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31st October 2022

To,
The Secretary
Central Electricity Regulatory Commission
Chandralok Building
New Delhi-110001

Sub: - Comments on Proposed Regulations of the Draft grid Code-2022

Dear Sir

Our comments on the Draft Grid Code are as under:

1. Force Majeure:

Proposed regulations seems to have skipped the definition of the Force Majeure Events. It is proposed to kindly incorporate the same in the final regulations.

2. Overload Operations of Hydro/ROR Plants during High Flow Season:

The Draft Grid Code Regulations 2022 in Regulation 45 of Chapter 7 on "Scheduling and Despatch Code" propose that: -

10. Optimum Utilisation of Hydro Energy

(a) During high inflow and water spillage conditions, for Storage type generating station and Run-of-River Generating Station with Pondage, the declared capacity for the day may be upto the installed capacity plus overload capability (upto 10%) minus auxiliary consumption, corrected for the reserve level.

(b) During high inflow and water spillage conditions, the concerned RLDC shall allow scheduling of power from hydro generating stations for the overload capability upto

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10% of installed capacity without the requirement of additional GNA for such overload capacity, subject to availability of margins in the transmission system.

Comments:

In this regard it is submitted that during the high flow season the restriction of overload capacity upto 10% should not be imposed on all types of ROR Plants and these Plants should be allowed to run on overload as guaranteed by the Original Equipment Manufacturer (OEM) in view of the following:

Regulation 7 of Chapter-3 on Connection Code proposes that all the users connected to or seeking connection to the grid, will be required to comply with the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010.

Regulation 32(2) of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electrical Lines) Regulations 2010 states that:

“The maximum continuous overload capacity of the unit at the generator terminal during the high head conditions or high discharge conditions or both as guaranteed by the manufacturer shall be based on the hydraulic parameters of the Station.”

Therefore instead of imposing the restriction of 110% on overload generation during high flow season, the Grid Code should allow the Generators to generate at full load plus overload as guaranteed by the OEM for the optimum utilization of the high inflow during monsoon season. The permission is relevant only for a limited period of 50-60 days of the high flow season in case of the hydro/all types of ROR Plants having the guaranteed capacity to generate at overload beyond 110% due to heavy discharge received by them during this period in a year. Relevant Portion of the Regulations of CEA is enclosed herewith for the reference as **Appendix # 1**.



Case Study:

A case study of 192 MW Allain Duhangan HEP is placed herewith for the reference as under:

1. The 192 MW Allain Duhangan Hydro Electric Project, a ROR with a peaking pondage was commissioned on 16th September 2010 and is connected to the National Grid.
2. The main TG equipment for the Plant was supplied by BHEL which is capable of generating the overload of upto 115.2 MW (app. 20%) for each machine on the given hydraulic parameters of the plant in its manual. Copy of the BHEL document is attached herewith as **Appendix # 2**.
3. It is submitted other equipment of the plant are also capable to support the overload generation upto 115.2 MW on each machine.
4. In order to prevent the spillage, the scheduling of Plant is done at 110% of the installed capacity. However the Plant can be run even beyond the 110% of the installed capacity upto 231 MW during high flow season only subject to availability of excess discharge whenever it is found that the Grid Frequency is lower than 50.05 Hz.
5. If the Plant is scheduled at 110% capacity, any excess water received is required to be spilled over. This spillage normally is for about 50-55 days from middle of July to middle of September every year. The data for the year 2019-20 has been tabulated as under:



