(5)

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From
The Chief Engineer
400kV Construction,
Vidyut Soudha,
Vijayawada–520 004.

To
The Secretary, APERC,
11-4-660, 4th Floor,
Singareni Bhavan, Red Hills,
HYDERABAD–500 004

Lr.No.CE/400kVCont/SE/PM/400kV/D1-A(S)/Polavaram/D.No. 05 /20,Dt.: 03.01.2020

Sir,

Sub : APTRANSCO- Transmission Scheme for evacuation of power from(12 x 80) MW Polavaram Hydro Electric Project in East Godavari District of Andhra Pradesh –Revised Investment proposal - Clarification Submitted for approval - Regarding.

Ref: 1) T.O.O.(CE-400kV Construction) Ms.No. 664, Date.18.01.2018
2) Lr.No.E-500-66/DD-Trans/2018,dt.21.07.2018
3) T.O.O.(CE-400kV Construction) Ms.No. 1029, Date.14.12.2018
4)Lr.No.CE/400kVCont/SE/PM/400kV/D1-A(S)/Polavaram/D.No.448/Dt.19.12.2018
5) Lr.No. E-500-66/DD-Trans/2019,Dt10.04.2019(received in this office on 17.04.19)
6) Lr.No.CE/400kV Const/SE/PM/400kV/D1-A(S)/Polavaram/D.No.139/19, Dt.30.04.2019

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This has with reference to the letter 5th cited, wherein the revised investment proposals of the Transmission scheme submitted by APTRANSCO to the Hon'ble APERC for Evacuation of 960 (12 x 80) MW Polavaram Hydro Electric Project are returned stating that the geographical distance between Polavaram and Guddigudem is not matching with proposed line length (60km) of Polavaram-Guddigudem QMDC line.

In this connection, it is submitted as follows:

1. The length of 60 kms considered in the Administrative approval for the proposed 400kV Poalavarm0-Guddigudem Line is for the estimate purpose only. There are number of villages, developed areas, Real Estate Ventures, Gardens along the route of line. Considerable part of the line is going through Forest Area. To avoid maximum Forest area, the line is routed through the other areas where ROW constraints are less.

   As such, taking into consideration all the above factors, line length is considered for the estimate purpose (i.e for administrative approval) on little higher side to cover the variation during the execution i.e during check survey after completion of preliminary and detailed surveys.

Contnd 2

Andhra Pradesh Electricity Regulatory Commission
185
13 JAN 2020
Hyderabad.

2. However, the payments will be limited both for the supplies and works to the actual during execution, depending on the final check survey approvals. As such, there will not be extra commitment to APTRANSCO on account of this.
3. Further, it is to submit that the approval for the earlier proposal of APTANSCO for construction of Polavaram Transmission line project with the Tr. Elements was already approved by CEA in 1st southern Region Standing committee on transmission held on 07.09.2018.
4. The CEA Approval for the revised proposal is herewith submitted to the Hon'ble APERC commission.

As the Polavaram Project is going to be completed on top priority, to meet the Power Evacuation schedule of Generation plant at Polavaram (12x 80 MW),APTRANSCO is going ahead with the issue of Purchase Order for the subject work, pending approval of the Hon'ble commission. It is once again submitted to the Hon'ble commission with a request to consider the above revised scheme and to arrange to accord necessary approval at the earliest as the original Polavaram scheme is already approved vide Commissions No.APT/E-500-66/INVST-30/2018,dt.21.07.2018.

Yours faithfully

Chief Engineer
400kV Construction

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग -II
Power System Planning & Appraisal Division-II

सेवा मे / To,

संलग्न सूची के अनुसार
As per list enclosed

विषय: पारेषण तंत्र पर दक्षिणी क्षेत्र स्थायी समिति (एसआरएससीटी) की द्वितीय बैठक की कार्यवृत्त।

Subject: Minutes of 2nd meeting of Southern Region Standing Committee on Transmission (SRSCT).

महोदय(Sir)/महोदया(Madam),

The 2nd meeting of Southern Region Standing Committee on Transmission (SRSCT) was held on **10 June 2019 (Monday) at Bengaluru.** A copy of minutes of the meeting is enclosed for your information and necessary action.

भवदीय/Yours faithfully,

P Jindal 10/07/2019

(प्रदीप जिंदल/ Pardeep Jindal)
मुख्य अभियंता/ Chief Engineer

प्रति सूचनार्थ/ Copy for kind information to:
1) PPS to Member (PS), CEA

i. Up-gradation of 220 kV Atchuthapuram S/S to 400/220 kV Atchuthapuram S/S with 3 x 500 MVA PTRs.
ii. Making LILO (4 km approx.) of existing 400 kV Kalapaka - Vemagiri TMSC & Vemagiri – Simhadri TMSC line at proposed 400/220 kV Atchuthapuram SS.
iii. Making 220 kV LILO (12 km approx.) of existing 220 kV Pendurthi - Upper Sileru SC line at proposed 400/220 kV Atchuthapuram SS.
iv. Making 220 kV LILO (12 km approx.) of existing 220 kV Koruprolu -Kakinada SC line & Koruprolu - Anark SC line at proposed 400/220 kV Atchuthapuram SS.
v. Erection of 220 kV DC line (8 km approx.) from 220 kV Brandix SS to proposed 220 kV Atchuthapuram SS.

9.2 The above proposal of APTRANSCO was agreed by the Standing Committee.

10.0 Proposal by APTRANSCO for evacuation of 960 MW (12x80 MW) power from Polavaram Hydro Electric Project of APGENCO in East Godavari district and system improvement network connected to 400 kV Guddigudem SS and Inter connection of 220 kV Lines.

10.1 Director (PSPA-II), CEA, stated that the following dedicated transmission scheme for evacuation of 960 MW (12 x 80 MW) power from Polavaram Hydro Electric Project (PHEP) was agreed in 42nd meeting of SCPSPSR:

i. KV Kota – PHEP 400kV D/C line (with quad Moose ACSR conductor) – 79 km.
ii. 2 x 125 MVAr, 400 kV bus Reactor at Polavaram Hydro Electric Project.

