CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 13/RP/2011
in
Petition No.9/MP/2011

Coram: Shri A.K. Singhal, Member
Shri A.S. Bakshi, Member

Date of Hearing: 21.10.2014
Date of Order: 07.05.2015

In the matter of

Review of Commission's order dated 28.6.2011 in Petition No. 9/2011 for Exemption from and Extension of time for implementation of Restricted Governor Mode Operation (RGMO) of various Thermal and Hydroelectric generating stations operated by the Andhra Pradesh Power Generation Corporation Ltd (APGENCO)

IN THE MATTER OF

1. Andhra Pradesh Power Generation Corporation Ltd.
Vidyut Soudha, Hyderabad - 500082

2. Telengana State Power Generation Corporation Ltd
Vidyut Soudha, Hyderabad – 500082 …**Petitioners**

Vs

Power System Operation Corporation Ltd (POSOCO)
B-9, Ist Floor, Qutub Institutional Area,
Katwaria Sarai, New Delhi – 110016 **....Respondents**

Parties present:

Shri K.Gopal Choudhury, Advocate, APGENCO & TSGENCO
Shri C.A.Nageswara Rao, APGENCO
Shri Siva Reddy, TSGENCO
Ms. Jayantika Singh, POSOCO

ORDER

Petition No. 9/MP/2011 was filed by the petitioner, APGENCO for relaxation of the provisions of clause 5.2(f) of the Indian Electricity Grid Code (IEGC), 2010 in exercise of its power under Clause (4) of Part 7 of the IEGC, 2010 and to grant exemption from and extension of time for implementation of RGMO in the thermal and hydro generating stations of the petitioner, as summarized under:

(a) Exemption from RGMO

Sl.No	Thermal/Hydro generating stations
1	Dr. Narla Tata Rao Thermal Power Station (420MW) LMW Units-I and II
2	Donkarayi Power House 1x 25MW
3	Nagarjunasagar Right Canal Power house 3 x 30 MW
4	Nagarjunasagar Left Canal Power house 2 x 30 MW
5	Penna Ahobilam Power house 2 x 10 MW

(b) Extension of time for RGMO

Sl.No	Thermal/Hydro generating stations	Extension upto
i.	Dr. NTTPS- 3 X 210 KWU Units 3, 5 & 6	31.12.2011
ii.	Dr. NTTPS- 1 X 2010 KWU Unit 4 and 1 X 500 KWU Unit 7	31.12.2011
iii.	RTPP- 2 X 210 KWU Unit 1	31.12.2011
iv.	RTPP- 2 X 210 KWU Unit 2	31.12.2012
v.	RTPP- 2 X 210 KWU Unit 3 & 4	31.12.2011
vi.	KTPS- Stage- V- 2 X 250 MW KWU Units 9 & 10	31.12.2011
vii.	KTPP- 1 X 200 MW KWU Unit 1	31.12.2011
viii.	Machkund HEP- 3 X 23 MW + 3X 17 MW	31.12.2013
ix.	Upper Sileru PH- 4 X 60 MW	31.12.2012
x.	Lower Sileru PH- 7 X 110 MW	31.12.2012
xi.	Srisailam RBPH- 7 X 110 MW	30.06.2012
xii.	Srisailam LBPH- 6 X 150 MW	31.12.2013
xiii.	Nagarjunasagar- 1 X 110 MW + 7 X 100.8 MW	31.12.2013
xiv.	Jurala- 4 X 39 MW	31.12.2012

2. By order dated 28.6.2011 the said petition was disposed of by the Commission and the relevant portion of the order containing the findings of the Commission is as under:

"8. The Commission observed that RGMO has been recommended by CEA in LMW turbines also, which would involve consideration of capital expenditure, during the Renovation and Modernization (R&M) of the units. It was also observed that RGMO is in interest of generators and in case the generators delay the implementation of RGMO, then these units would have to be operated in FGMO mode with appropriate droop setting, so that these units participate in load sharing and contribute to the stability of the grid.

9. As regards the constraints expressed by the learned counsel for the petitioner on discharge of water in canal in case of hydro generating units, the representative of RLDC clarified that the constraints relating to discharge of water in canal were insignificant. He however submitted that these units could operate on FGMO mode as time constant of the governing system was much smaller than the time constant of control of water system. He also submitted that the non-implementation of RGMO resulted in fluctuation in grid frequency and destabilization of the line flow and voltages, thereby threatening grid stability. He however suggested that these units could be put on FGMO without loss of further time, but prayed that the petitioner should be directed to implement the provisions of the IEGC, 2010 without fail.

10. Considering the submissions of the petitioner and the documents on record, we observe that the steps taken by the petitioner for implementation of the RGMO in its units of the generating station is belated. It is expected that the petitioner would expedite the

implementation of RGMO in these units at the earliest. We, however direct the petitioner to ensure that these thermal and hydro generating units shall be put on FGMO with manual intervention with immediate effect, till such time RGMO is implemented."

3. Aggrieved by the said order, the petitioner filed this review petition (Petition No. 13/RP/2011) seeking review and modification of the order dated 28.6.2011, as under:

(a) Exempt the petitioner's Dr.Narla Tata Rao Thermal Power Station (420MW) LMW Units-I and II from the requirement of RGMO and allow time till 31.12.2011 for implementation of FGMO with manual intervention to the extent practically feasible in these units, and

(b) Allow time upto 31.12.2011 for implementation of FGMO in Dr. NTTPS- 3 X 210 KWU Units 5 & 6, Dr. NTTPS- 1 X 500 KWU Unit 7,RTPP- 2 X 210 KWU Units 1&2, KTPP- 1 X 500 MW KWU Unit I and KTPS- Stage- V1 X 250 MW KWU Unit 10; and

(c) Exempt the petitioner's Nagarjunasagar Right Canal Power house 3 x 30 MW, Nagarjunasagar Left Canal Power house 2 x 30 MW, Donkarayi Power House 1x 25MW and Penna Ahobilam Power house 2 x 10 MW from the requirement of RGMO and FGMO:

4. Considering the submissions of the petitioner, the Commission by order dated 29.4.2013 disposed of the said review petition by modifying the order dated 28.6.2011 in respect of the thermal and hydroelectric generating stations of the petitioner as summarized under:

Sl. No	**Thermal/Hydro generating stations**	**Directions in Commission's order dated 29.4.2013**
	Dr. Narla Tata Rao TPS (420MW) Units-I and II	The operation of the units on FGMO with manual intervention is allowed.
1	Dr. Narla Tata Rao TPS Unit- 6	Since these units are operating in FGMO with manual intervention, time for implementation of RGMO after completion of R&M of C&I system undertaken during capital overhaul is allowed.
2	Rayalaseema TPP- Unit 1	
3	Rayalaseema TPP- Unit 2	
4	Donkarayi Power House 1x 25MW	The petitioner is directed to implement operation in FGMO with manual intervention.
5	Nagarjunasagar Right Canal Power house 3 x 30 MW	These hydrogenating stations are exempted from operation in RGMO/FGMO.
6	Nagarjunasagar Left Canal Power house 2 x 30 MW	
7	PennaAhobilam Power house 2 x 10 MW	The hydrogenating station is exempted from operation in RGMO/FGMO.
8	Machkund HEP- 3 X 23 MW + 3 x 17 MW	Extension of time upto 31.12.2013 for implementation of RGMO allowed. Meanwhile, the petitioner is directed to operate the units under FGMO with manual intervention.