Available Discharge and Generation for July to September in 2019-20

Sr. No.	Date	Discharge used for generation	Actual Spillage	Total discharge for the day	Generation Possible with guaranteed overload of 20% as per BHEL	Generation without 20% Overload	
		Cumecs	Cumecs	Cumecs	KWH	KWH	
A	B	D	E	F	G	H	
1	25-Jun-19	29.538	3.243	32 781	5,544,000	5,160,000	
2	26-Jun-19	29.568	0.693	30 261	5,440,462	5,160,000	
3	03-Jul-19	29.495	1.027	30.522	5,487,490	5,160,000	
4	04-Jul-19	30.020	3.816	33.836	5,544,000	5,160,000	
5	05-Jul-19	30.092	1.565	31.657	5,544,000	5,160,000	
6	06-Jul-19	30.002	1.218	31.220	5,544,000	5,160,000	
7	07-Jul-19	30.415	4.155	34.570	5,544,000	5,160,000	
8	08-Jul-19	30.400	5.024	35.424	5,544,000	5,160,000	
9	09-Jul-19	30.377	6.117	36.494	5,544,000	5,160,000	
10	10-Jul-19	30.319	6.885	37.204	5,544,000	5,160,000	
11	11-Jul-19	30.508	9.941	40.449	5,544,000	5,160,000	
12	12-Jul-19	30.618	5.128	35.746	5,544,000	5,160,000	
13	13-Jul-19	30.666	1.919	32.585	5,544,000	5,160,000	
14	14-Jul-19	30.236	0	30.236	5,436,060	5,160,000	
15	15-Jul-19	29.701	0.974	30.675	5,514,992	5,160,000	
16	16-Jul-19	30.359	1.535	31.894	5,544,000	5,160,000	
17	17-Jul-19	29.174	0.291	29.465	5,297,348	5,160,000	
18	18-Jul-19	29.813	0	29.813	5,360,040	5,160,000	
19	19-Jul-19	30.483	2.223	32.706	5,544,000	5,160,000	
20	20-Jul-19	29.711	2.221	31.932	5,544,000	5,160,000	
21	21-Jul-19	29.252	4.735	33.987	5,544,000	5,160,000	
22	22-Jul-19	29.472	6.34	35.812	5,544,000	5,160,000	
23	23-Jul-19	29.360	4.403	33.763	5,544,000	5,160,000	
24	24-Jul-19	28.836	10.246	39.082	5,544,000	5,160,000	
25	25-Jul-19	29.222	6.713	35.935	5,544,000	5,160,000	
26	26-Jul-19	29.821	4.2	34.021	5,544,000	5,160,000	
27	27-Jul-19	29.755	8.488	38.243	5,544,000	5,160,000	
28	28-Jul-19	29.758	9.643	39.401	5,544,000	5,160,000	
29	29-Jul-19	30.157	11.532	41.689	5,544,000	5,160,000	
30	30-Jul-19	30.367	11.362	41.729	5,544,000	5,160,000	
31	31-Jul-19	29.994	12.515	42.509	5,544,000	5,160,000	
32	01-Aug-19	30.146	17.922	48.068	5,544,000	5,160,000	
33	02-Aug-19	30.418	13.843	44.261	5,544,000	5,160,000	
34	03-Aug-19	30.581	4.267	34.848	5,544,000	5,160,000	
35	04-Aug-19	30.382	7.054	37.436	5,544,000	5,160,000	
36	05-Aug-19	30.484	7.199	37.683	5,544,000	5,160,000	
37	06-Aug-19	30.093	3.449	33.542	5,544,000	5,160,000	
38	07-Aug-19	30.111	7.601	37.712	5,544,000	5,160,000	
39	08-Aug-19	30.366	6.62	36.986	5,544,000	5,160,000	
40	09-Aug-19	30.396	5.298	35.694	5,544,000	5,160,000	
41	10-Aug-19	30.202	2.768	32.970	5,544,000	5,160,000	
42	11-Aug-19	29.400	2.928	32.328	5,544,000	5,160,000	
43	12-Aug-19	30.205	1.463	31.668	5,544,000	5,160,000	
44	13-Aug-19	30.731	1.767	32.498	5,544,000	5,160,000	
45	14-Aug-19	30.679	4.64	35.319	5,544,000	5,160,000	
46	15-Aug-19	30.223	1.873	32.096	5,544,000	5,160,000	
47	16-Aug-19	30.492	5.19	35.682	5,544,000	5,160,000	
48	17-Aug-19	30.771	29.896	60.667	5,544,000	5,160,000	
49	18-Aug-19	30.721	60.859	91.580	5,544,000	5,160,000	
50	19-Aug-19	30.734	18.526	49.260	5,544,000	5,160,000	
51	20-Aug-19	30.722	3.987	34.709	5,544,000	5,160,000	
52	21-Aug-19	29.507	0	29.507	5,304,950	5,160,000	
53	26-Aug-19	28.488	1.112	29.600	5,321,682	5,160,000	
54	27-Aug-19	30.074	0.007	30.081	5,408,059	5,160,000	
55	28-Aug-19	29.319	0	29.319	5,271,140	5,160,000	
Total					303,322,222	283,800,000	
Additional generation possible at Guaranteed Overload of 20% in 55 days of high inflow in Monsoon						19,522,222	kwh

6. If the Plant is allowed to schedule the power at 231 MW (20%) overload as shown by the manufacturer (BHEL) in terms of the Regulations, it is capable of scheduling about 19.20 MW extra power which would account for about 19.5 MUs of energy during the period of 55 days of monsoon which will be a boon for the National Grid specially for the Northern region having a lot of power requirement due to domestic and commercial demand as well as the high demand in agriculture sector due to paddy season. This will also help the home State by way of free power.