10.2 Subsequently, following 220 kV downstream power evacuation system from 400 kV Polavaram HEP and GVK power plant, by providing 2x 500 MVA, 400/220 kV at each location to overcome the overloading conditions in and around Ramachandrapuram area, was agreed in 1st meeting of SRSCT as an intra-state system:

i. 2 x 500 MVA, 400/220kV ICTs at PHEP.
ii. Polavaram- Pattiseema 220 kV D/C line (Twin Moose ACSR, 16 km approx.)
iii. LILO of both circuits of Polavaram - Pattiseema 220 kV D/C line at Purushothapatnam S/S (1 km approx.).
iv. LILO of the both existing circuits of the Vemagiri - Samalkot 220 kV D/C line at Jegurupadu S/S (1 km approx.)
v. 2x500 MVA, 400/220 kV ICTs at GVK-2 Power Plant
vi. 2x100 MVA, 220/132 kV ICTs at Ramachandrapuram SS
vii. GVK-2 Power Plant –Ramachandrapuram 220 kV D/C line (single moose ACSR conductor (25 km approx.)
viii. LILO of existing 132 kV RC Puram- Kakinada 132 kV D/C line at proposed at RC Puram (0.5 km approx.)

ix. LILO of existing 132 kV RC Puram - Editha at proposed 220/132 kV S/S at RC Puram (1 km approx.)

x. LILO of existing 132 kV RC Puram - Kothapeta at proposed 220/132 kV SS at RC Puram (6 km approx.)

xi. Gollapalem - RC Puram 132 kV D/C line (18 km approx.).

10.3 Director (PSPA-II), CEA, further stated that APTRANSCO has informed that space was not available for establishment of 220 kV features at Polavaram HEP. Accordingly, APTRANSCO had proposed the following revised transmission evacuation scheme for 12 x 80 MW (960 MW) Polavaram Hydro Electric Project in East Godavari district:

i. Polavaram – Guddigudem 400 kV D/c (quad) line.

ii. LILO of both circuits of existing Pallantha – Pattiseema 220 kV D/c line at 400/220 kV Guddigudem S/s.

iii. Purushothapuram – Guddigudem 220 kV D/c line.

(Guddigudem SS was already approved under Chintalapudi Lift Irrigation Scheme in the 41st SRSCT)

10.4 In the joint study meeting, CEA and CTU had opined that the proposed arrangement may result into constraints in power evacuation from Polavaram HEP and Hinduja generation projects due to overloading of Guddigudem – KV Kota section of the transmission system. After detailed discussions, following scheme was proposed for evacuation of power from Polavaram HEP.

i. Polavaram – Guddigudem 400 kV D/c (quad) line

ii. Guddigudem - Eluru 400 kV D/c (quad) line

Further, it was also brought out that there should be proper reactive compensation at Guddigudem and Eluru.

10.5 It was agreed to drop the following transmission system which had been approved in the 1st SRSCT meeting, on account of non-availability of space for establishment of 220 kV features at Polavaram HEP:

Dropped

i. 2 x 500 MVA, 400/220kV ICTs at PHEP.

ii. Polavaram- Pattiseema 220 kV D/C line (Twin Moose ACSR, 16 km approx.)

iii. LILO of both circuits of Polavaram - Pattiseema 220 kV D/C line at Purushothapatnam S/S (1 km approx.).

10.6 Accordingly, after further deliberations, following transmission scheme was agreed for evacuation of 960 MW power from PHEP by the Standing Committee:

i. Polavaram – Guddigudem 400 kV D/c (quad) line

ii. Guddigudem - Eluru 400 kV D/c (quad) line

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From
The Chief Engineer
400kV Construction,
Vidyut Soudha,
Vijayawada – 520 004.

To
The Secretary, APERC,
11-4-660, 4th Floor,
Singareni Bhavan, Red Hills,
HYDERABAD – 500 004

Lr.No.CE/400kVCont/SE/PM/400kV/D1-A(S)/Polavaram/D.No.139/19,Dt.:30.04.2019
Sir,

Sub : APTRANSCO- Transmission Scheme for evacuation of power from(12 x 80) MW Polavaram Hydro Electric Project in East Godavari District of Andhra Pradesh –Revised Investment proposal - Clarification Submitted for approval - Regarding.

Ref: 1) T.O.O.(CE-400kV Construction) Ms.No. 664, Date.18.01.2018
2) Lr.No.E-500-66/DD-Trans/2018,dt.21.07.2018
3) T.O.O.(CE-400kV Construction) Ms.No. 1029, Date.14.12.2018
4)Lr.No.CE/400kVCont/SE/PM/400kV/D1-A(S)/Polavaram/D.No.448/Dt.19.12.2018
5) Lr.No. E-500-66/DD-Trans/2019,Dt10.04.2019(received in this office on 17.04.19)

This has with reference to the letter 5th cited, wherein the revised investment proposals of the Transmission scheme submitted by APTRANSCO to the Hon'ble APERC for Evacuation of 960 (12 x 80) MW Polavaram Hydro Electric Project are returned stating that the geographical distance between Polavaram and Guddigudem is not matching with proposed line length (60km) of Polavaram-Guddigudem QMDC line.

In this connection, it is submitted as follows:

1. The length of 60 kms considered in the Administrative approval for the proposed 400kV Poalavarm0-Guddigudem Line is for the estimate purpose only. There are number of villages, developed areas, Real Estate Ventures, Gardens along the route of line. Considerable part of the line is going through Forest Area. To avoid maximum Forest area, the line is routed through the other areas where ROW constraints are less.

As such, taking into consideration all the above factors, line length is considered for the estimate purpose (i.e for administrative approval) on little higher side to cover the variation during the execution i.e during check survey after completion of preliminary and detailed surveys.

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In this connection, it is submitted as follows:

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2. However, the payments will be limited both for the supplies and works to the actual during execution, depending on the final check survey approvals. As such, there will not be extra commitment to APTRANSCO on account of this.

3. Further, it is to submit that the approval for the earlier proposal of APTANSCO for construction of Polavaram Transmission line project with the Tr. Elements was already approved by CEA in 1st southern Region Standing committee on transmission held on 07.09.2018.

4. The revised proposal is already submitted to CEA as an agenda and this will be going to be discussed in the forthcoming meeting. After receipt of minutes, the same will be submitted to the Hon'ble APERC commission.

As the Polavaram Project is going to be completed on top priority, to meet the Power Evacuation schedule of Generation plant at Polavaram (12x 80 MW), it is submitted to the Hon'ble commission with a request to consider the above revised scheme and to arrange to accord necessary approval at the earliest as the original Polavaram scheme is already approved vide Commissions No.APT/E-500-66/INVST-30/2018,dt.21.07.2018.