9	Upper Sileru PH- 4 X 60 MW	Petitioner is directed to take immediate steps for replacement of the governors in order to put these hydrogenating stations on RGMO mode of operation at the earliest. However, extension of time upto 31.12.2013 is allowed for RGMO mode of operation.
10	Lower Sileru PH- 7 X 110 MW	
11	Srisailam LBPH- 6 X 150 MW	
12	Nagarjunasagar- 7 X 100.8 MW	
13	Jurala- 4 X 39 MW	

5. Aggrieved by the order dated 29.4.2013, the petitioner had filed Appeal No. 208/2013 before the Appellate Tribunal for Electricity (the Tribunal) contending that the petitioner had not been heard fully on merits, in some of the issues raised by him. However, based on the submissions of the Commission that further opportunity of hearing could be given to the petitioner, the Tribunal by order dated 2.9.2014 disposed of the said appeal by remanding the matter to the Commission to hear the petitioner in respect of the issues on which the petitioner is aggrieved and pass final order in accordance with law. The relevant portion of the order is extracted as under:

> *"In view of the above statement made by the Central Commission in the affidavit at Para No.5, we feel that it would be appropriate to remand the matter to the Central Commission to hear the Appellant/Petitioner in respect of the issues by which the Appellant is aggrieved and pass the final order in accordance with law. Accordingly, ordered"*

6. In compliance with the directions of the Tribunal, the review petition was heard on 21.10.2014 and the learned counsel for the petitioners filed written submissions made detailed arguments on issues such as (a) the implementation of RGMO/FGMO in the operation of hydroelectric projects, namely (i) Donkarayi Power House, (ii) Machkund HEP, (iii) Upper Sileru & Lower Sileru HEP (iv) Nagarjuna HEP (v) Srisailam Left Bank Power House and (vi) Jurala HEP (b) the consideration of proportionality, cost-benefit and improved frequency band in the facts and circumstances of the case and (c) the non-consideration of the question of jurisdiction of the Central Commission in respect of the generating stations which are not connected with the ISTS and which are embedded with the State Grid. The Commission after hearing the learned counsel for the petitioners,

reserved orders in the petition after directing the petitioner to submit additional information on the following:

> *"For Jurala Hydroelectric Project*
> *Details of the incidents during which FGMO response got curtailed due to scarcity of water in the system along with a detailed write-up on the operation under FGMO, including the restrictions imposed by other Civic authorities which hampered the availability of water for providing the FGMO response.*
>
> *For Machkund Hydroelectric Project*
> *Status and the time frame required/involved in respect of R&M of the units of the station".*

7. The respondent, POSOCO (*impleaded as respondent by order dated 2.4.2014 of the Tribunal*) has filed its reply vide affidavit dated 1.12.2014 on the issues raised by the petitioners. The petitioners, in compliance with the direction of the Commission has filed additional information vide affidavits dated 2.12.2014 and 23.1.2015. The petitioners have also filed rejoinder vide affidavits dated 24.1.2015 to the reply of the respondent POSOCO.

8. Before proceeding, we take note of the preliminary objection raised by the petitioner regarding the jurisdiction of the Central Commission in respect of the generating stations of the petitioner on the ground that they do not from part of the ISTS and are embedded within the State Grid and examine them in the subsequent paragraphs.

Jurisdiction

9. One important issue raised by the petitioner is with regard to the jurisdiction of the Commission in respect of the generating stations which are not connected to the ISTS and which are connected only to and embedded within a State Grid. The petitioner has submitted that of all the thermal and hydro generating stations stated above, only the Kakatiya Thermal Power Project (1 x 500 MW) is connected directly to the ISTS and this station is already operating under RGMO. It has also submitted that all the other generating stations are embedded within the Andhra Pradesh State Grid and are subject only to the provisions of the State Grid Code within the jurisdiction of the State

Commission. The petitioner in its written submissions dated 21.10.2014 has submitted that the generating stations which are connected to the ISTS are subject to the IEGC and is within the jurisdiction of the Central Commission and all the other generating stations owned and/or operated by the petitioners are connected only to and embedded within the State Grid and are therefore subject only to the State Grid Code and the jurisdiction of the State Regulatory Commissions. The petitioner while pointing out that its generating stations are not subject to the jurisdiction of the Central Commission, has submitted that while Section 79(1)(h) provides for the Central Commission to specify a Grid Code and Section 86(1)(f) provides for the State Commission to specify the State Grid Code and hence there is clearly a demarcation of power and jurisdiction between the Central and State Commissions. The petitioner has argued that merely because the State Grid Code is required to be consistent with the Central Commission's Grid Code, it cannot be considered that the State Grid Code is rendered odious and/or that the Central Commission's Grid Code extends even to all entities embedded within a State's Grid. The petitioner has also stated that a conjoint reading of Clauses 1.2, 1.3. 2(qq) and 2(gggg) of the IEGC, 2010 would clearly show that the IEGC itself, on its own terms, applies only to utilities, generating companies, consumers connected to the ISTS.

Reply of Respondent

10. The respondent, POSOCO in its reply affidavit dated 1.12.2014 has submitted as under:

> (a) It is submitted that Hon'ble Commission has jurisdiction on all power stations connected to the synchronously operating power system.
>
> (b) Section 86(1)(h) of The Electricity Act, 2003 provides that one of the functions of State Commission is to specify State Grid Code consistent with the Grid Code specified under clause (h) of sub-section (1) of section 79. However, due process has to be followed for amending State Grid Code to make it compatible with IEGC, as and when the same is amended and it may take some time. During the intervening period, there cannot be multiple Regulations governing generating stations operating in the same synchronous power system and hence IEGC is applicable to all generators, irrespective of whether it is connected ISTS or intra-state system. It may be

emphasized that any deficiencies in System Protection & Defense Mechanism in any of the control area will impact the security of entire grid very adversely.

(c) As per Section 29 of the Electricity Act, 2003 which deals with the "Compliance of directions":

> *(i) The Regional Load Despatch Centre may give-such directions and exercise such supervision and control as may be required for ensuring stability of grid operations and for achieving the maximum economy and efficiency in the operation of the power system in the region under its control.*
>
> *(ii) Every licensee, generating company, generating station, substation and any other person connected with the operation of the power system shall comply with the direction issued by the Regional Load Despatch Centers under sub-section (1).*
>
> *(iii)All directions issued by the Regional Load Despatch Centers to any transmission licensee of State transmission lines or any other licensee of the State or generating company (other than those connected to inter State transmission system) or sub-station in the State shall be issued through the State Load Despatch Centre (lnd the State Load Despatch Centres shall ensure that such directions are duly complied with the licensee or generating company or sub-station.*
>
> *(iv) The Regional Power Committee in the region may, from time to time, agree on matters concerning the stability and smooth operation of the integrated grid and economy and efficiency in the operation of the power system in that region.*
>
> *(v) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the regional grid or in relation to any direction given under sub-section (1), it shall be referred to the Central Commission for decision: Provided that pending the decision of the Central Commission the directions of the Regional Load Despatch Centre shall be complied with by the State Load Despatch Centre or the licensee or the generating company, as the case may be.*
>
> *(vi) If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (2) or sub-section (3), he shall be liable to penalty not exceeding rupees fifteen lacs.*

(d) Sub-section (1) above specifies that the RLDC may give directions and exercise supervision and control for ensuring stability of grid operations. Grid has been defined under Section 2(32) of the Act as "the high voltage backbone system of interconnected transmission lines, sub-stations and generating plants;" It is clear that the definition of grid is all-inclusive i.e includes generators connected to intra-state system. Further, sub-section (3) has explicit provision on directions by RLDC to generating, company (other than those connected to inter State transmission system). In case of any dispute regarding any direction of RLDC, it has to be referred to the Central Commission.

(e) As per Section 28(3)(e), the RLDC shall "be responsible for carrying out real time operations for grid control and despatch of electricity within the region through secure and economic operation of the regional grid in accordance with the Grid Standards and the Grid Code." Thus RLDC is duty bound to operate the grid and issue directions for secure operation of the grid as per provisions of lEGC.