Needless to mention that this generation will always be subject to the directions issued by the Nodal Agency with respect to real time frequency of the Grid.

It is submitted that the same is the case in our 86 MW Malana-I Hydro electric Plant which is in operation since 5th July 2001.

In view of this it is submitted that the restriction of 10% overload may kindly be removed from the proposed Grid Code-2022.

Thanking you

Yours Faithfully

For A D Hydro Power Limited



Sumit Garg

Associate Vice President-Commercial


 सत्यमेव जयते
भारत का राजपत्र
The Gazette of India

असाधारण

EXTRAORDINARY

भाग III—खण्ड 4

PART III—Section 4

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 211]

नई दिल्ली, शुक्रवार, अगस्त 20, 2010/श्रावण 29, 1932

No. 211]

NEW DELHI, FRIDAY, AUGUST 20, 2010/SHRAVANA 29, 1932

CENTRAL ELECTRICITY AUTHORITY

NOTIFICATION

New Delhi, the 20th August, 2010

No. CEA/TETD/MP/R/01/2010.—In exercise of the powers conferred by sub-section (2) of Section 177 of the Electricity Act, 2003, the Central Electricity Authority hereby makes the following regulations namely :—

1. Short Title and Commencement.—(1) These regulations may be called the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Definitions.—(1) In these regulations, unless the context otherwise requires,—

- (a) "Act" means the Electricity Act, 2003;
- (b) "Authority" means the Central Electricity Authority established under sub-section (2) of Section 70 of the Act;
- (c) "Base Load Operation" means operation at maximum continuous rating (MCR) or its high fraction;
- (d) "Basic Insulation Level (BIL)" means reference voltage level expressed in peak (crest) voltage with standard 1.2/50 μ s lightning impulse wave. Apparatus should be capable of withstanding test wave of basic insulation level or higher;
- (e) "Black Start" means the start up of a generating unit or gas turbine or internal combustion (IC) engine based generating set without use of external power following grid failure;
- (f) "Boiler Maximum Continuous Rating (BMCR)" means the maximum steam output, the steam generator (boiler) can deliver continuously at rated parameters;

- (5) The generating units of rated capacity 50 MW and higher shall be capable of operation in synchronous condenser mode, wherever feasible.
- (6) The operation of the unit shall be smooth and quiet. The noise level shall not be more than 90 dBA at a distance of 1 metre from any equipment.
- 31. Layout Considerations-** (1) General layout of the Station shall be developed considering the proper utilization of space, functional requirements, future extensions and considering requirements of space during construction stage. The layout of the Station shall be compact so as to economise on the use of materials.
- (2) Maintenance facilities shall be provided as required for assembly, disassembly and handling during maintenance of all important equipments and auxiliaries.
- (3) Fire escape staircases/ galleries shall be provided in main Station building/Cavern. Each equipment room shall be provided with alternate exits to be used in case of fire/ accidents as per requirements of the Factory Act and other statutory requirements.
- (4) Adequate provisions in layout shall be made for protection of power house against flooding. The required provisions for protection against flooding are given in Regulation 39.
- 32. Operating Capability of the Generating Unit-** (1) The unit shall be capable of giving the rated output continuously as specified by the manufacturer at the rated design head and rated discharge and shall be capable of operating between the minimum and maximum head specified by the purchaser and ambient temperature at site as specified.
- (2) The maximum continuous overload capacity of the unit at the generator terminals during the high head conditions or high discharge conditions or both as guaranteed by the manufacturer shall be based on hydraulic parameters of the Station.
- (3) The unit and all the associated auxiliaries shall be suitable for continuous operation without any restriction within a frequency range of -5% to +3% (47.5 Hz to 51.5 Hz). All the equipment driven by the electric motors shall give their rated performance even at a power supply frequency of 47.5 Hz.
- (4) Provision shall be made for starting the machine in auto mode upto synchronization by a single command and loading of the unit to full load quickly. The design of the equipment and control system shall permit participation of the unit in automatic frequency control mode.