Yours faithfully

Chief Engineer
400kV Construction

ANDHRA PRADESH ELECTRICITY REGULATORY COMMISSION
Phone Nos.(040)233976381/399/556 Fax No.(040)23397378 website www.aperc.gov.in

From
Joint Director (Engg.), APERC,
#11-4-660, 4th Floor,
Singareni Bhavan, Red Hills,
Hyderabad – 500 004.

To
The Chief Engineer,
Construction, AP Transco,
Vidyut Soudha, Gunadala – 524 004
Vijayawada.

Lr. No. E-500-66 / DD Trans/2019 Date: 03-06-2019

Sir,

Sub: Revised Scheme - Polavaram Hydro Electric Project (12 x 80 MW) in E.G.Dist. - Return of investment scheme.

Ref: 1. Lr.No.CE/400kV Const./SE/PM/400kV/DI-A(S) /Polavaram/D.No.214/18 Dt: 18-06-2018.
2. Lr.No.CE/400kV Const./SE/PM/400kV/DI-A(S) /Polavaram/D.No.448/18 Dt: 19-12-2018.
3. Lr.No. E-500-66/DD-Trans/2018, Dated 21-07-2018.

* * *

M/s. APTRANSCO submitted an investment proposal for erection of "Transmission scheme for power evacuation from 12 x 80 MW Polavaram Hydro Electric Power Project" at an estimated cost of Rs. 292.49 crs. The Commission granted approval and the same was communicated to M/s. APTRANSCO vide letter dated 21-07-2018.

2) M/s APTRANSCO submitted revised investment scheme for an amount of Rs.358.10 crs stating that "220 kV downstream evacuation system by providing 2 x 500 MVA, 400/220 kV ICTs at Polavaram HEP SS" is required to overcome the overloading conditions in and around Ramachandrapuram area.

Please see the investment scheme submitted vide reference (1) cited above and investment scheme submitted vide reference (2) cited wherein M/s. APTRANSCO furnished different rates for similar works which are highly in deviation.

Item Description	Old Proposal		New Proposal	
	Polavaram HPS Kamavarapukota	Amount (Rs. Lakhs)	Polavaram HPS Guddigudem	Amount (Rs. Lakhs)
400 kV QMDC Line	70 km	21511.71	60 km	27980.00
400 kV Quad Bay Extensions	2nos. Kamavarapukota SS	2139.85	2 nos. Guddigudem	845.10

3) Now M/s. APTRANSCO submitted another scheme proposing addition of 220 kV downstream network with an amount of Rs. 114.40 crs.

4) It is not known, why M/s. APTRANSCO is planning the power evacuation scheme related to Polavaram HEP in piece meal method. Any transmission scheme related to Power evacuation should be planned in a comprehensive manner to have coordinated, efficient transmission system. In each proposal M/s. APTRANSCO is mentioning different reasons which cannot be comprehended.

5) M/s. APTRANSCO also mentioned about 2 x 500 MVA, 400/220 kV ICTs at Polavaram HEP SS to overcome overloading conditions in and around Ramachandrapuram area. There is no mention about this proposal in any of the scheme received so far. Similarly, there was no mention about 2 x 125 MVAR Bus reactors at Polavaram HEP SS in any scheme received so far.

6) To understand the Polavaram power evacuation scheme in full shape, it is very much essential to conduct the load flow studies considering all the proposed network elements at a time and the output results of such comprehensive load flow studies can be understood in a better manner.

7) In view of the above, the investment scheme is herewith returned. M/s. APTRANSCO is directed to submit a revised comprehensive investment scheme by conducting detailed load flow studies considering all the network elements at a time that are envisaged.

Yours faithfully,

Joint Director (Engg.)

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APERC
HYDERABAD
428
13 JUN 2019
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TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From
The Chief Engineer
400kV Construction,
Vidyut Soudha,
Vijayawada – 520 004.

To
The Secretary, APERC,
11-4-660, 4th Floor,
Singareni Bhavan, Red Hills,
HYDERABAD – 500 004

Lr.No.CE/400kVCont/SE/PM/400kV/D1-A(S)/Polavaram/D.No.448/18,Dt.:19.12.2018

Sir,

Sub : APTRANSCO- Transmission Scheme for evacuation of power from(12 x 80) MW Polavaram Hydro Electric Project in East Godavari District of Andhra Pradesh –Revised Investment proposal - Submitted for approval - Regarding.

Ref: 1) T.O.O.(CE-400kV Construction) Ms.No. 664, Date.18.01.2018
2) Lr.No.E-500-66/DD-Trans/2018,dt.21.07.2018
3) T.O.O.(CE-400kV Construction) Ms.No. 1029, Date.14.12.2018

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229/22/12/18

It is to submit that the Hon'ble APERC commission was accorded investment approval for Transmission Scheme for evacuation of power from(12 x 80) MW Polavaram Hydro Electric Project in East Godavari District of Andhra Pradesh at an estimated cost of Rs. 292.49 Crores vide Commission's reference No.APT/E-500-66/INVST-30/2018,dt.21.07.2018.

APTRANSCO has accorded revised administrative approval for the subject scheme at an estimated cost of Rs.358.10 Crores including an IDC of 26.00 Crores due to change in connectivity proposed earlier .

In this connection, the following information is submitted to Hon'ble commission regarding the modifications proposed to the scope of subject scheme works :

1. The scheme was originally approved with following connectivity during CEA 42nd Standing Committee meeting held on 27.04.2018 at Ernakulam, Kerala

a) 400kV Polavaram –Kamavarapukota QMDC Line of length 70 Kms (approx.)

b) 2 Nos. 400kV Bays at existing 400/220kV Kamavarapukota SS to meet the Power Evacuation from 960 MW Polavaram Hydro Electric Power Project which is under construction by M/s. APGENCO.

2. Further ,it was proposed to add 220kV down stream evacuation system for 400kV Polavaram Hydro Electric Project by providing 2 x 500 MVA,400/220kV ICTs at Polavaram HEP SS to overcome the overloading conditions in and around Ramachanadrapuram area by making

Contnd…2

3. LILO of (i) 220kV Polavaram-Pattiseema line at 220kV purushothapatnam S/S and (i) construction of 220kV Polavaram-Pattiseema Twin Moose D/C line(16 km Approx).

The aforesaid connectivity with 220kV features was approved CEA during 1st Southern standing committee meeting held on 07.09.2018.

