODAVARI-DUMMUGUDEM-BHADRACHALAM	22200.00	53.631	95144	34.77	56.93	57.28
GODAVARI-DUMMUGUDEM-BHADRACHALAM	22950.00	52.881	95144	34.29	56.88	57.24
GODAVARI-DUMMUGUDEM-BHADRACHALAM	23700.00	52.131	95144	33.30	56.65	57.03
(c/s of Godavari river at Bhadrachalam)	24701.00	51.13	95144	28.63	56.47	56.87

Table-1(e) : Water level profile table of Godavari river between Bhadrachalam and Kunavaram with and without Polavaram dam

Chainage (m) d/s of Bhadrachalam as per MIKE11 set up	Chainage (km) u/s of Godavari-sabari confluence at Kunavaram (as per data supplied)	Discharge (cumec)	Bed level (m)	Water surface profile level (m) without Polavaram dam	Water surface profile level (m) with Polavaram dam
GODAVARI-BHADRACHALAM-KUNAVARAM 0.00					
(c/s of Godavari river at Bhadrachalam)					
GODAVARI-BHADRACHALAM-KUNAVARAM 760.00	51.13	95144	28.63	56.47	56.87
GODAVARI-BHADRACHALAM-KUNAVARAM 1830.00	50.37	95144	29.60	56.47	56.87
GODAVARI-BHADRACHALAM-KUNAVARAM 2380.00	49.3	95144	26.20	56.26	56.69
GODAVARI-BHADRACHALAM-KUNAVARAM 3130.00	48.75	95144	30.75	56.10	56.54
GODAVARI-BHADRACHALAM-KUNAVARAM 3880.00	48	95144	30.60	56.06	56.51
GODAVARI-BHADRACHALAM-KUNAVARAM 4460.00	47.25	95144	30.50	56.06	56.51
GODAVARI-BHADRACHALAM-KUNAVARAM 5380.00	46.67	95144	31.10	56.01	56.46
GODAVARI-BHADRACHALAM-KUNAVARAM 6130.00	45.75	95144	28.55	55.88	56.34
GODAVARI-BHADRACHALAM-KUNAVARAM 7030.00	45	95144	25.95	55.82	56.30
GODAVARI-BHADRACHALAM-KUNAVARAM 7630.00	44.1	95144	28.60	55.57	56.07
GODAVARI-BHADRACHALAM-KUNAVARAM 8380.00	43.5	95144	29.60	55.41	55.93
GODAVARI-BHADRACHALAM-KUNAVARAM 9030.00	42.75	95144	28.35	55.38	55.90
GODAVARI-BHADRACHALAM-KUNAVARAM 9880.00	42.1	95144	28.00	55.30	55.83
GODAVARI-BHADRACHALAM-KUNAVARAM 10630.00	41.25	95144	28.15	55.21	55.75
GODAVARI-BHADRACHALAM-KUNAVARAM 11380.00	40.5	95144	28.50	55.11	55.66
GODAVARI-BHADRACHALAM-KUNAVARAM 11905.00	39.75	95144	29.80	55.01	55.58
GODAVARI-BHADRACHALAM-KUNAVARAM 12880.00	39.225	95144	28.90	54.94	55.52
GODAVARI-BHADRACHALAM-KUNAVARAM 13630.00	38.25	95144	25.20	54.86	55.45
GODAVARI-BHADRACHALAM-KUNAVARAM 14380.00	37.5	95144	26.50	54.66	55.27
GODAVARI-BHADRACHALAM-KUNAVARAM 15880.00	36.75	95144	27.33	54.61	55.23
GODAVARI-BHADRACHALAM-KUNAVARAM 16630.00	35.25	95144	26.66	54.37	55.02
GODAVARI-BHADRACHALAM-KUNAVARAM 17380.00	34.5	95144	26.62	54.27	54.94
GODAVARI-BHADRACHALAM-KUNAVARAM 17380.00	33.75	95144	23.25	54.21	54.89

GODAVARI-BHADRACHALAM-KUNAVARAM	18130.00	33	95144	21.22	53.72	54.45
GODAVARI-BHADRACHALAM-KUNAVARAM	18880.00	32.25	95144	18.44	53.29	54.09
GODAVARI-BHADRACHALAM-KUNAVARAM	19630.00	31.5	95144	20.86	53.30	54.10
GODAVARI-BHADRACHALAM-KUNAVARAM	20380.00	30.75	95144	20.94	53.22	54.05
GODAVARI-BHADRACHALAM-KUNAVARAM	21130.00	30	95144	22.40	53.13	53.97
GODAVARI-BHADRACHALAM-KUNAVARAM	21880.00	29.25	95144	23.17	53.10	53.95
GODAVARI-BHADRACHALAM-KUNAVARAM	22630.00	28.5	95144	20.58	52.81	53.70
GODAVARI-BHADRACHALAM-KUNAVARAM	23380.00	27.75	95144	19.11	52.75	53.67
GODAVARI-BHADRACHALAM-KUNAVARAM	24145.00	26.985	95144	20.52	52.60	53.55
GODAVARI-BHADRACHALAM-KUNAVARAM	24880.00	26.25	95144	21.06	52.27	53.30
GODAVARI-BHADRACHALAM-KUNAVARAM	25630.00	25.5	95144	21.97	52.24	53.29
GODAVARI-BHADRACHALAM-KUNAVARAM	26380.00	24.75	95144	20.56	52.14	53.21
GODAVARI-BHADRACHALAM-KUNAVARAM	27130.00	24	95144	17.93	51.96	53.07
GODAVARI-BHADRACHALAM-KUNAVARAM	27880.00	23.25	95144	25.00	51.96	53.07
GODAVARI-BHADRACHALAM-KUNAVARAM	28630.00	22.5	95144	25.96	51.94	53.06
GODAVARI-BHADRACHALAM-KUNAVARAM	29380.00	21.75	95144	26.54	51.84	52.98
GODAVARI-BHADRACHALAM-KUNAVARAM	31090.00	20.04	95144	22.75	51.70	52.88
GODAVARI-BHADRACHALAM-KUNAVARAM	31630.00	19.5	95144	22.75	51.66	52.85
GODAVARI-BHADRACHALAM-KUNAVARAM	32380.00	18.75	95144	19.88	51.57	52.78
GODAVARI-BHADRACHALAM-KUNAVARAM	33130.00	18	95144	19.34	51.38	52.63
GODAVARI-BHADRACHALAM-KUNAVARAM	33880.00	17.25	95144	21.96	51.11	52.43
GODAVARI-BHADRACHALAM-KUNAVARAM	34630.00	16.5	95144	19.63	51.15	52.47
GODAVARI-BHADRACHALAM-KUNAVARAM	35380.00	15.75	95144	21.46	51.02	52.36
GODAVARI-BHADRACHALAM-KUNAVARAM	36130.00	15	95144	22.90	50.90	52.27
GODAVARI-BHADRACHALAM-KUNAVARAM	36880.00	14.25	95144	22.18	50.83	52.22
GODAVARI-BHADRACHALAM-KUNAVARAM	37630.00	13.5	95144	22.18	50.80	52.20
GODAVARI-BHADRACHALAM-KUNAVARAM	38380.00	12.75	95144	23.22	50.71	52.14
GODAVARI-BHADRACHALAM-KUNAVARAM	39130.00	12	95144	23.25	50.55	52.02
GODAVARI-BHADRACHALAM-KUNAVARAM	39880.00	11.25	95144	24.13	50.60	52.07
GODAVARI-BHADRACHALAM-KUNAVARAM	40630.00	10.5	95144	20.27	50.60	52.06
GODAVARI-BHADRACHALAM-KUNAVARAM	41380.00	9.75	95144	23.03	50.55	52.03
GODAVARI-BHADRACHALAM-KUNAVARAM	42130.00	9	95144	23.74	50.51	52.00
GODAVARI-BHADRACHALAM-KUNAVARAM	42880.00	8.25	95144	23.90	50.47	51.97
GODAVARI-BHADRACHALAM-KUNAVARAM	43630.00	7.5	95144	24.55	50.41	51.93
GODAVARI-BHADRACHALAM-KUNAVARAM	44380.00	6.75	95144	24.39	50.24	51.80
GODAVARI-BHADRACHALAM-KUNAVARAM	45130.00	6	95144	21.46	50.18	51.76