(f) The Hon'ble Supreme Court has further reiterated in the Appeal (Civil) 2104 of 2006 (Central Power Distribution Co & ors Vs Central Electricity Regulatory Commission & anr) dated 17.8.2007 as follows:

"The various sections under the Electricity Act would clearly show beyond any doubt the powers of Central Commission and jurisdiction in regard to the grid, the scheduling and despatch. Under Section 79(1)(h) the Central Commission has the power to specify Grid Code. It also provides that the function of the State Commission to specify State Grid Code under Section 86(1)(f) should be consistent with the Grid Code specified by the Central Commission and therefore the power of the State Commission is subservient to the power of the Central Commission. Section 2 (32) defines Grid as inter connected transmission lines. The expression used inter connected has a significant meaning. Sub-section (1) of Section 28 deals with the function of RLDC (Regional Load Despatch Centre) to ensure integrated operation of the power system in the concerned region. The term power system is of wide import. etc. However, sub-section (3) of Section 28 deals with duties of RLDC using the expression "within the region" or "in the region". Obviously it includes both Inter State and Intra State lines and is not restricted to inter State lines. Section 29 of the Act empowers the RLDC to give directions and exercise such supervision and control to any person for ensuring stability of grid operation. It also provides that the State Load Despatch Centre shall duly enforce such directions. Sub-section (3) of Section 33 of the Act provides that the State Load Desptach Centre shall comply with the directions of the Regional Load Desptach Centre.

(18) A fascicule reading of the above provisions would clearly show that the scheme of the Electricity Act is that RLDC is required to follow the principles, guidelines and methodologies specified by the Central Commission and all persons including the distribution licensees like the appellants herein are required to follow the directions of RLDC. RLDC can enforce such directions through SLDC. In turn SLDC is required to follow the directions of RLDC

(19) *Having regard to the aforesaid mentioned provisions of law, the contention that the Central Commission has no jurisdiction to deal with grid discipline in regard to single State beneficiary station, in our view, has no merit.*

... .In the facts and circumstances as alluded, and as per the scheme of the Electricity Act, 2003 mentioned above, the Central Commission has the plenary power to regulate the Grid, particularly in the context of the Grid being integrated and connected across the region comprising of more than one State. The State Grid cannot be isolated and can be seen as independent from the region." (Annexure-I)"

Petitioner's Rejoinder

11. The petitioner in its rejoinder dated 24.1.2015 has clarified as under:

(a) The averment in respondents reply fairly submits and agrees that it is the statutory function of the State Commission under Section 86(1)(h) to specify the State Grid Code consistent with the Grid Code specified in Section 79(1)(h). Clearly therefore, the statute provides for both the Grid Code u/s 79(1)(b) for the inter-state transmission system (as the IEGC indeed does on its own terms) and a State Grid Code under section 86(1)(h). Clearly the mandate of the statute is that the State Grid Code will apply exclusively within the State and the Central Grid Code will apply in the inter-state system and CGS stations.

(b) There is no question of multiple Regulations governing generating stations as erroneously contended by the Respondents. The State Grid Code has to be consistent with the IEGC, but that is only a requirement of the provisions of the State Grid Code.

(c) Even so, it is always the State Grid Code that will exclusively hold the field to all entities and systems embedded within the State. Consequently, all issues arising in respect of the generating stations or other utilities/entities entirely embedded within the State are required to conform only to the State Grid Code and fall within the exclusive jurisdiction of the State Commission.

(d) There is no provision in law that the IEGC renders the State Grid Code superfluous, irrelevant and/or otiose and the State Commission is stripped or superseded in respect of its statutory power and function; and such a view is grave violence against the specific provisions of the statute.

(e) The inference sought to be suggested by the Respondents based upon the provisions of section 29 is erroneous, over-reached and misconceived. Merely because the RLDC can give directions, it cannot be inferred there from that the IEGC is all pervasive and that the State Grid Code is of no effect or consequence. Merely because all State Grids are interconnected, it does not mean that there is only a single grid; there are several different grid elements (State Systems and Inter-State Systems) connected together. Because a situation in any State / Inter-State Grid system may affect other State / Inter-State systems, the RLDCs are given the power to give directions, but through the SLDCs.

(f) The reliance on the judgment of the Supreme Court in the APCPDCL case is not justified and that is clearly distinguishable on facts. In that case, the ratio of the judgment is that the CERC had the power to bring the NTPC Simhadri PS under the ABT and provide for UI even though it is a single State beneficiary power station for the reason that the NTPC generating stations and the ISTS evacuating the power is within the exclusive regulatory control of the CERC. It is not an authority for the erroneous proposition that the IEGC is all pervasive and that the State Grid Code is of no effect.

(g) It is submitted that the provisions of the Act have to be interpreted harmoniously with due respect and regard to the specific and separate power of the State Commission to specify the State Grid Code and to enforce the same.

12. We have examined the matter. The requirement of governors controlling the turbine output in generators to respond to system frequency was recognised by the Commission in order dated 30.10.1999 in Petition No.1/1999 wherein the Commission had observed as under:

"5.13 The question of operating each generating unit with turbine speed governor was considered by us with the support of our technical experts. A number of suggestions have been made by various respondents like (a) free governor shall be "normally in operation" in place of "always in operation"; (b) it may not be possible in existing units; (c) special treatment to nuclear units; and (d) exclusion of units embedded in the intra-State transmission system. We are convinced that provision for free governor action in generating units is desirable for overall grid control. Though frequency control in the present conditions of the power system operation may not be possible with governor action alone and other means like load shedding, manual intervention etc. may also be necessary, yet the necessity of invoking the free governor action cannot be undermined. We also understand that governor is always an integral part of the turbine supplied to the generating unit...."

13. Section 79(1)(h) of the 2003 Act provides the Central Commission with the power to specify the Grid Code having regard to Grid standards. Similarly, Section 86(1)(h) of the 2003 Act provides the States Commissions to specify the Grid code consistent with the Grid code specified by the Central Commission under Section 79(1)(h). The Commission vide its order dated 20.8.2009 in Petition No.12/2004 had directed the generating companies to implement RGMO in various types of thermal and hydro units as per the following schedule.

"41. Based on the above and having specific regard to the prevailing condition of shortage, we direct the implementation of only restricted governor operation in various types of thermal and hydro units as per the following schedule:

(a) KWU & LMZ turbines for thermal sets of 200 MW and above: (i) Software based EHG system: 1.3.2010 (ii) Hardware based EHG system where boiler controls are in "auto": 1.6.2010

(b) Hydro units of 10 MW and above 1.3.2010

42. All the generating companies are directed to place before the Commission, within a month, their action plan in line with the above schedule and furnish monthly progress reports to the Commission in this regard."

14. In exercise of the power under Section 79(1)(h) read with section 178(2)(g) of the 2003 Act, the Central Commission has also notified the IEGC Regulations, 2010, effective from 3.5.2010. Regulation 5.2(f) of the IEGC Regulations, 2010, as amended from time to time, provides that all thermal generating units of 200 MW and above and all hydro units of 10 MW and above which are synchronized with the grid, irrespective of their ownership, shall be required to have their governors in operation at all time in accordance with the

provisions in sub-clauses (i) to (iii). The relevant provisions of the IEGC Regulations, 2010 with regard to Governor action are extracted as under:-

*"**Governor Action***

(i) Following Thermal and hydro (except those with up to three hours pondage) generating units shall be operated under restricted governor mode of operation with effect from the date given below:

(a) Thermal generating units of 200 MW and above,

(1) Software based Electro Hydraulic Governor (EHG) system: 1.8.2010
(2) Hardware based EHG system: 1.8.2010
(b) Hydro units of 10 MW and above: 1.8.2010

(ii) The restricted governor mode of operation shall essentially have the following features:

(a) There should not be any reduction in generation in case of improvement in grid frequency below 50.2 Hz. (for example if grid frequency changes from 49.3 to 49.4 Hz. then there shall not be any reduction in generation).

Whereas for any fall in grid frequency, generation from the unit should increase by 5% limited to 105 % of the MCR of the unit subject to machine capability.

(b) Ripple filter of +/- 0.03 Hz. shall be provided so that small changes in frequency are ignored for load correction, in order to prevent governor hunting.

(c) If any of these generating units is required to be operated without its governor in operation as specified above, the RLDC shall be immediately advised about the reason and duration of such operation. All governors shall have a droop setting of between 3% and 6%.

(d) After stabilisation of frequency around 50 Hz, the CERC may review the above provision regarding the restricted governor mode of operation and free governor mode of operation may be introduced.