4. The Chief Engineer/ IPC & Power Systems has communicated the modified Polavaram Power Evacuation scheme (with Pending CEA approval) consisting of following transmission elements in view of the difficulty expressed by the APGENCO officials in non availability of site for providing 220kV features at 400kV Polavaram HEP SS.

1) 400kV QMDC Line form 400kV Polavaram SS to 400/220/11kV Guddigudem SS – 60Kms.
2) Two (2) Nos. 400kV Bay Extensions at 400/220/11kV Guddigudem SS.
3) Making LILO (12Kms) of existing 220kV DC Line from Pallantla – Pattiseema at 400/220 kV Guddigudem SS.
4) Laying of 220kV DC Line (32 Kms) from 220kV Purushothapatnam SS to 400/220 kV Guddigudem SS.

5. Accordingly, revised administrative approval was issued considering above 400kV Connectivity under Si.No.(i) & (ii) at an estimated cost of Rs. 358 .10 Crores against earlier project estimated cost.of Rs. 292.10 Crores.

The scheme cost is increased by Rs. 66 Crores as the above 400kV QMDC Polavaram-Guddigudem line needs to cross Godavari River and requires 6 Nos towers with Pile foundations which are expensive than normal tower foundations. Also the prices are revised as per latest 400kV SSR-2018-19 of APRANSCO.

6. Being multi-purpose irrigation project which has been accorded national project status by the union government of India and its reservoir spreads in parts of other states also(Odiissa and Chattisgarh) ,APTRANSCO has taken up the subject scheme as precedence project and programmed for tendering soon within couple of weeks.

Contnd…3

In view of the above and as the Hon'ble Chief Minister of Andhra Pradesh prioritized the project and reviewing the project execution weekly the necessary revised investment approval from Hon'ble APERC commission may please be accorded at earliest for the proposed scheme.

Encl: As above.

Yours faithfully

Chief Engineer
400kV Construction

NEW SCHEME - OVERALL DETAILS

INV-1

Name of the Licensee:	APTRANSCO	Date of submission	12.2018
Administrative Sanction	Revised T.O.O.(CE-400kV Construction) Ms.No1029, Date:14.12.2018	Estimated cost	Rs. 358.10 Crore.
Scheme Title	Transmission Scheme for evacuation of power from 960 MW (12 x 80) Polavaram Hydro Power Project in East Godavari District of Andhra Pradesh		
Scheme Description	The scheme comprises the erection of : **a)** 400kV Polavaram HPS - Guddigudem QMDC line b) 2 Nos. 400kV Quad Bay Extensions at Guddigudem 400kV LIS .		
Project Objective	Evacuation of power from 960 MW (12 x 80) Polavaram Hydro Power Project in East Godavari District of Andhra Pradesh		
Mention in Resource Plan	Included in Resource Plan for FY 2018-19		
Nodal Officer of Licensee	Chief Engineer/400kV Construction, APTRANSCO, Vidyuth Soudha, Vijayawada		

For Commission Purpose

Commission Reference Number (CRN): APT/E-500-66/INVST-30/2018,dt.21.07.2018

Shall be unique to the scheme and in future shall be referred by this number

This will be provided once the Commission Staff confirm that the information provided is complete.

Chief Engineer
400kV Construction

TECHNICAL DETAILS ABOUT TRANSMISSION SCHEME

Attach the comprehensive sketch of the scheme: Enclosed.

Lines	District in which project is being taken up	Kilometers of New Line	KMs feeders taken for Bifurcation	KMs of feeders taken for reconductoring	Size and type of conductor used	Part of any special scheme
400kV Polavaram –Guddigudem QMDC Line of length 60 Kms (approx.)	East and West Godavari District	60	-	-	ACSR "Moose" Conductor of size 54/7/3.53 mm	-

Substation	District in which project is being taken up	Number of transformers	Capacity of transformers	Number of out-going feeders	Details of capacitor bank	Part of any special scheme
-	-	-	-	-	-	-

Chief Engineer,
400kV Construction

INV-3

COSTING DETAILS OF SCHEMES

Details of options explored by the Licensee	Revised Transmission Scheme for evacuation of power from 960 MW (12 x 80) Polavaram Hydro Power Project in East Godavari District of Andhra Pradesh. (Awaiting CEA approval.)
Demonstrate that the chosen option is least cost	Chosen option is least cost with reduction of system losses.

(Rupees in Lakhs)

	2018-19	2019-20	2020-21	Total Amount
Major Equipment/ Material	1,000.00	17,000.00	15,210.00	33,210.00
Anciliary Equipment				
Civil works cost				
Erection/ Commissioning charges				
Consultancy Charges	-	- -	-	-

Taxes & Duties	incl.above
Total Cost for work	33,210.00
Interest during Construction	2,600.00
Total Project Cost	35,810.00

Say Rs.358.10 Crores

Chief Engineer
400kV Construction

SCHEME FINANCING DETAILS

INV-4

Total cost of the scheme	Rs. 358.10 Crore
Rupee Loan	Rs. 322.29 Crore
Forex Loan	- Nil -
Internal Accrual	Rs. 35.81 Crore

Financier	Rupee Loan				Forex Loan			
	Loan Amount (Crore Rs.)	Mora-torium	Repayment Period	Interest Rate	Loan Amount	Mora-torium	Re-payment period	Interest Rate
The proposal is posed to M/s. REC (Funding Agency) by Finance wing of APTRANSCO for funding tie-up.					-- Nil --			

Chief Engineer
400kV Construction

DETAILS OF BENEFITS PROJECTED TO ACCRUE FROM THE SCHEME

System Loss Reduction :

Losses in the relevant system at the beginning of the project (MW)	--
Losses in the system envisaged after the implementation of the project (MW)	--
Losses reduced because of the implementation of the scheme (MW)	--

System Improvement :

Voltage profile in the relevant system at the beginning of the project	--
Targetted voltage profile after the implementation of the project	--
Improvement because of the implementation of the scheme	--

System Expansion : The system study report is enclosed.

Load catered to by the relevant system at the beginning of the project (MW)	--
Load catered to by the relevant system after implementing the project (MW)	--
Additional load being catered (MW)	--

Evacuation from Generating Stations :

Capacity to be evacuated (MW)	960 MW
Existing System	--
Date of commercial operation of the power plants	Programmed for commissioning by 2020-2021

Total Financial Benefit Quantified for the scheme (Crore Rs./annum) :	73.87
The annual rate of pay back for the investments (%) :	20.63%

Chief Engineer
400kV Construction

STATUTORY CLEARANCES

1) Board Approval :

Revised Administrative approval was accorded vide T.O.O.(CE-400kV Construction) Ms.No.1029, Date: 14.12.2018.