GODAVARI-BHADRACHALAM-KUNAVARAM	45880.00	5.25	95144	21.89	50.15	51.74
GODAVARI-BHADRACHALAM-KUNAVARAM	46630.00	4.5	95144	21.75	50.13	51.73
GODAVARI-BHADRACHALAM-KUNAVARAM	47380.00	3.75	95144	21.74	50.07	51.69
GODAVARI-BHADRACHALAM-KUNAVARAM	48130.00	3	95144	16.63	50.01	51.64
GODAVARI-BHADRACHALAM-KUNAVARAM	48880.00	2.25	95144	19.70	49.87	51.54
GODAVARI-BHADRACHALAM-KUNAVARAM	49630.00	1.5	95144	18.70	49.84	51.52
GODAVARI-BHADRACHALAM-KUNAVARAM	50380.00	0.75	95144	20.40	49.83	51.52
GODAVARI-BHADRACHALAM-KUNAVARAM	51130.00	0	101940	20.35	49.84	51.52
(Confluence of Godavari and Sabari rivers at Kunavaram)						

Table-1(f) : Water level profile table of Godavari river between Kunavaram and Polavaram dam site with and without Polavaram dam

Chainage (m) d/s of kunavaram as per MIKE11 set up	Chainage (km) u/s of Polavaram dam (as per data supplied)	Discharge (cumec)	Bed level (m)	Water surface profile level (m) without Polavaram dam	Water surface profile level (m) with Polavaram dam
GODAVARI-KUNAVARAM-POLAVARAM DAM 0.00	56.815	101940	20.35	49.84	51.52
GODAVARI-KUNAVARAM-POLAVARAM DAM 1080.00	67.735	101940	19.89	49.83	51.52
GODAVARI-KUNAVARAM-POLAVARAM DAM 4830.00	63.985	101940	16.57	49.73	51.45
GODAVARI-KUNAVARAM-POLAVARAM DAM 7080.00	61.735	101940	16.74	49.38	51.17
GODAVARI-KUNAVARAM-POLAVARAM DAM 10650.00	58.165	101940	12.60	49.04	50.92
GODAVARI-KUNAVARAM-POLAVARAM DAM 11525.00	57.29	101940	13.30	48.94	50.86
GODAVARI-KUNAVARAM-POLAVARAM DAM 15315.00	53.5	101940	16.08	48.74	50.74
GODAVARI-KUNAVARAM-POLAVARAM DAM 17565.00	51.25	101940	14.84	48.14	50.36
GODAVARI-KUNAVARAM-POLAVARAM DAM 20565.00	48.25	101940	6.63	46.97	49.26
GODAVARI-KUNAVARAM-POLAVARAM DAM 23565.00	45.25	101940	3.26	45.43	48.22
GODAVARI-KUNAVARAM-POLAVARAM DAM 26565.00	42.25	101940	9.38	45.67	48.46
GODAVARI-KUNAVARAM-POLAVARAM DAM 28065.00	40.75	101940	4.05	44.25	47.32
GODAVARI-KUNAVARAM-POLAVARAM DAM 29565.00	39.25	101940	0.35	43.49	46.84
GODAVARI-KUNAVARAM-POLAVARAM DAM 32815.00	36	101940	-45.81	42.07	45.68
GODAVARI-KUNAVARAM-POLAVARAM DAM 37315.00	31.5	101940	9.45	42.02	45.87
GODAVARI-KUNAVARAM-POLAVARAM DAM 38815.00	30	101940	11.13	41.98	45.92
GODAVARI-KUNAVARAM-POLAVARAM DAM 41065.00	27.75	101940	4.20	41.47	45.68
GODAVARI-KUNAVARAM-POLAVARAM DAM 41815.00	27	101940	-12.82	40.38	44.94
GODAVARI-KUNAVARAM-POLAVARAM DAM 44065.00	24.75	101940	2.64	40.47	45.15
GODAVARI-KUNAVARAM-POLAVARAM DAM 44815.00	24	101940	3.13	39.73	44.69
GODAVARI-KUNAVARAM-POLAVARAM DAM 47065.00	21.75	101940	-9.51	38.65	44.13
GODAVARI-KUNAVARAM-POLAVARAM DAM 47815.00	21	101940	-8.34	37.77	43.68
GODAVARI-KUNAVARAM-POLAVARAM DAM 48565.00	20.25	101940	-2.55	37.41	43.49
GODAVARI-KUNAVARAM-POLAVARAM DAM 50065.00	18.75	101940	-20.32	37.44	43.51
GODAVARI-KUNAVARAM-POLAVARAM DAM 53065.00	15.75	101940	9.26	36.80	43.37

GODAVARI-KUNAVARAM-POLAVARAM DAM	55315.00	13.5	101940	11.69	36.18	43.23
GODAVARI-KUNAVARAM-POLAVARAM DAM	59195.00	9.62	101940	-10.79	35.30	43.05
GODAVARI-KUNAVARAM-POLAVARAM DAM	59945.00	8.87	101940	-10.79	35.13	43.01
GODAVARI-KUNAVARAM-POLAVARAM DAM	63565.00	5.25	101940	2.30	33.92	42.76
GODAVARI-KUNAVARAM-POLAVARAM DAM	65550.00	3.265	101940	10.63	33.618	42.755
GODAVARI-KUNAVARAM-POLAVARAM DAM	66565.00	2.25	101940	7.96	33.387	42.721
GODAVARI-KUNAVARAM-POLAVARAM DAM	68815.00	0	101940	7.44	32.937	42.67
(Polavaram dam site)						

(18)



NATIONAL PROJECTS DIRECTORATE
CENTRAL WATER COMMISSION
2A, 8th Floor (N), Sewa Bhawan, R.K. Puram Sector-1,
New Delhi-110066

Annexure-V

राष्ट्रीय परियोजना निदेशालय
केन्द्रीय जल आयोग
Tele / Fax : 011 - 29583395
Email: np1dte@gmail.com

Sub: Examination of the subject 'Status of implementation of provisions of the APR Act. 2014' by the Department related Parliamentary Standing Committee on Home Affairs - regarding.