(iii) All other generating units including the pondage up to 3 hours Gas turbine/Combined Cycle Power Plants, wind and solar generators and Nuclear Power Stations shall be exempted from Sections 5.2 (f), 5.2 (g), 5.2 (h) and ,5.2(i) till the Commission reviews the situation:

Provided that if a generating unit cannot be operated under restricted governor mode operation, then it shall be operated in free governor mode operation with manual intervention to operate in the manner required under restricted governor mode operation." 3.

15. Similarly, in terms of Section 86(1)(h) of the 2003 Act, the Andhra Pradesh Electricity Regulatory Commission (APERC) has notified the Grid Code in the form of the Code of Technical Interface (CTI) on 26.3.2014. Some of the provisions of the said Code with regard to Governor Operation read as under:

"1.2 Definition of Terms

Governor Droop*: In relation to the operation of the Governor of a Generating Unit, the percentage drop in APTRANSCO system frequency which would cause the Generating Unit under free governor action to change its output from zero to full load.*

Primary Response*: The automatic response of the Governor of a generation unit to APTRANSCO system frequency changes over a time period of 0 to 30 seconds, from the time of frequency changes and fully available by 30 seconds and sustainable for up to 3 minutes.*

Secondary Response*: The automatic governor response to Frequency transients which is fully available within 30 seconds from the time the Frequency transient occurs and maintained for at least 30 minutes.*

1.10 Precedence of Indian Electricity Grid Code

This CTI is prepared such that it is consistent with the IEGC. However if any clause of the AP CTI (AP Grid Code) contradicts the provision of the IEGC during a real situation, the IEGC takes precedence. It is open to APTRANSCO to obtain from CERC exemption from any provision of IEGC in favour of a clause of AP CTI where the issue pertains solely to the internal system of A.P (considering the present, future, direct and indirect impacts) and does not impact the Southern Regional Grid or the system any of the other constituents of the Southern Regional Grid.

3.2.5 System Performance

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(h) The new generating units to be connected to the Grid shall be capable of increasing the output by 5% instantaneously upto 105% MCR for a minimum of 5 minutes.

(i) The new Generating units shall have AVR and turbine speed governor with overall droop of 3 to 6%.

3.9 Design Parameters of New Generating Units

(i) New Units: For new plant para 3.2.5 (a), this para (3.9) and other paras of this Code apply. For plant existing as on the Transfer date the actual specifications hold for the life period of the equipment. However, if certain parts can be replaced at reasonable investment then those parts shall be replaced under a Renovation, Rehabilitation and Modernization Programme to ensure better performance to conform to the requirements of CTI and IEGC. For example the Generators shall replace the Turbine Speed Governors and AVR systems of the alternators, and install Power System Stabilisers if technically possible in order to meet the operating standards of the CTI and IEGC.

In addition APTRANSCO may require Generators to comply with other specifications in a bilateral agreement before the Connection Application is accepted in order to ensure the required performance of the transmission system and the total system.

(ii) The Generating Units shall be capable of supplying rated active power output between 0.85 power factor lagging and 0.95 power factor leading.

(iii) The Short Circuit Ratio of Generating Units shall be not less than 0.5.

(iv) A Generating Unit shall be capable of supplying rated active power output within the system frequency range 49.5 to 50.5 Hz.

(v) ***Decrease of output with decrease of frequency****: Any decrease of output in the frequency range 49.5 to 47 Hz should not be more than pro rata with frequency. The Generating Units must be capable of operation in 47.5 to 52 Hz range for a short duration without any deleterious effects and without reduction of life.*

(vi) ***Effect of Voltage Fluctuations****: The MW output of a generating unit should not be affected by voltage changes in the permissible range. The Reactive Power Output under steady state conditions should be fully available as per capability curves within a voltage range of ± 5% of nominal value.*

(vii) ***Governors****: All new Generating units must have automatic Governors with a droop of 3 to 6% and automatic voltage regulators. Power System Stabilizers shall be installed under a bilateral agreement with APTRANSCO. All new units shall have provision for incorporating power system stabilizers, if not provided at the time of initial commissioning."*

16. We now examine the provisions of the Code of Technical Interface relating to operation of governors with that of the provisions under the IEGC Regulations, 2010. The IEGC Regulations, 2010 lay down the rules, guidelines and standards to be followed by various persons and participants in the system to plan, develop, maintain and operate the power system, in the most secure, reliable, economic and efficient manner, while facilitating healthy competition in the generation and supply of electricity. The IEGC brings together a single set of technical and commercial rules, encompassing all the Utilities connected to/or using the inter-State transmission system (ISTS) and provides the principles and procedures which define the relationship between the various users of the inter-State transmission system (ISTS), National Load Despatch Centre, as well as the Regional and State Load Despatch Centres. It also facilitates the optimal operation of the grid, facilitation of coordinated and optimal maintenance planning of the grid and facilitation of development and planning of economic and reliable National / Regional Grid. The Operating Code, under IEGC Regulations, 2010 describes the operational philosophy to maintain efficient, secure and reliable Grid Operation and contains the general security aspects to be followed by generating companies and all Regional entities of the Grid. As per Regulation 5.2 (f) of the IEGC Regulations, 2010, all thermal generating units of 200 MW and above and all hydro units of 10 MW and above which are synchronized with the Grid, irrespective of their ownership, are required to have their governors in operation at

all time in accordance with the provisions of sub-clauses (i) to (iii) of the Grid Code. Also, the generators on the pretext of technical constraints cannot be allowed to avoid the said provisions of IEGC. On the contrary, the provisions of the CTI specified by the APERC (as quoted above) contain no provision as regards the operation of generating units under RGMO or FGMO under manual intervention to operate in the manner required under RGMO. CTI only requires that new generating units shall be equipped with turbine speed governor with overall droop of 3 to 6% and shall be capable of increasing the output by 5% instantaneously upto 105% MCR for minimum of 5 minutes. It is therefore evident that no such provision exists in CTI for operation of the generating stations under RGMO/FGMO under manual intervention. Moreover, Section 1.10 of the CTI provides that the IEGC Regulations, 2010 shall be given precedence, in case the same contradicts the provisions of the CTI. In the absence of any provision in the CTI with regard to operation of RGMO/FGMO with manual intervention, the question of inconsistency does not arise. Merely because there is no provision in the CTI regarding RGMO/FGMO with manual intervention, this area cannot be left unregulated, since it has grave consequences in so far as the safety and security of the grid is concerned. This Commission being invested with the power to regulate inter-state transmission of electricity has the jurisdiction to regulate the RGMO/FGMO in the generating stations including intra-state generating stations.

17. The petitioner has also contended that the judgment of the Hon'ble Supreme Court in APCPDCL case is distinguishable on facts of the present case and cannot be an authority for the proposition that IEGC is all pervasive and that the State Grid has no effect. It is pertinent to mention that APCPDCL (appellant in the Civil Appeal) had contended that the Central Commission has no jurisdiction to introduce ABT for generating stations supplying power within the state of Andhra Pradesh. It was also contended by the appellant that Section 86(1)(c)of the 2003 Act confers the power of jurisdiction of facilitating intra-State

transmission upon the State Regulatory Commission and that the UI charges in respect of Simhadri could have only been imposed by the State Regulatory Commission after due consultation with all other generators in the State and the transmission utility who has the responsibility to maintain the grid. Negating the contentions of the appellant, the Hon'ble SC had in its judgment observed as under:

> *"(25) In the facts and circumstances as alluded, and as per the scheme of the Electricity Act, 2003 mentioned above, the Central Commission has the plenary power to regulate the Grid, particularly in the context of the Grid being integrated and connected across the region comprising of more than one State. The State Grid cannot be isolated and can be seen as independent from the region."*