2) Financing Commitment :

The proposal is posed to M/s. REC (Funding Agency) by Finance wing of APTRANSCO for funding tie-up.

3) Clearance from the Central Electricity Authority :

The Polavaram Power Evacuation scheme is revised in view of the difficulty expressed by the APGENCO officials in non availability of site for providing 220kV features at 400kV Polavaram HEP SS as approved in CEA 1st Souther Power Standing Committee meeting and proposed for approval against pending CEA aaproval.

4) Clearance from the Pollution Control Board :

The scheme has no effect on environment as there will not be any affluents emitted from transmission lines.

5) Clearance from the Forest Authorities :

It is proposed to lay the transmission lines avoiding Forest land. However "No objection" Certificate from the Department of Forests will be obtained separately, if necessary.

6) Permission from Revenue authorities and Private persons affected in case of land acquisition.

No land acquisition is required for construction of 400kV Tr. Line and the land required for 2 Nos. 400kV bay extensions is already available in the existing Substation at Guddigudem.

CHIEF ENGINEER
400kV Construction

SCHEDULE OF IMPLEMENTATION OF PROJECT

INV-7

Expected date of commencement	Mar'2019
Schedule date of completion	Jun'2020

Work schedule :

Date	Milestones	Description of Milestone	Completion Schedule		Remarks
			% Work to be completed	% Budget to be used	
Mar'2019	Award of Contract	Sale of bid documents, Receipt & opening of documents, Bid analysis & Award of contracts.	0%	0%	--
June'2019	Foundations & other civil works	Foundations of Bay Extensions at Substation &Transmission Line/ Procurement activities	10%	8%	--
Nov'2019	Procurement of material and equipment	Procurement of Material/ Equipment & Civil works	45%	40%	--
April'2020	Erection activities	Erection of Transmission Line and Bay extension	80%	65%	--
June'2020	Testing & Commissioning	Testing & Commissioning of Line	100%	90%	Balance 10% of the budget will be utilised towards balance and pending payments.

Attach Gantt Chart indicating major milestones and the completion schedule in the MS Project Format.	Bar-chart enclsoed.

Procurement of Major Equipment :

Description of the equipment	Power Transformers,Switchgear equipment, ACSR Moose Conductor, OPGW etc.
Approximate Date when required	Mar'19 - Jun'2020
Status of imports Procedure	--

Chief Engineer
400kV Construction

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

Transmission Scheme for evacuation of power from 960 (12 x 80) MW Polavaram Hydro Electric Project in East Godavari District of Andhra Pradesh– Revised Administrative Approval – Accorded

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T.O.O.(CE-400kV Construction) Ms. No;1029 Date: 14.12.2018.
Ref: T.O.O.(CE-400kV Construction) Ms. No:664, Date: 18.01.2018

PROCEEDINGS:

1. APTRANSCO has accorded administrative approval for Transmission Scheme for evacuation of power from 960 (12 x 80) MW Polavaram Hydro Electric Project in East Godavari District of Andhra Pradesh, at an estimated cost of Rs. 275.61Crores and Interest During Construction of Rs. 16.49 Crores **(i.e. Totalling to Rs.292.10 Crore)** .

   The scheme was originally approved with following connectivity.

   a) 400kV Polavaram –Kamavarapukota QMDC Line of length 70 Kms (approx.)
   b) 2 Nos. 400kV Bays at existing 400/220kV Kamavarapukota SS to meet the Power Evacuation from 960 MW Polavaram Hydro Electric Power Project which is under construction by M/s. APGENCO.

2. The Chief Engineer/ IPC & Power Systems vide U.O dated 13.08.2018 has communicated the revised connectivity approval issued by the Board of APTRANSCO with 220kV features at Polavaram HEP SS to extend power supply to the proposed 220/132/33kV Ramachandrapuram SS, the details of which are as follows.

   The same was approved by CEA in 1st Southern Region Standing Committee on Transmission held on 7th September 2018.

   a) 400kV Polavaram –KamavarapukotaQMDC Line of length 70 Kms (approx.)
   b) 2 Nos. 400kV Bays at existing 400/220kV Kamavarapukota SS .
   c) 2 No 125 MVAR Bus Reactors at Polavaram HEP SS.

Contnd....2

d) 220kV features at 400/220kV Polavaram SS with 2 x 500 MVA ICTs.

e) Erection of 220kV Twin Moose DC Line (16 kms approx.) from 400/220kV Polavaram 220kV Pattiseema SS.

f) Making Twin Moose DC LILO (1 Km approx.) of proposed 400/220kV Polavaram 220kV Pattiseema SS Twin Moose DC Line at 220kV Purushothapatnam SS.

g) 220kV DC LILO (1 Km approx.) of existing 220kV Vemagiri - Samalkot DC Line 220kV Jegurupadu SS.

3. Further vide U.O dated 15.10.2018, the Chief Engineer/ IPC & Power Systems h communicated the modified Polavaram Power Evacuation scheme (Pending CEA approv consisting of following 400kV network elements in view of the difficulty expressed by t APGENCO officials in non availability of site for providing 220kV features at 400k Polavaram HEP SS.

1) 400kV QMDC Line form 400kV Polavaram SS to 400/220/11kV Guddigudem SS – 60Kms.

2) Two (2) Nos. 400kV Bay Extensions at 400/220/11kV Guddigudem SS.

3) Making LILO (12Kms) of existing 220kV DC Line from Pallantla – Pattiseema at 400/220 kV Guddigudem SS.

4) Laying of 220kV DC Line (32 Kms) from 220kV Purushothapatnam SS to 400/220 kV Guddigudem SS.

4. In view of the above, after careful consideration, APTRANSCO accords revised administrati approval for the 400kV Transmission Scheme for evacuation of power from 960 (12 x 80) M Polavaram Hydro Electric Project in East Godavari District of Andhra Pradesh, at an to estimated cost of Rs. 332.10 Crores and Interest During Construction of Rs. 26.00 Crores w the following connectivity .

a) 400kV QMDC Line form 400kV Polavaram SS to 400/220/11kV Guddigudem SS – 60 Kms.

b) Two (2) Nos. 400kV Bay Extensions at 400/220/11kV Guddigudem SS.

The total estimated cost of the scheme including IDC is Rs.358.10 Crores (Rupees Thr Hundred and Fifty Eight Crores Ten Lakhs only), as per the Annexure enclosed.