Your email dated 29.08.2018.

Query : Will 50 lakh cusecs discharge submerge Bhadrachalam ?

The material/information on the above issue is as under :

- As per GWDT Award 1980, Back water studies were carried out by Central Water Commission for 36 lakh cusec discharge and no such studies are carried out for 50 lakh cusec discharge.
- Keeping the safety of dam in view, CWC revised the design flood from 36 lakh cusec to 50 lakh cusec as per criteria laid down in Bureau of Indian Standard Code IS-11223 "Guidelines for fixing Spillway Capacity". The design flood is meant only for fixing the size of spillway gates and not to be used for back water studies
- As per BIS code 12094-2000 titled "Guidelines for Planning and Design of River Embankments (Levees)" 1 in 25 year return period flood in case of predominantly agricultural areas and 1 in 100 year return period flood for townships/industrial areas are to be adopted for design of embankments. In this case, 1 in 25 year flood is 22 lakh cusec and 1 in 100 year flood is 29 lakh cusec. As per existing provisions, maximum designed flood to be adopted for back water studies is a 1 in 100 year flood but in spite of the above, a flood of 36 lakh cusec (500 year frequency) has been considered which is much on conservative side. Therefore, backwater study carried out for 36 lakh cusec is much on conservative side and **studies with 50 lakh cusec discharge is not required.**
- Water levels estimated in Back water studies carried out by CWC using MIKE 11 model for 36 lakh cusec discharge (Copy enclosed) at various locations including Bhadrachalam is shown in the table below :

Location	Polavaram Dam Site	Bhadrachalam	Dummugudem
Without Polavaram Dam	32.94 m	56.47 m	64.00 m
With Polavaram Dam	42.67 m	56.87 m	64.09 m

- The level of Bhadrachalam temple is 62 m, which clearly indicates that due to Polavaram Project there will not be any additional danger of submergence to Bhadrachalam town/temple.

Encl : As Above


29/8/18
(जी० एल० बंसल / G. L. Bansal)
निदेशक / Director

वरिष्ठ संयुक्त आयुक्त, (राज्य परि.-1), जल संसाधन, नदी संरक्षण एवं गंगा पुनरुद्धार मंत्रालय, क. क्र.-438, बी-विंग, कृषि भवन, नई दिल्ली-03.

क्र० / No. : 4/7/2017/NP/ Vol-IX/ 1285

दिनांक / Date : 29th अगस्त / August, 2018.

CONTOUR WISE SUBMERGENCE VILLAGES OF POLAVARAM IRRIGATION PROJECT HEAD WORKS

S.No	Contour Level	Village RL	Name of the Habitations	Name of the Revenue Village	Name of the Mandal	Name of the District
1	Below +21 No. of Villages: 3	20.08	Tutigunta	Tutigunta	Polavaram	WEST GODAVARI
2		20.08	Kamavarapu lanka	Tutigunta	Polavaram	WEST GODAVARI
3		20.08	Pudakalagondi	Tutigunta	Polavaram	WEST GODAVARI
4	between 22-23 No. of Villages: 5	22.38	Sarugudu	Tutigunta	Polavaram	WEST GODAVARI
5		22.38	Vadapalli	Kondrukota	Polavaram	WEST GODAVARI
6		22.71	Mamidigondi	Polavaram	Polavaram	WEST GODAVARI
7		22.71	Devaragondi (Shifted)	Polavaram	Polavaram	WEST GODAVARI
8		22.71	Thotagondi	Polavaram	Polavaram	WEST GODAVARI
9	between 23-24 No. of Villages: 3	23.66	Kothamamidigondi	Kondrukota	Polavaram	WEST GODAVARI
10		23.66	kothuru	Kondrukota	Polavaram	WEST GODAVARI
11		23.71	Ramaiahpetta	Polavaram	Polavaram	WEST GODAVARI
12	between 24-25 No. of Villages: 6	24.30	Tallavaram	Kondrukota	Polavaram	WEST GODAVARI
13		24.50	Nelakota	Nelakota	Devipatnam	EAST GODAVARI
14		24.57	Chegondipalli	Chegondipalli	Polavaram	WEST GODAVARI