18. The submission of the petitioner in the present case that the Central Commission has no jurisdiction on the ground that the State Grid Code exclusively holds the field to all entities and systems embedded within the state is not acceptable. As observed by the Hon'ble Supreme Court, the Central Commission has the plenary power to regulate the grid in the context of Grid being integrated and connected across the region comprising of more than one state. Section 2(32) of the 2003 Act defines Grid to mean the high voltage backbone system of inter-connected transmission lines, sub-station and generating stations. As the transmission lines embedded within the State Grid are incidental to the inter-state transmission systems, the provisions of the IEGC Regulations, 2010, as amended from time to time would prevail and accordingly the Commission has the jurisdiction to regulate the RGMO/FGMO in respect of the generating stations including intra-state generating stations of the petitioner. Also, in terms of Section 28 and 29 of the 2003 Act, the Regional Load Despatch Centres (RLDCs) have been empowered to give such directions and exercise such supervision and control as may be required for ensuring stability of grid operations and for achieving the maximum economy and efficiency in the operation of the power system in the region under its control. It also provides that every licensee, generating company, generating station, sub-station and any other person connected with the operation of the power system shall comply with the directions issued

by the RLDCs. It also provides that the State Load Despatch Centres (SLDCs) shall duly enforce such directions. Sub-section (3) of Section 33 of the 2003 Act provides that the SLDCs shall comply with the directions of the RLDCs. In short, the RLDCs enforce decisions through SLDCs and the SLDCs are required to follow the decisions of RLDCs, in order to ensure stability of grid operations. This would include both inter-state and intra state lines and not restricted only to inter-state lines. Accordingly, the directions of RLDC as per provisions of IEGC Regulations is to be followed by all persons including the generating stations of the petitioner and in case of any dispute, the matter shall be referred to the Central Commission. In this regard, the observations of the Hon'ble SC in APDPCL case are extracted as under:

> *"17……The term power system is of wide import. etc. However, sub-section (3) of Section 28 deals with duties of RLDC using the expression "within the region" or "in the region". Obviously it includes both Inter State and Intra State lines and is not restricted to inter State lines. Section 29 of the Act empowers the RLDC to give directions and exercise such supervision and control to any person for ensuring stability of grid operation. It also provides that the State Load Despatch Centre shall duly enforce such directions. Sub-section (3) of Section 33 of the Act provides that the State Load Desptach Centre shall comply with the directions of the Regional Load Desptach Centre.*
>
> *(18) A fascicule reading of the above provisions would clearly show that the scheme of the Electricity Act is that RLDC is required to follow the principles, guidelines and methodologies specified by the Central Commission and all persons including the distribution licensees like the appellants herein are required to follow the directions of RLDC. RLDC can enforce such directions through SLDC. In turn SLDC is required to follow the directions of RLDC"*

19. In the background of the above discussions, we hold that the provisions of the IEGC Regulations, 2010, as amended from time to time, shall be applicable and the Central Commission has the jurisdiction to regulate the RGMO/FGMO in the generating stations including intra-state generating stations of the petitioner. Accordingly, we proceed to decide the reliefs prayed for in this petition, as stated in the subsequent paragraphs.

20. Based on the submissions of the parties and the documents available on record, the issues raised by the petitioner are examined as stated under:

(A) Implementation of RGMO/FGMO in the operation of hydroelectric projects

Srisailam Left bank Power House (6 x 150 MW), Nagarjunasagar (1 x 110 MW+7x100.8 MW), Lower Sileru (4 x 115 MW) and Upper Sileru Power House (4 x 60 MW)

21. In respect of the above said hydro generating stations, the Commission in its order dated 29.4.2013 had directed the petitioner to take immediate steps for replacement of the governors in order to put these hydro generating stations on RGMO mode of operation and had accordingly granted extension of time upto 31.12.2013 for RGMO mode of operation.

Submissions of Petitioner

22. As regards Srisailam Left Bank Power House, the learned counsel for the petitioner has now submitted that the generating station is equipped with analog based Hitachi governors and there is no provision to operate the said station under RGMO without replacing the existing governors with new microprocessor-based governors. He has also submitted that the units are being operated under FGMO with manual intervention and the same is in compliance with the provisions of the Indian Electricity Grid Code (IEGC) specified by the Commission. The learned counsel has further submitted that the existing units are of the Reversible pump/ Turbine type and due to the complexity involved, the governors for RGMO have to be procured from the OEM (Hitachi). The learned counsel has stated that as it is necessary to import the equipment, the time required for replacement of all the governors for operation under RGMO is about 54 months and in case RGMO is directed to be implemented, the same may be considered during future R&M works. Accordingly, the learned counsel for petitioner has prayed for timefor implementation in RGMO mode of operation.

23. As regards Nagarjunasagar generating station, the learned counsel for the petitioner has submitted that the governor of Unit-1 of the generating station has been replaced with

a new microprocessor-based governor and operation of this unit is now under RGMO. He also submitted that the Units 2 to 7 of this generating station are equipped with *analog* based Hitachi governors and there is no provision to operate the generating station under RGMO without replacing the existing governors with new microprocessor-based governors. He has also submitted that the units are being operated under FGMO with manual intervention and the same is in compliance with the provisions of the IEGC specified by the Commission. The learned counsel has further submitted that the existing units are of the Reversible pump/ Turbine type and due to the complexity involved, the governors for RGMO have to be procured from the OEM (Hitachi).The learned counsel has stated that as it is necessary to import the equipment, the time required for replacement of all the governors for operation under RGMO is about 57 months and in case RGMO is directed to be implemented, the same may be considered during future R&M works. Accordingly, the learned counsel for the petitioner has prayed for time for implementation in RGMO mode of operation.

24. As regards Upper Sileru Power House, the learned counsel for the petitioner has submitted that the governors of Stage I units which were commissioned during the years 1967 and 1968 are of the mechanical flyball type and have become old and obsolete and the governors of the Stage II units, commissioned during 1994 and 1995, are of the BHEL G25 type. He also submitted that there is no provision to operate these governors in RGMO and these units are being operated under FGMO with manual intervention and the same is in compliance with the provisions of IEGC specified by the Commission. Accordingly, the learned counsel for petitioner has prayed for grant of 42 months timefor replacement of all the governors for operation under RGMO and in case RGMO is directed to be implemented, the same may be considered during future R&M works.

25. As regards Lower Sileru Power House, the Governors of Stage I units, which were commissioned during 1968 and 1974-76 are of LMZ type. He also submitted that there is no provision to operate these governors in RGMO and these units are being operated under FGMO with manual intervention and the same is in compliance with the provisions of IEGC specified by the Commission. Accordingly, the learned counsel for petitioner has prayed for grant of 42 months' timefor replacement of all the governors for operation under RGMO.

Reply of Respondent

26. The respondent has pointed out that the Commission has amended the IEGC Regulations during the year 2012 and the petitioner can operate these generating stations in FGMO mode with manual intervention.

Commission Views

27. Proviso to clause (iii) of sub-clause (f) of Regulation 5.2 of the IEGC Regulations, 2010, as amended on 5.3.2012, provides as under:

> *"Provided that if a generating unit cannot be operated under restricted governor mode operation, then it shall be operated in free governor mode operation with manual intervention to operate in the manner required under restricted governor mode operation"*

28. Considering the fact that the operation of the units of these generating stations under FGMO with manual intervention is consistent with the said proviso to Regulation 5.2(f)(iii) of IEGC amended regulations, the implementation of RGMO is deferred. However, the SLDC is directed to monitor the Governor response of these generating stations for six months and accordingly submit a report to the Commission. The Commission reserves the right to direct the replacement of the existing governors with EHG governors capable of giving the desired response, in case the operation of these units is not found satisfactory, in terms of the report. The review on this ground is disposed of in terms of the above.