APPENDIX # 2

I N D E X

- 1.0 BASIS OF GENERATOR DESIGN
- 2.0 GENERATOR SCOPE OF SUPPLY
- 3.0 DESCRIPTION OF GENERATOR
- 4.0 TECHNICAL SCHEDULE
- 5.0 GENERATOR TEST SCHEDULE
- 6.0 LIST OF ENCLOSURES

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BASIS OF GENERATOR DESIGN :

TURBINE DATA

Number of units	: 2
Type of turbine	: V. PELTON
Rated output of turbine	: 98 MW
Maximum output of turbine	: 117.6 MW
Synchronous speed	: 500 rpm
Runaway speed	: 900 rpm
Direction of rotation (viewed from top)	: Clockwise
Required GD ² from generator rotor	: 1370 TM ²
Weight of turbine rotating parts	: 21 T
maximum hydraulic thrust	: 4 T

GENERATOR DATA

Rated output	: 96 MW / 106.67 MVA
Over load continuous output	: 115.2 MW / 128 MVA
Rated voltage with variation	: 11 +/- 5% kV
Rated Power factor (Lagging)	: 0.9
Rated frequency with variation	: 50 +/- 3% Hz
Short circuit ratio. (Not less than)	: 1.1
Class of insulation for windings	: Class 'F'
Standards and tolerances	: IS:4722, IEC :60034
Statutory and regulatory requirements	: As per HGS-9451

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2.0 SCOPE OF SUPPLY FOR GENERATOR :

2.1 GENERATOR SCOPE

2 Nos, 96 MW, 11 kV, 0.9 pf(lagging), 50 Hz, 500 RPM, 3 Phase AC Generator having combined thrust and guide bearing above the rotor with guide bearing below the rotor with closed air circuit ventilation.

Each generator consists of :

ONE NO. Stator complete with stator frame, core and stator winding with reflex insulation system of BHEL (Class 'F') neutral terminals terminated on stator frame.

ONE NO. Rotor complete with spider, rim, fans etc.

ONE SET Poles with field coil and damper winding assembly insulation.

ONE NO. Thrust collar & runner disc, top shaft and bottom shaft half coupling to suit turbine shaft half coupling.

ONE SET Slip rings & Brush gear.

ONE NO. Upper bearing housing complete with Bearing bracket, upper guide Pads, oil retaining sleeve and oil vapour seal.

ONE NO. Lower bearing housing complete with Bearing bracket, Pads, oil retaining sleeve and oil vapour seal.

ONE NO. Self contained lubrication system for Lower guide bearing in oil coolers, Including water piping, control valves and level indicators.

ONE SET Self contained lubrication system for thrust cum upper guide bearing with plug-in oil coolers, Including water piping, control valves and level indicators.

ONE SET Hydrostatic lubrication system for thrust bearing complete with pump-motor, high pressure pipe, pressure gauge, filter and flexible hoses etc.

ONE SET Air coolers with valves, connecting water piping etc.

ONE SET Sole plates, holding down bolts, foundation bolts for STATOR.

ONE SET Sole plates, holding down bolts, foundation bolts for BOTTOM BRACKET.

- ONE SET Turbine pit air seal.
- ONE SET Top floor plates along with support structures
- ONE SET Air operated brakes with high pressure piping also suitable for use as rotor jacks using high pressure oil. The system will be complete with electrically and manually operated valves.
- ONE SET Brake dust collection equipment.
- ONE SET Anti-condensation heaters.
- ONE SET Carbon dust collection system.
- ONE NO. Top casing to enclose brush gear and Dome light.
- ONE SET Radial jack for stiffening the top bracket.
- ONE SET Generator barrel and brush gear lighting.
- ONE SET Access doors, stairs, railings etc. as required.
- ONE NO. Generator marshalling box located outside the generator barrel.
- ONE SET Cables for connections from various terminals boxes to generator marshalling box.
- ONE LOT Oil required for first oil filling of the upper thrust cum guide bearing and lower guide bearing reservoirs including 10% extra.

INSTRUMENTS, CONTROL & SAFETY DEVICES:

RESISTANCE TEMPERATURE DETECTOR (RTD- DUPLEX TYPE)

- 1 NOS. Stator winding, located between top and bottom coil sides
- 1 NOS Stator Core
- 1 NOS Hot air inlet to air coolers
- 1 NOS Cold air outlet from air coolers
- 1 NOS. Thrust bearing pads
- 1 NOS. Upper guide bearing pads
- 1 NOS. Lower guide bearing pads
- 1 NO Top oil reservoir

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