15		24.77	Singanapalli	Singanapalli	Polavaram	WEST GODAVARI
16		24.77	Pydipaka	Pydipaka	Polavaram	WEST GODAVARI
17		24.95	Toyyeru	Thoyyeru	Devipatnam	EAST GODAVARI
18	between 26-27 No. of Villages: 5	26.30	Veeravaramlanka	A.Veeravaram	Devipatnam	EAST GODAVARI
19		26.55	Gajulagondi	Kondrukota	Polavaram	WEST GODAVARI
20		26.55	Mulakalagudem	Kondrukota	Polavaram	WEST GODAVARI
21		26.77	Pallapuru	Tutigunta	Polavaram	WEST GODAVARI
22		26.77	Paidakualamamidi	Tutigunta	Polavaram	WEST GODAVARI
23	between 27-28 No. of Villages: 3	27.18	Kondrukota	Kondrukota	Polavaram	WEST GODAVARI
24		27.18	Madhapuram	Kondrukota	Polavaram	WEST GODAVARI
25		27.59	Penikilapadu	Manturu	Devipatnam	EAST GODAVARI
26	between 28-29 No. of Villages: 3	28.25	Agraharam	Thoyyeru	Devipatnam	EAST GODAVARI
27		28.32	Mulametta	Manturu	Devipatnam	EAST GODAVARI
28		28.45	Mulapadu	Thoyyeru	Devipatnam	EAST GODAVARI
29	between 29-30 No. of Villages: 4	29.25	Cheeduru	Cheeduru	Polavaram	WEST GODAVARI
30		29.25	Sivagiri	Sivagiri	Polavaram	WEST GODAVARI
31		29.51	Mettaveedhi	Manturu	Devipatnam	EAST GODAVARI
32		29.77	Anguluru	Anguluru	Devipatnam	EAST GODAVARI
33	between 30-31 No. of Villages: 7	30.02	Tekuru	Tekuru	Polavaram	WEST GODAVARI
34		30.02	Boranagondi	Tekuru	Polavaram	WEST GODAVARI
35		30.13	Lingavaram	Lingavaram	Devipatnam	EAST GODAVARI
36		30.23	Devipatnam	Devipatnam	Devipatnam	EAST GODAVARI
37		30.30	Kothagudem	Kondamodalu	Devipatnam	EAST GODAVARI
38		30.40	Nadipudi	Kondamodalu	Devipatnam	EAST GODAVARI
39		30.55	Manturu	Manturu	Devipatnam	EAST GODAVARI
40	between 31-32 No. of Villages: 6	31.20	Thatiwada	Kondamodalu	Devipatnam	EAST GODAVARI
41		31.30	Talluru	Kondamodalu	Devipatnam	EAST GODAVARI
42		31.30	Somarlapadu	Kondamodalu	Devipatnam	EAST GODAVARI
43		31.30	Pedagudem	Kondamodalu	Devipatnam	EAST GODAVARI
44		31.50	Kondamodalu	Kondamodalu	Devipatnam	EAST GODAVARI
45		31.81	Koruturu	Koruturu	Polavaram	WEST GODAVARI
46	between 32-33 No. of Villages: 4	32.30	Metagudem	Kondamodalu	Devipatnam	EAST GODAVARI
47		32.40	Kathanapalli	Kondamodalu	Devipatnam	EAST GODAVARI
48		32.50	Teliperu	Kondamodalu	Devipatnam	EAST GODAVARI
49		32.50	Kokkirigudem	Kondamodalu	Devipatnam	EAST GODAVARI
50	between 33-34	33.14	Yenugulagudem	Devipatnam	Devipatnam	EAST GODAVARI
51	between 34-35 No. of Villages: 7	34.12	Sirivaka	Sirivaka	Polavaram	WEST GODAVARI
52		34.12	Telladibbalu	Sirivaka	Polavaram	WEST GODAVARI
53		34.12	Yerravaram	Tutigunta	Polavaram	WEST GODAVARI
54		34.30	A.Veeravaram	A.Veeravaram	Devipatnam	EAST GODAVARI
55		34.50	Gangulagondi	Gangulagondi	Devipatnam	EAST GODAVARI
56		34.58	Madipalli	Manturu	Devipatnam	EAST GODAVARI
57		35.00	Gandikota	Manturu	Devipatnam	EAST GODAVARI
58	between 37-38 No. of Villages: 2	37.60	Dandangi	Dandangi	Devipatnam	EAST GODAVARI
59		37.60	Kolluru	Kolluru	V.R.Puram	EAST GODAVARI
60	between 38-39 No. of Villages: 6	38.17	Jeediguppa	Jeediguppa	V.R.Puram	EAST GODAVARI
61		38.17	Issunuru	Issunuru	V.R.Puram	EAST GODAVARI
62		38.34	D.Ravilanka	Dandangi	Devipatnam	EAST GODAVARI
63		38.40	Paragasani padu	Pudipalli	Devipatnam	EAST GODAVARI
64		38.50	Pudipalli	Pudipalli	Devipatnam	EAST GODAVARI
65		38.91	Thatkurgommu	Thatkurgommu	Velairpadu	WEST GODAVARI
66	39.20	Suddakonda	Kachuluru	Devipatnam	EAST GODAVARI	
67	39.26	K.Gonduru	K.Gonduru	Devipatnam	EAST GODAVARI	
68	39.30	Ch.Ramaniah Peta	Ch.Ramanayyapeta	Devipatnam	EAST GODAVARI	
69	39.40	Gubbalampadu	Ch.Ramanayyapeta	Devipatnam	EAST GODAVARI	