Donkarayi Power House (1x 25MW)

Submissions of Petitioner

29. As regards Donkarayi Power House, the Commission in order dated 29.4.2013 had directed the petitioner to implement operation in FGMO with manual intervention.The learned counsel for the petitioner has submitted that the power house operates between the discharge of the Upper Sileru Power House and the fore bay of the Lower Sileru Power House and the Power House discharges into a power canal leading to the fore bay. He also submitted that the power canal is more than 35 years old and there are frequent repairs and maintenance required to be done due to impairment of the canal and hollowness has developed in between sub-base and canal panels. The learned counsel also submitted that the increases in the discharge may lead to breach of canal bund at embankment location as the canal was designed for 4500 cusecs and discharge through power house is 4250 cusecs at maximum load. He further submitted that If RGMO operational effect is to be achieved, whether by incorporating RGMO facility or operating in FGMO with manual intervention to operate as in RGMO, the discharge may increase to 4600 cusecs which may lead to water flowing over canal bunds and/or causing scouring of canal bunds. The learned counsel argued that the operation of the Power House is thus dependent upon and controlled by the discharges through and into the power canal to the fore bay and the maintenance of the level in the power canal and the fore bay and the strict requirement to monitor flow under the complex hydrology without endangering breach of the power canal and the forebay is imperative and decisive. While stating that there is no scope for controlling the water flow on other considerations even under FGMO or otherwise, the learned counsel has contended that this Power House ought to be exempted from the implementation of RGMO and FGMO with manual intervention to operate in the manner required for RGMO. The learned counsel further stated that while this generating station has been placed under FGMO with manual intervention, it will not

be possible to achieve operational results of performance under RGMO which may be expected in terms of the proviso to Regulation 5.2(f)(iii) of the IEGC, 2010. He added that the operation under FGMO with manual intervention will always be subject to the hydrology, the necessity of the imperatives of maintenance of the water level in the power canal and the fore bay and monitoring of the flow without endangering breach of the power canal and the fore bay. The learned counsel submitted that it is entirely possible and it may also be necessary, in likely circumstances, that the manual intervention on considerations of hydrology and safety is opposite to that which is required if the operation were to be in the manner required by RGMO. He reiterated that even the requirements of Clause 5.2(f)(iii) cannot be complied with invariably and therefore, it is imperative and necessary that these limitations be recognized and incorporated with respect to the requirement for operating the generating station under FGMO with manual intervention.

Reply of Respondent

30. In response to the contention of the petitioner above that it is not possible or worthwhile to implement RGMO/FGMO with manual intervention and the Commission ought to have given exemption to Donkarayi Power House, the respondent has clarified that the RGMO/FGMO performance is instantaneous and does not lead to a big change in water level. The respondent has pointed out that the issue of implementing RGMO/ FGMO on irrigation based hydro project plant was discussed in the special meeting on RGMO implementation with all the beneficiaries of the Southern Region in Bangalore on 23.6.2014 and it was decided that RGMO/ FGMO response does not have any serious impact on the release of water. It has also submitted that one of the irrigation based hydro projects from Karnataka, namely, Almatti, provided adequate RGMO/FGMO response in some of the instances, even though it was irrigation based project.The respondent has contended that the only exception made in the IEGC Regulations, 2010 is in respect of

hydro projects having capacity of upto 10 MW and this generating station does not fall within the purview of the said regulations for grant of exemption.

Petitioner's Rejoinder

31. The petitioner in its rejoinder while pointing out that the purported comparison of Donkarayi Project with Almatti is unwarranted and misconceived, has submitted that Donkarayi Project is not an irrigation project. It has also been submitted that the discharge from the power house is into a power canal leading to a fore bay from which water goes to generate power in the Lower Sileru Power House and there are intermediate inflows into the power canal between its lower and upper reaches from the Alimeru Vagu pick up dam which also limits the discharges permissible from the Donkarayi Power house. The petitioner has further submitted that the scheme is unique and the hydrology and security of the power canal is decisive and imperative.

Commission's Views

32. The petitioner has been operating the unit under FGMO with manual intervention. The petitioner has however submitted that the canal was designed for 4500 cusecs and the discharge through power house is 4250 cusecs at maximum load. The petitioner has also argued that if RGMO operational effect is to be achieved, whether by incorporating RGMO facility or operation in FGMO with manual intervention, the discharge may increase to 4600 cusecs which may lead to water flowing over canal bunds and/or causing scouring of canal bunds. The submissions of the petitioner are not acceptable. It is pertinent to mention that operation under FGMO with manual intervention so as to meet the requirements of RGMO warrants a maximum increase in generation by 5% only from the level the unit is generating at the time of frequency fall. Generally, the hydro units are designed for 10% overload capacity and even if the unit is operating at maximum load i.e 25 MW with discharge of 4250 cusecs, the increase in generation by 5% would require a

flow increase by 5% (*approx*) considering a slight increase in head loss. As such, the increase in discharge to accommodate the maximum increase in generation would be within the design capacity of the canal. In this background, the prayer of the petitioner for exemption of this generating station for RGMO/FGMO with manual intervention is rejected and the petitioner is directed to continue with the operation of the unit under FGMO with manual intervention.

Machkund Hydro Electric Project

33. The Commission in order dated 29.4.2013 while allowing the extension of time upto 31.12.2013 for implementation of RGMO had directed the petitioner to operate the units under FGMO with manual intervention.

Submissions of Petitioner

34. The learned counsel for the petitioner has now submitted as under:

"The project was a joint project between the States of undivided Andhra Pradesh (84 MW share) and Odisha (36 MW share) having been commissioned in 1955. The station runs as a base load station as per water available in the Jalaput reservoir. The discharge from this Powerhouse maintains the water level in the Balimela reservoir from which the States of Odisha and undivided Andhra Pradesh shared water equally. The governors do not have the facilities required for FGMO or RGMO.

APGENCO) was only the operator of the project which was owned by the two States. The generating station is very old and there are frequent interruptions due to multiple maintenance issues. Proposals were under consideration between the APGENCO and OHPC for R&M of the station by joint participation, which required also the agreement between the States of Odisha and undivided Andhra Pradesh. It was proposed to replace the existing units themselves with new ones with higher capacity to harness more power from the existing resources. On implementation of an R&M scheme, the new units can be operated under RGMO.

On the expectation that the agreement between the States of undivided Andhra Pradesh and Odisha and also the consequent arrangements of joint participation between the then APGENCO and the OHPC would be concluded soon and considering that the delivery period for the equipment is about 18 months, extension of time till 31.12.2015 for the implementation of RGMO in the project as part of the R&M was sought.

However, agreements between the two States were not concluded. The discussions were going on between the officials of the two State Governments, and the same were at an advanced stage. It was later considered expedient to take up the R&M of the units one by one so as to avoid/minimize generation loss. In the circumstances, it was considered necessary to seek time, on estimate basis, up to December, 20I8 for the complete implementation of RGMO in this power station.

Now consequent to the A.P.Reorganization Act, 2014 and the consequent bifurcation of the undivided State, and as the said Act provides for assets located outside the undivided Andhra Pradesh to be divided between Telangana and the residual Andhra Pradesh., the entire scheme of the project, its operation and the R&M proposals and the investments therefore have to be re-worked through tri-partite agreements between the three States of Andhra Pradesh, Telangana and Odisha. This exercise will take time by reason of the inherent nature of the exercise to be undertaken.

In the meantime, it is futile and entirely wasteful to replace the governors at this stage for the existing generating units, apart from the fact that the three States have to agree on funding the same even to do that. As the existing governors do not have any provision for operating even under FGMO, the operation under even FGMO is not possible. It is therefore necessary to exempt this station from operation in RGMO and/or FGMO".

35. Pursuant to the hearing, the Commission directed the petitioner to submit additional information giving the project status and the time frame required/involved in respect of R&M of the units of the generating station.

36. In compliance with the directions of the Commission, the petitioner vide affidavit dated 2.12.2014 has submitted the information as under:

"*Present condition of the project*

4. The 6 units of the project have been in service for 55-59 years, and have operated at a good average load factor of 60%.

5. However, due to operation and long service with the high silt content of the water in the Jalaput reservoir and high wear and tear, many of the core equipment like the wicket gates, runners, BF valves etc have eroded. The spherical valves and centrally balanced valves of the penstocks and the pressure regulators are not functioning satisfactorily. The runner vanes have eroded and have been repaired by welding. The instrumentation, controls, excitation and governing systems have become unreliable and obsolete. Consequently, there are several forced outages of the units and serious maintenance issues are being faced repeatedly.

6. It has therefore become essential to carry out extensive Renovation, Modernization and Up-gradation works. This requires agreement between the State of Andhra Pradesh and Odisha on the sharing of the cost of such works by the State Governments and related matters.