Contnd...

5. The Chief Engineer/400kV Construction, Vidyut Soudha, Vijayawada is here by authorized to take up the above works making necessary budget provision and funds tie up.

6. In exercise of the powers conferred vide G.O.Ms.No.115, dated 07-10-2003 of Government of Andhra Pradesh, APTRANSCO or their authorized representatives shall have the powers for placing of the electric supply lines or electric plant for the transmission of electricity or for the purpose of telephonic or telegraphic communications necessary for the proper co-ordination of works that a telegraphic authority possesses under the provision of the Indian Telegraph Act, 1885 (Central Act-13 of 1885).

This order is issued as per the approval accorded vide full board approved note in FLM .File No. 4011334,(Noting No.7) dated: 05.12.2018.

(BY ORDER AND IN THE NAME OF TRANSMISSION CORPORATION OF ANDHRAPRADESH LIMITED)

Encl: Annexure

Sd/-
DIRECTOR/ (Grid & Transmission Management)
APTRANSCO

To
The Chief Engineer/ 400kV Construction/ Vidyut Soudha, Vijayawada.

Copy to:

1. The Chief Engineer/ Construction/APTRANSCO/ Vidyut Soudha,Vijayawada,
2. The Chief Engineer/ Transmission/APTRANSCO/ Vidyut Soudha/Vijayawada,
3. The Chief Engineer/ Telecom & IT /APTRANSCO/ Vidyut Soudha/Vijayawada,
4. The Chief General Manager/HRD & Planning/APTRANSCO/VS/Vijayawada.
5. The Chief Engineer/IPC & Power Systems/APTRANSCO/Vidyut Soudha/Vijayawada,
6. The Chief Engineer/SLDC /APTRANSCO/ Vidyut Soudha /Vijayawada,
7. The Chief Engineer/Lift Irrigation, EA & Operation/APTRANSCO/ VS /Vijayawada.
8. The Chief Engineer/Civil/APTRANSCO/Vidyut Soudha/Vijayawada.
9. The Chief Engineer/Commercial/APTRANSCO/ Vidyut Soudha /Vijayawada,

Contnd....4

10. The FA & CCA (Accounts)/ APTRANSCO/ Vidyut Soudha/Vijayawada,
11. The FA & CCA(R & E)/ APTRANSCO/ Vidyut Soudha/Vijayawada,
12. The P.S. to the Chairman & Managing Director/APTRANSCO/Vidyut Soudha/ Vijayawada,
13. The P.S. to the Joint Managing Director (Vigilance & Security)/APTRANSCO/ VS/Vijayawda,
14. The P.S. to the Director (Grid & Transmission Management)/ APTRANSCO/ VS/Vijayawada,
15. The P.S. to the Director (Technical)/ APTRANSCO/ Vidyut Soudha/Vijayawada,
16. The Chief Engineer/Zone/APTRANSCO/Vijayawada,
17. The Chief Engineer/Zone/APTRANSCO/Visakhapatnam.
18. The Chief Engineer/Zone/APTRANSCO/Kadapa.
19. The Superintending Engineer//PM/400kV/APTRANSCO/ Vidyut Soudha/Vijayawada,
20. The Superintending Engineer/400kV/OMC/APTRANSCO/Vijayawada,
21. The Superintending Engineer/400kV/OMC/APTRANSCO/Kadapa.
22. The Superintending Engineer/400kV Construction/APTRANSCO/Visakhapatnam..
23. Central Record Section – 2 copies.