S.No	Contour Level	Village RL	Name of the Habitations	Name of the Revenue Village	Name of the Mandal	Name of the District
70	between 39-40 No. of Villages: 10	39.43	Katchuluru	Kachuluru	Devipatnam	EAST GODAVARI
71		39.46	Kotarugommu	Kotarugommu	V.R.Puram	EAST GODAVARI
72		39.69	Sithampeta	Sithampeta	V.R.Puram	EAST GODAVARI
73		39.69	Sithampeta Colony	Sithampeta	V.R.Puram	EAST GODAVARI
74		39.69	Sriramgiri	Sriramgiri	V.R.Puram	EAST GODAVARI
75		39.69	Kothuru	Kothuru	V.R.Puram	EAST GODAVARI
76	between 40-41 No. of Villages: 8	40.10	Perantalapalli	Perantalapalli	Velairpadu	WEST GODAVARI
77		40.21	Thustivarigudem	Prathipaka	V.R.Puram	EAST GODAVARI
78		40.23	K.Veeravaram	Dandanggi	Devipatnam	EAST GODAVARI
79		40.46	Venakata Narasimhapuram	Venakata Narasimhapuram	V.R.Puram	EAST GODAVARI
80		40.55	Tekupalli	Tekupalli	Velairpadu	WEST GODAVARI
81		40.80	Gommugudem	Gommugudem	Kukunooru	WEST GODAVARI
82		40.89	Mettagudem	Nuthigudem	V.R.Puram	EAST GODAVARI
83		41.00	Bojjaraigudem	Bojjaraigudem	Kunavaram	EAST GODAVARI
84	between 41-42 No. of Villages: 4	41.02	Nagulapalli	A.Veeravaram	Devipatnam	EAST GODAVARI
85		41.15	Bodigudem	Dandanggi	Devipatnam	EAST GODAVARI
86		41.72	Muthyalammagondi	Mulakapalli	V.R.Puram	EAST GODAVARI
87		41.98	Kalthanuru	Kalthanuru	V.R.Puram	EAST GODAVARI
88	between 42-43 No. of Villages: 6	42.09	Gangampalem	Dandanggi	Devipatnam	EAST GODAVARI
89		42.10	P.Gonduru	Pudipalli	Devipatnam	EAST GODAVARI
90		42.22	Velairupadu	Repakagommu	Velairpadu	WEST GODAVARI
91		42.35	Thirumalapuram	Thirumalapuram	Velairpadu	WEST GODAVARI
92		42.72	Koida	Koida	Velairpadu	WEST GODAVARI
93		43.00	Tallagudem	Tallagudem	Kunavaram	EAST GODAVARI
94	between 43-44 No. of Villages: 15	43.20	Raigudem	Tallagudem	Kunavaram	EAST GODAVARI
95		43.23	Bhimavaram	Bhimavaram	V.R.Puram	EAST GODAVARI
96		43.23	Choppalli	Choppalli	V.R.Puram	EAST GODAVARI
97		43.32	SriramachandraPuram	Ramachandra puram (Kothuru)	Kukunooru	WEST GODAVARI
98		43.50	Nadimigommu	Repakagommu	Velairpadu	WEST GODAVARI
99		43.50	Kakisnoor	Kakisnoor	Velairpadu	WEST GODAVARI
100		43.50	Kannayigudem	Kannayigudem	V.R.Puram	EAST GODAVARI
101		43.60	Tekubaka	Tekubaka	Kunavaram	EAST GODAVARI
102		43.70	Damanapalli	Damanapalli	Devipatnam	EAST GODAVARI
103		43.80	Thurpumitta	Narlavaram	Velairpadu	WEST GODAVARI
104		43.85	Markandelpeta	Markandelpeta	Chinturu	EAST GODAVARI
105		43.86	Chintoor	Chintoor	Chinturu	EAST GODAVARI
106		43.86	Nimmalagudem	Chintoor	Chinturu	EAST GODAVARI
107		43.89	Sabarikothagudem	Sabarikothagudem	Kunavaram	EAST GODAVARI
108		44.00	Repakagommu	Repakagommu	Velairpadu	WEST GODAVARI
109	44.06	Pathapuchirala	Repakagommu	Velairpadu	WEST GODAVARI	
110	44.06	Ramavaram padu	Jallivarigudem	V.R.Puram	EAST GODAVARI	
111	44.08	Jallivarigudem	Jallivarigudem	V.R.Puram	EAST GODAVARI	
112	44.08	Ramavaram	Jallivarigudem	V.R.Puram	EAST GODAVARI	
113	44.10	Srirampuram	Thatkurugommu	Velairpadu	WEST GODAVARI	
114	44.10	Chigurumamidi	Chigurumamidi	Velairpadu	WEST GODAVARI	
115	44.10	Gonduru	Kolluru	V.R.Puram	EAST GODAVARI	
116	44.10	Mulakapalli	Mulakapalli	V.R.Puram	EAST GODAVARI	
117	44.10	Thummileru	Thummileru	V.R.Puram	EAST GODAVARI	
118	44.10	Tekulaboru	Kunavaram	Kunavaram	EAST GODAVARI	
119	44.10	Gundugudem	Gundugudem	V.R.Puram	EAST GODAVARI	
120	44.15	jagannadhapuram	Thatkurugommu	Velairpadu	WEST GODAVARI	
121	44.20	Chinarkuru(Z)	Chinarkuru(Z)	Kunavaram	EAST GODAVARI	
122	44.21	Narlavaram colony	Narlavaram	Velairpadu	WEST GODAVARI	
123	44.25	Narlavaram	Narlavaram	Velairpadu	WEST GODAVARI	
124	44.28	Chittamreddipalem	Siddaram	Velairpadu	WEST GODAVARI	
125	44.30	Seetharam	Ch.Ramanayyapeta	Devipatnam	EAST GODAVARI	
126	44.34	Chuturu	Chuturu	Chinturu	EAST GODAVARI	
127	44.35	Mukunnuru	Mukunnuru	Chinturu	EAST GODAVARI	
128	44.36	A.G.Koderu	A.G.Koderu	Chinturu	EAST GODAVARI	
129	44.39	V.R.Puram	Vaddigudem	V.R.Puram	EAST GODAVARI	
130	44.41	Kalleru	Kalleru	Chinturu	EAST GODAVARI	
131	44.41	Koyuguru	Koyuguru	Chinturu	EAST GODAVARI	
132	44.43	Potlavai	Potlavai	Kunavaram	EAST GODAVARI	
133	44.43	Gommuayyavarigudem	Gommuayyavaigudem	Kunavaram	EAST GODAVARI	
134	44.50	Rudramkota	Rudramkota	Velairpadu	WEST GODAVARI	
135	44.50	Chintalapadu	Siddaram	Velairpadu	WEST GODAVARI	
136	44.50	Vinjaram	Vinjaram	Kukunooru	WEST GODAVARI	
137	44.50	Prathipaka	Prathipaka	V.R.Puram	EAST GODAVARI	
138	44.50	Chintaregupalli	Chintaregupalli	V.R.Puram	EAST GODAVARI	
139	44.52	Kummuru	Kummuru	Chinturu	EAST GODAVARI	
140	between 44-45 No. of Villages: 64	44.60	Padamatamitta	Narlavaram	Velairpadu	WEST GODAVARI
141		44.60	Rajupeta	Rajupeta	V.R.Puram	EAST GODAVARI
142		44.64	Annavaram	Annavaram	V.R.Puram	EAST GODAVARI