Status of required Agreement between the States

7. The work of Renovation, Modernization and Up-gradation can only be taken up after definitive conclusion of a modified agreement between the States of Andhra Pradesh & Orissa.

8. Proposals were mooted initially in 1992. CEA also approved the R&M proposals in 2000 approving a cost of Rs.150 cr. However, due to non-settlement of some outstanding issues with the Government of Odisha, the R&M and up-rating works could not be taken up.

9. A draft of the modified agreement was sent to the Government of Odisha for obtaining concurrence to proceed with the R, M &U works. High Level meeting was held between the

officials of the Government of the undivided Andhra Pradesh and the Government of Odisha on 27/28 May 2013 to resolve various issues pertaining to the Machkund Project.

10. Now, after the Re-Organization of Andhra Pradesh and the re-organization of the State undertakings, the issue is being taken up against to secure the modified agreement between the two States including agreement on the sharing of the costs of the works. The issue is under examination by the respective Government for signing the Minutes of Meeting.

11. The process of implementation of the R, M & U units can only be taken up by the implementing agency after definitive conclusion and signing of the agreement between the State of Andhra Pradesh and Odisha, and the estimates hereafter are on that basis.

Projected Time-Frame

11. As up gradation of the units is being planned, the implementation is proposed to be done one unit at a time to minimize loss of generation from the basin. Thus, the 2nd unit will be taken up after the 1st unit is commissioned, and so on. The implementation schedule is consequently very long and estimated at one unit per year.

12. The Estimated Time Frame is as follows:

b.	*Conclusion of R. M & U Agreement*	*December, 2015*
c.	*Fixing up of Agency*	*July, 2016*
d.	*Completion of R, M & U of 1st Unit*	*July, 2017*
e.	*Completion of R, M & U of 2nd Unit*	*July, 2018*
f.	*Completion of R, M & U of 3rd Unit*	*July, 2019*
g.	*Completion of R, M & U of 4th Unit*	*July, 2020*
h.	*Completion of R, M & U of 5th Unit*	*July, 2021*
i.	*Completion of R, M & U of 6th Unit*	*July, 2022*

13. Considering the above, and for the reasons submitted in the petition and the submissions made heretofore, the Hon'ble Commission may be pleased to exempt the project from operation in FGMO/RGMO till the implementation of the RM & U works."

Reply of Respondent

37. The respondent in its reply has submitted that the petitioner had sought extension of time till 31.12,2015 for implementing of RGMO in this project as a part of its renovation and modernization programme and the Commission by its order dated 29.4.2013 had extended time till 31.12.2013. It has also submitted that the petitioner has however sought further time till December, 2018 for the very same implementation. The respondent has further submitted that while it is acceptable that RGMO would be implemented only after renovation and modernization, the petitioner needs to give a proper implementation programme with specific timeline before this Commission for seeking any such extension. Accordingly, the respondent has submitted that the provisions of IEGC Regulations cannot be flouted or not complied with for such long periods.

Rejoinder of the petitioner

38. The petitioner in its rejoinder vide affidavit dated 24.1.2015 has submitted that the APGENCO is only an operating agency for the existing project which is owned by the State of Andhra Pradesh and the State of Odisha/OHPC. It has also submitted that there is also the uncertainty arising out of the A.P. Reorganization Act, 2014 and the bifurcation of the undivided State of Andhra Pradesh thereby, and on issues relating to the bifurcation / division of assets / functions thereupon and consequently. The petitioner has also submitted that only the O&M expenditure is incurred and recovered by APGENCO and any capital expenditure is outside the scope of APGENCO and thus it is not possible for the APGENCO to implement any R&M capital expenditure. The petitioner has further submitted that all R&M expenditure, even it is only for the replacement of the governors, has to be funded by agreement between the aforementioned owners of the projects and implemented by an agency decided upon by them. Accordingly, the petitioner has argued that the APGENCO has only given the projected time frame for the up-gradation and replacement of the generating station as contemplated and it is for the aforementioned owner States/entities to come to an agreement on the funding and also to nominate the implementing agency for the execution of the R&M works. The petitioner has stated that the submissions of the respondent are not based on a realistic consideration or appreciation of the peculiar facts and circumstances of the case.

Commission's Views

39. We have examined the submissions of the parties. While the petitioner has sought for time extension starting from July, 2019 (1st Unit) to July, 2022 (6th Unit) for implementation of RGMO, apparently after signing of agreements between the States of Andhra, Odisha and Telengana for any R&M expenditure, the respondent has stated that proper implementation programme with time line has not been given by the petitioner. Considering the fact that the existing units including governing system are 55 to 59 years

of age and that the replacement of governors cannot be undertaken by the petitioner considering the complexities involved in the funding of capital expenditure and the involvement of three participating governments, we allow the prayer of the petitioner and exempt the generating station from operation under RGMO/FGMO with manual intervention till R&M of the generating station for replacement of units.

Jurala Hydroelectric Project

40. The Commission in order dated 29.4.2013 while allowing extension of time upto 31.12.2013 for implementation of RGMO had directed the petitioner to for replacement of the governors in order to put these hydrogenating stations on RGMO mode of operation at the earliest.

Submission of Petitioner

41. The learned counsel for the petitioner has submitted as under:

> *"The project, commissioned during 2008-2011, is a run-of-the-river system and only surplus water is utilized for power generation. The governing equipment of this project is from PR China and does not incorporate RGMO features. There is no provision to operate the station under RGMO at present.*
>
> *The proviso to Clause 5.2(f)(iii) of the IEGC, 2010, as amended, permits the operation under FGMO with manual intervention if a generating cannot be operated under RGMO.*
>
> *The units were presently being operated under FGMO with manual intervention and the same is in compliance with the IEGC as amended and presently in force.*
>
> *Without prejudice to the above, the time required for incorporation of RGMO features in all the governors after again consulting and re-opening the issue with the manufacturer for operation under RGMO is about 14 months depending upon positive response from the manufacturer. In the event it is directed to implement RGMO for the station for any reason, time ought to be allowed accordingly from the date of an order hereafter."*

42. Pursuant to the hearing, the Commission directed the petitioner to submit additional information on the following:

> ***"****Details of the incidents during which FGMO response got curtailed due to scarcity of water in the system along with a detailed write-up on the operation under FGMO, including the*

restrictions imposed by other Civic authorities which hampered the availability of water for providing the FGMO response."

43. In compliance with the above directions, the petitioner vide affidavit dated 24.1.2015 has submitted the information as under:

"3.The Priyadarshini Jurala Hydro Electric Project was commissioned during 2008-11.

4. It was designed and constructed as a purely run-of-the-river system utilizing only the surplus water from the Pridarshini Jurala Project ("PJP") Dam for power generation. It is not a run-of-river system with any pondage and the water below the FRL of the PJP Dam is not permitted to be used for power generation. It is only the surplus water released beyond the FRL of the PJP dam that is permitted to be used for power generation.

5.The PJP Dam is meant for irrigation and drinking water requirements of Mahboobnagar District under the control of the Irrigation Department. Though the FRL of the PJP dam is 318.516 mts, and considering the need to maintain a cushion for enabling opening / closing of the crest gates during heavy floods, the surplus water received over and above 318.45 mts only is released to be utilized for power generation. The release of water is under the control of the Irrigation authorities.

6. The units are presently being operated under FGMO with manual intervention and the same is in compliance with the IEGC as amended and presently in force. The proviso to Clause 5.2(f)(iii) of the IEGC 2010, as amended, permits the operation under FGMO with manual intervention if a generating unit cannot be operated under RGMO. However, there are practical and necessary limitations on the possibility of manual intervention and the effect of RGMO operation by manual intervention cannot be practically realized. Such limitation requires to be recognized and the requirement of manual intervention under FGMO to achieve operation as in RGMO requires to be relaxed.

7. During flood season, the water is allowed for power generation when so released by the irrigation authorities. Depending on the quantum of inflows, the PJHEP machines are run at a rate of 8000 cusecs per machine for the full load of 39 MW strictly maintaining the MDDL.