// FORWARDED BY ORDER //

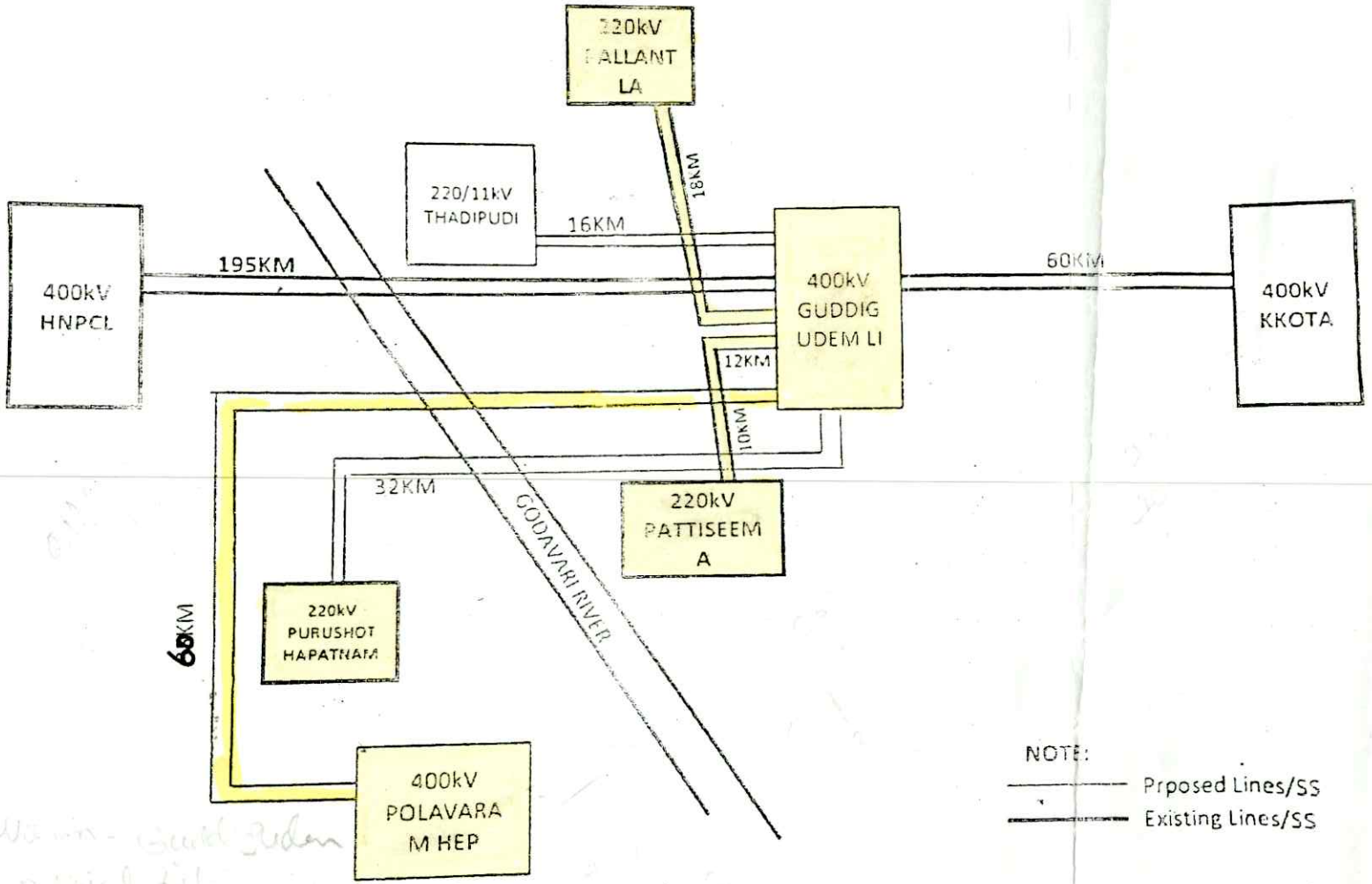
S. Sd/

Dy.Executive Engineer/Schemes
400kV Construction

Contd....

PROPOSED POLAVARAM POWER EVACUATION SCHEME: INTER CONNECTION OF 220kV NETWORKS WITH PRPOSED 400/11-9 GUDDIGUDEM LI SS

OPTION-III



Superintending Engineer
Const/Circle/APTRANSCO
RAKHAPATNAM

-95-

Revised Abstract Estimate :: Transmission Scheme for Evacuation of Power from 960 MW (12 x 80) Polavaram Hydro Power Project in East Godavari District of Andhra Pradesh

(Amount in Lakh Rs.)

Sl. No.	Description of Line/ Substation	Exisitng System Length/ No. of bays	Proposed System Length/ No. of bays	Unit	Estimated Cost as per T.O.O. dt.18.01.18	Estimated cost now proposed
A)	400 kV Transmission Network :					
1	400kV Polavaram HPS - Kamavarapukota QMDC line	70	Deleted	km	21,511.71	-
2	400kV Quad Bay Extensions at 400kV Kamavarapukota SS	2	Deleted	Nos	2,139.85	-
3	400kV Polavaram HPS - Guddigudem QMDC line	-	60	km	-	27,980.00
4	400kV Quad Bay Extensions at 400kV Guddigudem SS	-	2	Nos	-	845.10
	Total (A)					**28,825.10**
B)	Communication Equipment/ Material :				269.99	Included above
	Total (A+B) :				23,921.55	28,825.10
C)	Special T & P @ 1% :				239.22	288.25
	Total (A+B+C) :				24,160.77	29,113.35
D)	Contingencies (3%) :				724.82	873.40
	Total including contingencies :				24,885.59	29,986.75
E)	Estt. and other charges @ 10.75% :				2,675.20	3,223.58
	Grand Total :				27,560.79	33,210.33
	or Say (Rs. in Crores) ::				**275.61**	**332.10**
	Interest During Construction (Rs. in Crores) :				16.49	26.00
	Total (including IDC) - (Rs. in Crores) :				**292.10**	**358.10**

Chief Engineer
400kV Construction

YEAR WISE PHASING OF FUNDS and INTEREST DURING CONSTRUCTION

Transmission Scheme for evacuation of power from 960 MW (12 x 80) Polavaram Hydro Power Project in East Godavari District of Andhra Pradesh

(Amount in Crore Rs.)

A) Year Wise Phasing of Funds :

1)	2018-2019	5.00
2)	2019-2020	120.00
3)	2020-2021	135.00
4)	2021-2022	72.10
	Total :	332.10

B) Calculation of Interest During Construction :

Sl. No.	Year	Loan at the beginning of the Year	Investment during the Year	IDC @ 10 % on col.(3) + @ 5% on col.(4)	Less Investment for which works are completed	Investment at the end of the Year
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(3+4-6)
1)	2018-2019	-	5.00	0.25	-	5.00
2)	2019-2020	5.00	120.00	6.50	-	125.00
3)	2020-2021	125.00	135.00	19.25	260.00	-
4)	2021-2022	-	72.10	-	-	
	Total :		332.10	**26.00**		
Interest During Construction :				26.00		
Total Cost of the Scheme including IDC :				**358.10**		

CHIEF ENGINEER
400kV Construction

Calculation of Annual Revenue Return (ARR)

1	Name of the Transmission Scheme	:	Revised Transmission Scheme for evacuation of power from 960 MW (12 x 80) Polavaram Hydro Power Project in East Godavari District of Andhra Pradesh
2	Cost of the Transmission Scheme including IDC (Crore Rs.)	:	358.10
3	Installed Capacity of the Project (MW)	:	960
4	Auxiliary Consumption @ 3% (MW)	:	960 x 0.03 = 28.80
5	Balance Power Available (MW)	:	960 - 28.80 = 931.20
6	Power available for transmission with a L.F. of 0.7	:	931.20 x 0.70 = 651.84
7	Transmission Tariff in Rs. per kW per Month (for the year 2018-19 as per TTO dt.09.05.2014)	:	94.44
8	Annual Revenue by the way of transmission of Power (Crore Rs.)	:	$\frac{651.84 \times 10^3 \times 12 \times 94.44}{10^7} = 73.87$
9	ANNUAL REVENUE RETURN	=	$\frac{73.87}{358.10} \times 100 = 20.63\%$

CHIEF ENGINEER
400kV Construction

STATEMENT OF DISCOUNTED CASH FLOWS

Amount in Crore Rs.