S.No	Contour Level	Village RL	Name of the Habitations	Name of the Revenue Village	Name of the Mandal	Name of the District
143		44.72	Mamillagudem	Kumuru	Chinturu	EAST GODAVARI
144		44.80	Vaddigudem	Vaddigudem	V.R.Puram	EAST GODAVARI
145		44.80	Darmatallagudem	Vaddigudem	V.R.Puram	EAST GODAVARI
146		44.86	Karakagudem	Karakagudem	Kunavaram	EAST GODAVARI
147		44.88	Srirampuram	Srirampuram	Kunavaram	EAST GODAVARI
148		44.95	Thummarigudem	Thummarigudem	Chinturu	EAST GODAVARI
149		45.00	Burreddygudem	Tekuru	Velairpadu	WEST GODAVARI
150		45.00	Sivakasipuram	Repakagommu	Velairpadu	WEST GODAVARI
151		45.00	Thatkurugommu Colony	Thatkurugommu	Velairpadu	WEST GODAVARI
152		45.00	Geegavari Gumpu	Thatkurugommu	Velairpadu	WEST GODAVARI
153		45.00	Sudda Gumpu	Thatkurugommu	Velairpadu	WEST GODAVARI
154		45.00	Yerraboru	Thatkurugommu	Velairpadu	WEST GODAVARI
155		45.00	Pedamanu Kollu	Kakisnoor	Velairpadu	WEST GODAVARI
156		45.00	Kotha reddigem	Rallapudi	Velairpadu	WEST GODAVARI
157		45.00	Polaram	Polaram	Kukunooru	WEST GODAVARI
158		45.00	Yerraboru	Vinjaram	Kukunooru	WEST GODAVARI
159		45.00	Gundamboru	Vinjaram	Kukunooru	WEST GODAVARI
160		45.00	Ambothulogudem	Upperu	Kukunooru	WEST GODAVARI
161		45.00	Yelakalagudem	Amaravaram	Kukunooru	WEST GODAVARI
162		45.00	Cheruvu Komugudem	Komatlagudem	Kukunooru	WEST GODAVARI
163		45.00	Isukapadu	Kukunuru	Kukunooru	WEST GODAVARI
164		45.00	Lankapalli	Kukunuru	Kukunooru	WEST GODAVARI
165		45.00	Koyagudem	Kukunuru	Kukunooru	WEST GODAVARI
166		45.00	Goparajugudem	Maredubaka	Kukunooru	WEST GODAVARI
167		45.00	Arvaipalli	Arvaipalli	Kukunooru	WEST GODAVARI
168		45.00	Gommuru	Gommuru	Kukunooru	WEST GODAVARI
169		45.00	Moddulagudem	Dacharam	Kukunooru	WEST GODAVARI
170		45.00	Ramannagudem	Dacharam	Kukunooru	WEST GODAVARI
171		45.00	Kondraka	Kondraka	Kukunooru/Burgampadu	EAST GODAVARI
172		45.00	Venkatayapalem	Venkannagudem	Kunavaram	EAST GODAVARI
173		45.05	Peddarkuru	Peddarkuru	Kunavaram	EAST GODAVARI
174		45.05	Musurugudem	Bhagavanpuram	Kunavaram	EAST GODAVARI
175		45.05	Pandirajupalli	Pandrajupeta	Kunavaram	EAST GODAVARI
176		45.10	Thallagondi	Koida	Velairpadu	WEST GODAVARI
177		45.10	K.Kothagudem	K.Kothagudem	V.R.Puram	EAST GODAVARI
178		45.10	Pocharam	Pocharam	V.R.Puram	EAST GODAVARI
179		45.10	Tekuru	Tekuru	Velairpadu	WEST GODAVARI
180		45.10	Kacharam	Kacharam	Velairpadu	WEST GODAVARI
181		45.10	Pocharam	Pocharam	Kukunooru	WEST GODAVARI
182		45.10	Kunavaram	Kunavaram	Kunavaram	EAST GODAVARI
183		45.10	Jinnelaguem (Mangalagudem)	Pandrajupeta	Kunavaram	EAST GODAVARI
184		45.10	Chinarkuru(G) Jinnelaguem	Chinarukuru(G)	Kunavaram	EAST GODAVARI
185		45.10	Palagudem	Palagudem	Chinturu	EAST GODAVARI
186		45.13	Chokkanapalli	Chokkanapalli	V.R.Puram	EAST GODAVARI
187		45.20	Korrajulagudem	Thatkurugommu	Velairpadu	WEST GODAVARI
188		45.20	Narayanapuram	Narayanapuram	V.R.Puram	EAST GODAVARI
189		45.22	Kachavaram	Kachavaram	Kunavaram	EAST GODAVARI
190		45.27	kukunooru	Kukunuru	Kukunooru	WEST GODAVARI
191		45.27	Pusugudem	Sabarikothagudem	Kunavaram	EAST GODAVARI
192		45.28	Gommugudem	Gommugudem	Kunavaram	EAST GODAVARI
193		45.30	Pusugondi	Koida	Velairpadu	WEST GODAVARI
194		45.30	Veerapuram	Chatti	Chinturu	EAST GODAVARI
195		45.32	Nandigama	Nandigama	Yetapaka	EAST GODAVARI
196		45.32	Gowridevipeta	Gowridevipeta	Yetapaka	EAST GODAVARI
197		45.35	Kothuru	Kothuru	Velairpadu	WEST GODAVARI
198		45.36	Bandarugudem/ Laxmipuram	Bandarugudem	Chinturu	EAST GODAVARI
199		45.40	Pochavaram	Pochavaram	Kunavaram	EAST GODAVARI
200		45.47	Chatti	Chatti	Chinturu	EAST GODAVARI
201		45.50	Upparimaddigatla	Arvaipalli	Kukunooru	WEST GODAVARI
202		45.50	Bandaru gudem	Nandigama	Yetapaka	EAST GODAVARI
203		45.52	Kudalipadu	Kudalipadu	Kunavaram	EAST GODAVARI
204		45.53	Jaggavaram	Jaggavaram	Kunavaram	EAST GODAVARI
205		45.53	Mulluru	Mulluru	Kunavaram	EAST GODAVARI
206		45.54	A.Venkannagudem	A.Venkannagudem	V.R.Puram	EAST GODAVARI
207		45.54	Ummadivaram	Ummadivaram	V.R.Puram	EAST GODAVARI
208		45.55	Narasinga peta	Narasingapeta	Chinturu	EAST GODAVARI
209		45.60	Katkuru	Katkuru	Velairpadu	WEST GODAVARI
210		45.60	Maddigatla	Repakagommu	Velairpadu	WEST GODAVARI
211		45.60	Siddaram	Siddaram	Velairpadu	WEST GODAVARI
212		45.60	Venkatayapalem (G)	Venkatayapalem	Kunavaram	EAST GODAVARI
213		45.60	Narsingapeta	Narsingapeta	Kunavaram	EAST GODAVARI
214		45.60	Abhicherla	Abhicherla	Kunavaram	EAST GODAVARI
215		45.60	Turakalagudem (Bhimavaram)	Turakalagudem (Bhimavaram)	Kunavaram	EAST GODAVARI