8. From the previous years' flood pattern it is noticed that the average inflow during flood season is above 50,000 cusecs and there is also water released into the river through the crest gates also in .addition to Power House discharge. Consequently there is raising of the tail race level over the normal (around 3 to 5 mts above the normal 299.60 mts) due to river back water pooling with tail race water. This results in reduction of net head of the power house and consequent reduction of power generation. Having regard to increase in machine vibrations due to air hammering at the intake end of the machine because of insufficient water driving force as water is drawn from the surface of the dam, the wicket gate opening is increased to a maximum possible limit of 80%. Under such conditions, the RGMO type / effect operation / intervention will necessitate further opening of the wicket gate to further raise the load, and this will cause more vibrations in the machines which may trip on high vibrations. Hence, RGMO type facility / operation / intervention is not feasible in this project.

A statement of the Inflows, Outflows, Tail Race Water Level and the Generation load for 2012-13 and 2013-14 is annexed hereto as Annexure-1.

9.During Non-Flood season, whenever the PJP dam reservoir level approaches the FRL of 318.45 mts due to accumulation of re-generated water coming from upstream of the dam, the Irrigation Authorities release water through the power house up to a level of 318.35 mts instead of allowing it to pass over the crest gates. Under such circumstances, only

0.347 TMC of water is available, being the difference of FRL and MDDL, which will last for two hours at a rate of 0.029 TMC per machine per hour for six machines.

Hence, the RGMO effect from manual intervention is not practically achievable or possible, and the requirement to operate under FGMO with manual intervention so as to achieve operation as in RGMO is not possible.

10. It requires to be recognized that, in view of the complex and varying circumstances and hydrology particular to the project, the operation under FGMO with manual intervention to achieve the effect of operation under RGMO is not possible.

11. Considering the above, and for the reasons submitted in the petition and the submissions made heretofore, the Hon'ble Commission may be pleased to recognize the practical limitations and realities and exempt the project from the requirement to operate as if in RGMO whilst in operation under FGMO with manual intervention."

Reply of respondent

44. The respondent, POSOCO has submitted that Regulation 5.2 (iii) of the IEGC Regulations, 2010 provides as under:

"(iii)AII other generating units including the pondage upto 3 hours Gas turbine/Combined Cycle Power Plants, wind and solar generators and Nuclear Power Stations shall be exempted from Sections 5.2 (f) ,5.2(g), 5.2 (h) and 5.2(i) till the Commission reviews the situation."

45. Referring to the above, the respondent has submitted that the Grid Code Regulations provide an exemption for run of the river projects with three hours pondage and therefore, the petitioner is required to bring the hydro project under at least FGMO with manual intervention.

Petitioner's Rejoinder

46. The petitioner in its rejoinder has submitted that the submissions of the respondent are incorrect as Jurala Project is not a run of the river project and/or that there is pondage of three hours. It has further reiterated that the project operates only when surplus waters are released beyond FRL of the PJP dam and it is not a case where there is pondage. The petitioner has stated that if there is no surplus water released, there is no generation and the generation is only when, and is limited to the extent of surplus water released. Accordingly, the petitioner has argued that it has to be considered as a scheme where

there is no pondage and it needs to be exempted in terms of Section 5.2 (f) (iii) of the IEGC Regulations, 2010, as amended from time to time.

Commission's Views

47. The matter has been examined. Considering the fact that the said generating station does not have pondage and operates purely as a Run-of the River plant, we, in terms of Section 5.2(f)(iii) of the IEGC Regulations, 2010 exempt the generating station from the provisions of Sections 5.2(f),5.2(g),5.2(h) and 5.2 (i) of the IEGC Regulations, 2010. The prayer of the petitioner is therefore allowed and the order dated 29.4.2013 stands revised in terms of the above.

(B) <u>Consideration of proportionality, cost benefit and change in frequency band</u>

48. The petitioner has submitted as under:

> *"It is necessary to appreciate that the maximum of 5% of the variation of generation that may be required by FGMO/RGMO in small hydroelectric stations is of insignificant effect on the frequency of the very large capacity regional/national grid, and that the costs of implementing RGMO is disproportional and unjustifiable for any tangible benefit, more particularly when considered along with, and in the context of, project specific constraints. In cases where there are constraints, there ought to be an exemption from the requirements on a case to case basis.*

Commission's Views

49. We have examined the submissions of the petitioner. The submissions of the petitioner that the variation in generation due to governor operation has insignificant effect on the frequency of large capacity grid are not acceptable. To assume that FGMO/RGMO mode of operation in all small hydro generating stations would not help the large capacity Regional / National grid would only result in endangering the safety of the grid. Being a collective effort, these hydro generating stations do play a major role in providing primary response to the fluctuations in grid frequency. The respondent has also stressed the need for maintaining the frequency with in the band of 49.9 Hz to 50.05 Hz specified under the IEGC Regulations, 2010 and the same can only be achieved by the collective efforts of all

the generators connected to the grid. In our view, the variation in the grid frequency can only be minimized by putting all the generating stations on RGMO/FGMO. As regards the contention of the petitioner that costs for implementing RGMO is disproportional and unjustifiable for any tangible benefits, it is pointed out that in respect of the generating stations which are not able to put their units on RGMO mode of operation, the Commission by amendments to the IEGC Regulations, 2010 has specified the alternative for putting the units on FGMO with manual intervention as long as the RGMO stipulations are being met. The benefits of putting the units on RGMO/FGMO should not be measured in terms of the small response given by individual generating stations, but in terms of the grid safety and quality of electricity provided to ultimate consumers. When viewed from this perspective, the cost incurred would not be disproportional. We are of the considered view that the cost incurred for implementing RGMO/FGMO is required to be allowed by the concerned Appropriate Commissions as a part of the capital expenditure. As regards the submissions of the petitioner that there ought to be an exemption from the requirements on a case to case basis, considering the special or equipment constraints, it is pertinent to mention that the Commission by its orders have been granting relaxation for certain units on case to case basis, considering the constraints expressed by the parties, including the present case of the petitioner, wherein, relaxation/exemption from implementation of RGMO had been granted based on the specific constraints indicated and found acceptable.

50. The petitioner has also submitted that:

> *"Clause 5.2(f)(ii)(d) contemplates that the Hon'ble Commission reviews the provision for implementation of RGMO after stabilization of frequency around 50 Hz and to introduce FGMO.*
>
> *In the IEGC, 2010, the frequency band contemplated for grid operation measures was 49.5 to 50.2. In the Ist amendment, it was changed to 49.7 to 50.2. In the 2nd amendment it was further changed to 49.95 to 50.05. This signifies the recognition of the achievement substantially of the improvement of the frequency and the stabilization thereof. The improvement is a result of various measures taken by the Hon'ble Commission to ensure grid discipline. The review contemplated in the aforesaid provision is now warranted or is*

imminent. However, it certainly warrants that the exemption from the provisions for RGMO/FGMO with manual intervention to operate in the manner required by RGMO be considered appropriately keeping in view the frequency band now applicable and considering the proportionality of the requirements on case to case basis where there are local and/or special or equipment constraints."

Reply of Respondent

51. The respondent has submitted that as per Regulation 5.2(f)(ii)(d) of IEGC Regulations, 2010, the Commission has already specified that after stabilization of frequency, the Commission may review the provision regarding RGMO and introduce FGMO. It has pointed out that the frequency profile has stabilized around 50 Hz and has accordingly annexed a sample frequency plot as well as frequency profile for the period January to October, 2014.

Commission's views

52. The submissions of the parties have been considered. It is pertinent to mention that in order to consider various aspects in the implementation of RGMO/FGMO with manual intervention in the thermal units including the review of the procedure for reversion back to FGMO mode of operation in case of the frequency gets stabilized within the specified band, the Commission has constituted a High Level Committee. Based on the recommendations of the Committee, necessary amendments to the IEGC Regulations, 2010 would be considered by the Commission as deemed fit and necessary.

53. Petition No.13/RP/2011 is disposed of in terms of the above.

Sd/-
(A.S.Bakshi)
Member

Sd/-
(A.K. Singhal)
Member