

SECTION – 4
AVAILABILITY

4.1 EXISTING PROVISION

In the GOI tariff notification dt. 31.3.92 (as ammended upto 6.11.95), the following provision is made regarding the Availability.

“Availability in relation to a plant means the capacity of the plant including the generating units, to generate power on availability of water and the annual Availability of a plant shall be determined as per the following formula”.

$$\text{Percentage Annual Availability} = \frac{U_1 H_1 + U_2 H_2 + \dots + U_N H_N}{(U_1 + U_2 + \dots + U_N) 8760} \times 100$$

where U₁, U₂..... U_N is the capacity in MW of different generating units

H₁, H₂..... H_N are the hours for which the respective units were available for operation during the year.

4.2 DISCUSSIONS

- i) The above formula is based on the time factor and does not take into account output capability factor. The sent out capacity (capability) in MW of generating units indicated in the numerator is considered the same as the guaranteed output of the units indicated in denominator. This may not be true in all cases. There is a possibility that some of the generating units are only partially available. The above

formula thus needs modification on this account as recommended in para 4.3 below.

- ii) To be precise in computation of Availability, the guaranteed capacity of the generating units in the denominator need to be adjusted with respect to actual operating head based on the water level in the upper pond/reservoir. Similarly the guaranteed capacity in the denominator would also need to be adjusted when any generating unit is running in over load condition.
- iii) As per above referred tariff notification, full fixed charges becomes payable on achieving Annual Availability of 85%. The analysis of data on annual Availability of all the hydro plants in operation in the country, computed by the Central Electricity Authority for the years 1992-93, 1993-94 and 1994-95 indicated that normative annual Availability of 85% is quite appropriate for payment of full fixed charges as it is possible to achieve annual availability of 85% and in almost all cases. This is true even for the plants which are located in Himalayas and are subjected to silt erosion and for old plants which were even commissioned 50 years back..

4.3 RECOMMENDATIONS

- i) The Availability of the plant for any period shall be calculated by using the following formula

$$\text{Percentage Availability} = \frac{U_1 H_1 + U_2 H_2 + \dots + U_N H_N}{UXH} \times 100$$

Where $U_1, U_2 \dots U_N$ are the sent out capacity in MW of different units during the period under consideration.

$H_1, H_2 \dots H_N$ are the hours for which the respective units were under operation during the period.

U is the guaranteed output in MW of the plant during the same period.

H represents the total number of hours of the period.

- ii) The sent out capacity of individual unit at any time shall not be more than the guaranteed capacity.
- iii) In hydro plants in general and the storage schemes in particular where head available for power generation varies depending upon the level of water in the upper pond/reservoir, the guaranteed output used in the above formula should correspond to the head available during that period.
- iv) The generating units which are designed to have over load capability, may some times be called upon to run at over load conditions to meet contingencies. The guaranteed output of the plant during that period would correspond to over load rating.
- v) Full fixed charges shall be payable on attaining annual Availability of 85%. In case the annual Availability is less than 85%, the fixed charges payable shall be reduced on pro-rata basis.