between 45-46
No. of Villages: 75

S.No	Contour Level	Village RL	Name of the Habitations	Name of the Revenue Village	Name of the Mandal	Name of the District
216		45.60	Chidumuru	Chidumuru	Chinturu	EAST GODAVARI
217		45.61	Chuchirevula	Chuchirevula	Kunavaram	EAST GODAVARI
218		45.61	Marrigudem	Marrigudem	Kunavaram	EAST GODAVARI
219		45.62	Chagarpalli	Thatkurugommu	Velairpadu	WEST GODAVARI
220		45.63	Kondrajupeta	Kondarajupeta	Kunavaram	EAST GODAVARI
221		45.63	Wolfordpeta	Wolfordpeta	Kunavaram	EAST GODAVARI
222		45.66	Dugutta	Dugutta	Kunavaram	EAST GODAVARI
223		45.67	Rayigudem	Issunuru	V.R.Puram	EAST GODAVARI
224		45.68	Nallagunta	Nallagunta	Yetapaka	EAST GODAVARI
225		45.68	Nallagunta 111	Nallagunta 111	Yetapaka	EAST GODAVARI
226		45.70	Ippuru	Ippuru	V.R.Puram	EAST GODAVARI
227		45.70	Vasantavada	Thatkurugommu	Velairpadu	WEST GODAVARI
228		45.70	Yerrametta	Siddaram	Velairpadu	WEST GODAVARI
229		45.70	Chalampalem	Chalampalem	Yetapaka	EAST GODAVARI
230		45.70	Ulumuru	Ulumuru	Chinturu	EAST GODAVARI
231		45.70	Mallithota	Mallithota	Chinturu	EAST GODAVARI
232		45.71	Nandigamapadu	Nandigama	Yetapaka	EAST GODAVARI
233		45.71	Koderu	Koderu	Kunavaram	EAST GODAVARI
234		45.72	Yadavalli	Chigurumamidi	Velairpadu	WEST GODAVARI
235		45.72	Pochavaram colony	Pochavaram	Kunavaram	EAST GODAVARI
236		45.72	Kachavaram Colony	Kachavaram	Kunavaram	EAST GODAVARI
237		45.72	Rekapalli	Rekhapalli	V.R.Puram	EAST GODAVARI
238		45.72	Rajupeta Colony	Rekhapalli	V.R.Puram	EAST GODAVARI
239		45.72	Suddagudem	Suddagudem	V.R.Puram	EAST GODAVARI
240		45.79	China Narasingapeta	Narasingapeta	Kunavaram	EAST GODAVARI
241		45.86	Repaka	Repaka	Kunavaram	EAST GODAVARI
242		45.95	Murumuru	Murumuru	Yetapaka	EAST GODAVARI
243		45.96	Bhagavanpuram	Bhagavanpuram	Kunavaram	EAST GODAVARI
244		45.98	Bandarugudem	Peddarkuru	Kunavaram	EAST GODAVARI
245		45.98	Kodayagudem	Kondaigudem	Kunavaram	EAST GODAVARI
246		45.98	Palluru	Palluru	Kunavaram	EAST GODAVARI
247		46.00	Kondepudi	Kondepudi	V.R.Puram	EAST GODAVARI
248		46.10	Gommumurumuru	Murumuru	Yetapaka	EAST GODAVARI
249		46.20	Pinapalli	Pinapalli	Yetapaka	EAST GODAVARI
250		46.20	Seetharampuram	Seetharampuram	Kunavaram	EAST GODAVARI
251		46.21	Gorlagudem	Kummuru	Chinturu	EAST GODAVARI
252		46.24	Koppalle	Kopalle	V.R.Puram	EAST GODAVARI
253		46.30	Chuchirevulagudem	Chuchirevulagudem	Kunavaram	EAST GODAVARI
254		46.30	Lakshmipuram	Lakshmipuram	Kunavaram	EAST GODAVARI
255		46.30	Lellavai	Lellavai	Kunavaram	EAST GODAVARI
256		46.40	Thotapalli	Thotapalli	Yetapaka	EAST GODAVARI
257		46.41	Lingapuram	Lingapuram	Kunavaram	EAST GODAVARI
258		46.50	Nagulagudem	Thatkurugommu	Velairpadu	WEST GODAVARI
259		46.50	Ratnapuram	Ratnapuram	Chinturu	EAST GODAVARI
260	between 46-47	46.60	Koyagudem	Kondapally	Kukunooru	WEST GODAVARI
261	No. of Villages: 25	46.65	Amaravaram	Amaravaram	Kukunooru	WEST GODAVARI
262		46.68	Bollapalli	Chigurumamidi	Velairpadu	WEST GODAVARI
263		46.68	Singanagudem	Singanagudem	Chinturu	EAST GODAVARI
264		46.70	Madharam	Madharam	Kukunooru	WEST GODAVARI
265		46.70	Bestagudem	Dacharam	Kukunooru	WEST GODAVARI
266		46.70	Achutapuram	Achutapuram	Yetapaka	EAST GODAVARI
267		46.72	Cheeravalli	Cheeravalli	Kukunooru	WEST GODAVARI
268		46.76	Raghavapuram	Raghavapuram	Yetapaka	EAST GODAVARI
269		46.85	Yellappagudem	Damaracharla	Kukunooru	WEST GODAVARI
270		46.85	Thotapally	Thotapally	V.R.Puram	EAST GODAVARI
271		47.00	Kondayaigudem	Kondayaigudem	Yetapaka	EAST GODAVARI
272		47.00	Dammapeta	Dammapeta	Yetapaka	EAST GODAVARI
273		47.06	Ramachandrapuram (Kothuru)	Cheeravalli	Kukunooru	WEST GODAVARI
274		47.12	Nuthigudem	Nuthigudem	V.R.Puram	EAST GODAVARI
275		47.13	Borigudem	A.Venkannagudem	V.R.Puram	EAST GODAVARI
276		47.13	SabariRavigudem	Sabarivarigudem	V.R.Puram	EAST GODAVARI
277		47.35	Vegithota	Vegithota	Chinturu	EAST GODAVARI
278		47.41	Lachagudem	Pocharam	Kukunooru	WEST GODAVARI
279		47.56	bonagiri	Ravigudem (Big)	Kukunooru/Burgampadu	WEST GODAVARI
280		47.61	Chinapolipaka	Chinapolika	Kunavaram	EAST GODAVARI
281	between 47-48	47.61	Peddapolipaka	Pedapolipaka	Kunavaram	EAST GODAVARI
282	No. of Villages: 18	47.68	Dacharam	Dacharam	Kukunooru	WEST GODAVARI
283		47.69	Sunnamvarigudem	Chinnamettapalli	V.R.Puram	EAST GODAVARI
284		47.70	Chinnamettapalli	Chinnamettapalli	V.R.Puram	EAST GODAVARI
285		47.75	Jaggavaram colony	Jaggavaram	Kunavaram	EAST GODAVARI
286		47.80	Maredubaka	Maredubaka	Kukunooru	WEST GODAVARI
287		47.82	Gundubarigudem	Gundubarigudem	Kunavaram	EAST GODAVARI
288		47.90	Kothuru	Kothuru	Kunavaram	EAST GODAVARI