Estimated Project cost :	332.10
IDC (Interest During Construction) :	26.00
Total Project cost including IDC :	**358.10**

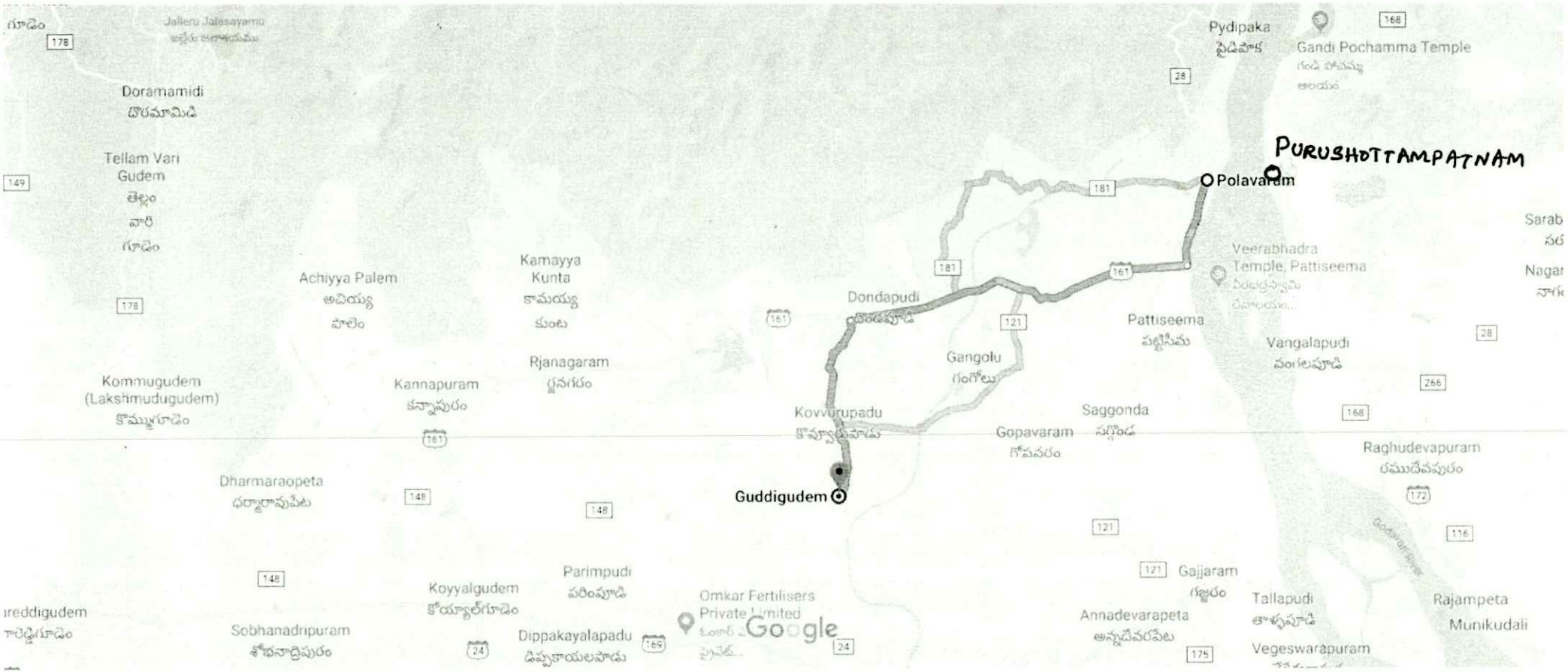
Revised Transmission Scheme for evacuation of power from 960 MW (12 x 80) Polavaram Hydro Power Project in East Godavari District of Andhra Pradesh

Year	Book Value	Depreciation @ 3.6%	O&M charges @ 2.5%	IWC @ 0.5%	Cash Outflow (excl. depreciation.)	Cash Inflow	Net Cash Flow	Discount Factor @ 10%	Discounted Cash Flow
(1)	(2)	(3)	(4)	(5)	(6) = (4+5)	(7)	(8) = (7-6)	(9)	(10) = (8 x 9)
1st Year	358.10	12.89	8.95	1.79	10.74	73.87	63.13	1.000	63.13
2nd Year	345.21	12.89	9.31	1.86	11.17	73.87	62.70	0.909	57.00
3rd Year	332.32	12.89	9.68	1.94	11.62	73.87	62.25	0.826	51.45
4th Year	319.43	12.89	10.07	2.01	12.08	73.87	61.79	0.751	46.43
5th Year	306.54	12.89	10.47	2.09	12.56	73.87	61.31	0.683	41.88
6th Year	293.65	12.89	10.89	2.18	13.07	73.87	60.80	0.621	37.75
7th Year	280.76	12.89	11.33	2.27	13.60	73.87	60.27	0.564	34.02
8th Year	267.87	12.89	11.78	2.36	14.14	73.87	59.73	0.513	30.65
9th Year	254.98	12.89	12.25	2.45	14.70	73.87	59.17	0.467	27.60
10th Year	242.09	12.89	12.74	2.55	15.29	73.87	58.58	0.424	24.84
11th Year	229.20	12.89	13.25	2.65	15.90	73.87	57.97	0.386	22.35
12th Year	216.31	12.89	13.78	2.76	16.54	73.87	57.33	0.350	20.09
13th Year	203.42	12.89	14.33	2.87	17.20	73.87	56.67	0.319	18.06
14th Year	190.53	12.89	14.90	2.98	17.88	73.87	55.99	0.290	16.22
15th Year	177.64	12.89	15.50	3.10	18.60	73.87	55.27	0.263	14.55
16th Year	164.75	12.89	16.12	3.22	19.34	73.87	54.53	0.239	13.05
17th Year	151.86	12.89	16.76	3.35	20.11	73.87	53.76	0.218	11.70
18th Year	138.97	12.89	17.43	3.49	20.92	73.87	52.95	0.198	10.48
19th Year	126.08	12.89	18.13	3.63	21.76	73.87	52.11	0.180	9.37
20th Year	113.19	12.89	18.86	3.77	22.63	73.87	51.24	0.164	8.38
21st Year	100.30	12.89	19.61	3.92	23.53	73.87	50.34	0.149	7.48
22nd Year	87.41	12.89	20.39	4.08	24.47	73.87	49.40	0.135	6.68
23rd Year	74.52	12.89	21.21	4.24	25.45	73.87	48.42	0.123	5.95
24th Year	61.63	12.89	22.06	4.41	26.47	73.87	47.40	0.112	5.29
25th Year	48.74	12.89	22.94	4.59	27.53	73.87	46.34	0.102	4.70
	Total :	322.25	372.74	74.56	447.30	1,846.79	1,399.49	9.98	589.12

Note : Depreciation @ 3.6% plus the O&M charges at 2.5% and interest on working capital @ 0.5% of the project cost including the IDC is considered as cash out flow every year (with an annual escalation of 4% on O&M charges and IWC).

CHIEF ENGINEER
400kV Construction

Google Maps **Polavaram, Andhra Pradesh 534315 to Guddigudem, Andhra Pradesh** Drive 20.4 km, 47 min



via Dondapudi - Koyyalagudem Rd/Polavaram Koyyalagudem Rd and Dondapudi-Gopalapuram Rd/Gopalapuram - Dondapudi Rd — 47 min, 20.4 km

Fastest route

via Repallivada - Polavaram Rd — 1 h 10 min