S.No	Contour Level	Village RL	Name of the Habitations	Name of the Revenue Village	Name of the Mandal	Name of the District
289		47.97	Potlavarigudem	Potlavarigudem	Kunavaram	EAST GODAVARI
290		48.00	Kondapalli	Kondapally	Kukunooru	WEST GODAVARI
291		48.10	Burrathogu	Thatkurugommu	Velairpadu	WEST GODAVARI
292		48.10	Kowdanyamukthi	Kowdanyamukthi	Kukunooru	WEST GODAVARI
293		48.31	Komatlagudem	Komatlagudem	Kukunooru	WEST GODAVARI
294		48.32	Kuturu	Kuturu	Kunavaram	EAST GODAVARI
295		48.50	Ayyavarigudem	Ayyavaraigudem	Kunavaram	EAST GODAVARI
296		48.50	Gurram peta	Gurrampeta	V.R.Puram	EAST GODAVARI
297		48.52	T.P Veedu	T.P.Veedu	Yetapaka	EAST GODAVARI
298		48.54	Venkatareddy peta	Chodavaram	Yetapaka	EAST GODAVARI
299	between 48-49	48.54	Rayunipeta	Rayunipeta	Yetapaka	EAST GODAVARI
300	No. of Villages: 18	48.54	Gundala Colony	Gundala	Yetapaka	EAST GODAVARI
301		48.58	Somulagudem	Somulagudem	V.R.Puram	EAST GODAVARI
302		48.68	Narasimhapuram	Narasimhapuram	Chinturu	EAST GODAVARI
303		48.70	Ramasingaram	Kukunuru	Kukunooru	WEST GODAVARI
304		48.80	Damaracharla	Damaracharla	Kukunooru	WEST GODAVARI
305		48.94	Kistaram/Krishnavaram	Kistaram/Krishnavaram	Yetapaka	EAST GODAVARI
306		48.94	Bandarugudem	Kistaram/Krishnavaram	Yetapaka	EAST GODAVARI
307		48.94	Bhupathirao peta	Kistaram/Krishnavaram	Yetapaka	EAST GODAVARI
308		48.95	Kivvaka	Kivvaka	Kukunooru	WEST GODAVARI
309		49.10	Kammarigudem	Komatlagudem	Kukunooru	WEST GODAVARI
310		49.18	Gannavaram	Gannavaram	Yetapaka	EAST GODAVARI
311		49.36	Regulapadu	Regulapadu	Kunavaram	EAST GODAVARI
312		49.46	Errampeta	Errampeta	Chinturu	EAST GODAVARI
313		49.56	Gondu Rajupeta	Rajupeta	Yetapaka	EAST GODAVARI
314	between 49-50	49.56	Gundala	Gundala	Yetapaka	EAST GODAVARI
315	No. of Villages: 12	49.85	Ayyavaripeta	Ayyavaripeta	Yetapaka	EAST GODAVARI
316		49.85	Regatigutta	Ayyavaripeta	Yetapaka	EAST GODAVARI
317		49.89	Nelliapaka	Nelliapaka	Yetapaka	EAST GODAVARI
318		49.89	Buttaigudem	Buttaigudem	Yetapaka	EAST GODAVARI
319		49.91	Kumaraswamigudem	Kumaraswamigudem	Kunavaram	EAST GODAVARI
320		0.00	Devarapalli	Devarapalli	Yetapaka	EAST GODAVARI
321		50.73	Thondipaka	Thondipaka	Kukunooru	WEST GODAVARI
322	between 50-51	50.95	Ramanapalem	Ramanapalem	Chinturu	EAST GODAVARI
323	No. of Villages: 5	50.99	Kapavaram	Kapavaram	Yetapaka	EAST GODAVARI
324		51.00	Kothuru	Ramachandra puram (Kothuru)	Kukunooru	WEST GODAVARI
325		51.00	Kusumanepalli	Kusumanepalli	Yetapaka	EAST GODAVARI
326		51.02	Paidigudem	Paidgudem	Kunavaram	EAST GODAVARI
327		51.03	Venkatapuram	Ravigudem (Big)	Kukunooru/Burgampadu	EAST GODAVARI
328		51.10	Muthyalamma padu	Vinjaram	Kukunooru	WEST GODAVARI
329		51.25	Chinaseethanapally	Chinaseethanapally	Chinturu	EAST GODAVARI
330		51.48	Pedamettapalli	Pedamettapalli	V.R.Puram	EAST GODAVARI
331	between 51-52	51.52	Chinna Nallagunta	Chinna Nallagunta	Yetapaka	EAST GODAVARI
332	No. of Villages: 12	51.68	Alligudem	Ratnapuram	Chinturu	EAST GODAVARI
333		51.79	Seethapuram	T.P.Veedu	Yetapaka	EAST GODAVARI
334		51.79	Prakash Nagar	T.P.Veedu	Yetapaka	EAST GODAVARI
335		51.85	Kapagampalli	Kapagampalli	Yetapaka	EAST GODAVARI
336		51.92	Korlakonta	Kukunuru	Kukunooru	WEST GODAVARI
337		51.98	Mummidivaram	Mummidivaram	Yetapaka	EAST GODAVARI
338		52.16	Kunjavarigudem	Kunjavarigudem	V.R.Puram	EAST GODAVARI
339		52.23	Puchirala colony	Repakagommu	Velairpadu	WEST GODAVARI
340		52.44	Rachagampalli	Rachagampalli	Yetapaka	EAST GODAVARI
341	between 52-53	52.62	Kistaram	Kukunuru	Kukunooru	WEST GODAVARI
342	No. of Villages: 9	52.66	Tummayapeta	Tummayapeta	V.R.Puram	EAST GODAVARI
343		52.72	Upperu	Upperu	Kukunooru	WEST GODAVARI
344		52.80	Gommukoyagudem	Gommukoyagudem	Yetapaka	EAST GODAVARI
345		52.80	Ganganametta	Ganganametta	Chinturu	EAST GODAVARI
346		52.92	Ganapavaram	Ganapavaram	Kukunooru/Burgampadu	EAST GODAVARI
347		53.10	Gumpenapalli	Gumpenapalli	Kukunooru/Burgampadu	WEST GODAVARI
348		53.10	Chodavaram	Chodavaram	Yetapaka	EAST GODAVARI
349	between 53-54	53.11	Seetharamnagar	Seetharamnagar	Kukunooru/Burgampadu	EAST GODAVARI
350	No. of Villages: 7	53.17	Gollagudem	G.Kothagudem	Yetapaka	EAST GODAVARI
351		53.36	Badaraigudem	Pedaseethanapally	Chinturu	EAST GODAVARI
352		53.40	Alligudem	Ravigudem (Big)	Kukunooru/Burgampadu	EAST GODAVARI
353		53.72	Mittagudem	Thondipaka	Kukunooru	WEST GODAVARI
354		54.01	Kannapuram	Kannapuram	Chinturu	EAST GODAVARI
355		54.03	Sridhara	Sridhara-Velair	Kukunooru/Burgampadu	EAST GODAVARI
356	between 54-55	54.08	Pedaseethanapally	Pedaseethanapally	Chinturu	EAST GODAVARI
357	No. of Villages: 6	54.52	Marripadu	Cheeravalli	Kukunooru	WEST GODAVARI
358		54.53	Yerragunta	Yerragunta	Yetapaka	EAST GODAVARI
359		54.87	G.Kothagudem	G.Kothagudem	Yetapaka	EAST GODAVARI
360		55.10	Kannaigutta	Thirunipapuram	Velairpadu	WEST GODAVARI
361		55.15	Budevipeta	Thatkurugommu	Velairpadu	WEST GODAVARI

S.No	Contour Level	Village RL	Name of the Habitations	Name of the Revenue Village	Name of the Mandal	Name of the District
362	between 55-56	55.20	Burgampadu	Burgampadu	Kukunooru/Burgampadu	EAST GODAVARI
363	N. of Villages: 6	55.32	Gannuru Koyapadu	Gowridevipeta	Yetapaka	EAST GODAVARI
364		55.50	Reddigudem	Upperu	Kukunooru	WEST GODAVARI
365		55.75	Gogubaka	Gogubaka	Yetapaka	EAST GODAVARI
366		56.08	Narasingapeta	Narasingapeta	Yetapaka	EAST GODAVARI
367	between 59-60	60.00	Ramavaram	Ramavaram	Velairpadu	WEST GODAVARI
368	between 61-62	62.00	Banjaragudem	Thondipaka	Kukunooru	WEST GODAVARI
369	between 62-63	62.68	Ravigudem	Ravigudem (Big)	Kukunooru/ Burgampadu	EAST GODAVARI
370	between 64-65	64.10	Veleru	Sridhara-Velair	Kukunooru/ Burgampadu	EAST GODAVARI
371	between 66-67	66.54	Ibrahimpet	Ibrahimpet	Kukunooru/ Burgampadu	EAST GODAVARI

Sd/- M.Nagi Reddy
Superintending Engineer,
PIPHW Circle,Dowlaiswaram

//t.c.f//

K. Karthikeyan
Deputy Superintending Engineer
29/1/2020

29/1/2020.

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