SECTION – 5

OPERATION AND MAINTENANCE EXPENSES

5.1 EXISTING PROVISION

The GOI tariff notification dt. 31.3.92 (ammended upto 6.11.95) provides that :

"Operation and Maintenance Expenses inclusive of Insurance expenses for the first year after commissioning of the plant shall be calculated at 1.5% of the approved capital expenditure or ceiling on capital expenditure".

It is further provided that "The expenditure on Operation and Maintenance inclusive of Insurance expenses in each subsequent year after the first full year of operation shall be revised as may be mutually agreed upon between the Board and the Generating company on the basis of weighted price index".

5.2 DISCUSSIONS

i) The data on annual O&M expenses for the years 1994-95, 1995-96, 1996-97, 1997-98 and 1998-99 for 29 plants has been analysed in order to derive a common Norm of annual O&M expenses. The components of O&M expenses are indicated in Annexure-13.

ii) The likely capital expenditure of above mentioned 29 plants was worked out, if these were to be commissioned in 1997-98, based on the completion cost of a few new projects recently techno-economically cleared by CEA (Annex-14). The actual

expenditure incurred in the year 1998-99 was utlised to determine O&M expenses as percentage of capital expenditure for these 29 plants. The above exercise revealed that O&M expenditure in the first year of operation after commissioning is about 1.36% of capital expenditure on average basis ignoring one or two cases with exceptionally high values.

iii) As per the information gathered from insurance companies, the expenses to be incurred to insure power plants against fire, floods and earth quake would be about 0.11% of the capital cost.

iv) The actual O&M expenditure incurred during the year 1999-2000 for 17 plants owned by UP Jal Vidyut Nigam, Small and big with total installed capacity of 1066.55 MW is indicated in Annexure-15. The average O&M expenditure for all the 17 projects works out to 1.38% of capital expenditure determined on the basis discussed in sub para (ii) above. It would be interesting to note that even for 3x30 MW Tiloth Plant which is being very severely affected by silt erosion, the O&M expenditure is 1.47% of the capital expenditure.

v) The information on expenditure actually incurred by NHPC on their plants during the years 1996-97, 1997-98, 1998-99 and 1999-2000 is indicated in Annexure-16. The O&M expenditure as percent of capital expenditure for the year 1998-99 (determined as per sub para (ii) above) is indicated in Annexure-17. It could be seen that O&M expenses in case of NHPC plants varies from 2.22% (for Uri) to 5.28% (for Loktak) of capital expenditure which is much higher than the value computed for other plants discussed in sub-paras (iii) and (iv) above. The possible reasons for this could be the following :

a) **O&M Staff :** - The O&M staff actually deployed at NHPC stations and the staff required as per the Norms worked out in the 9th plan document brought out by the Group constituted by the planning commission on Man power planning (Annex-18) are indicated in the table below. It would be seen that except Uri plant, the O&M staff deployed at NHPC plants is much higher than the standard Norms.

S.No.	Name of the Plant	O&M Staff deployed	O&M Staff as per Norms
1.	Baira Siul (3x60 MW)	687	360
2.	Loktak (3x35 MW)	988	210
3.	Salal (6x115 MW)	1867	1380
4.	Tanak Pur (3x40 MW)	519	240
5.	Chamera (3x180 MW)	1257	1080
6.	Uri (4x120 MW)	428	960

b) Insurance expenses in case of Uri and Chamera are indicated as 38% and 15.6% of annual O&M expenses respectively against normal value of about 7%.

c) Other Misc. expenses which should normally cover Administrative expenses are very high.

5.3 COMPARISON WITH INTERNATIONAL PRACTICE

The annual O&M expenses in some developed countries may be quite low because of skelton staff deployed for operation and maintenance. The projects are designed for un-attended and remote control operation. The annual and major repairs are carried out

through contracts . M/s. Electrowatt Engineering Limited, Switzerland, have informed that as a general rule for O&M cost, they take it as 0.8% of the completed cost of power plant.

5.4 ESCALATION ON O&M EXPENSES

As discussed above the O&M expenses in the first year of operation after commissioning of the project are about 1.5% of the capital expenditure. The O&M expenses determined for the first year would need to be escalated suitably to work out the O&M expenses for the subsequent years.

To derive a suitable formula for escalation of O&M expenses, the data of O&M expenses for about 29 plants was analysed to work out average cost of main elements which constitute O&M expenses. The study indicated the constituents of annual O&M expenses and their weightage as below :

	Item	Weightage
1.	Employees remuneration & benefits	60%
2.	Repairs & Maintenance	
	a) Store & Spares	6%
	b) Contract Work/Repair work	20%
3.	Other expenses	7%
4.	Insurance	7%

5.5 RECOMMENDATIONS

i) The annual Operation and Maintenance (O&M) expenses inclusive of insurance expenses after commercial operation date of last unit shall be equal to 1.5 % of the capital cost of the project.

The capital cost of the project means the actual capital expenditure on the project approved by the Authority.

Provided further that where a power purchase agreement entered between the generating company and Board/Utility provides ceiling on capital expenditure, the capital expenditure shall not exceed such ceiling.

ii) No escalation in O&M expenses shall be allowed upto one year after the commercial operation of last unit.

iii) For the project located in sensitive areas there could be need for special security involving additional O&M expenses. CERC could consider the same on case to case basis of such needs if this requirement is not met by State Government.

iv) Upto the commercial operation date of the last unit, the O&M expenses for units in commercial operation shall be allowed in proportion to the allocation of capital cost to the respective unit as set out in techno-economic clearance of the Authority or the power purchase agreement, as the case may be.

v) The annual O&M expenses in the Nth year of operation after commercial operation of last unit shall be determined as per the following formula.

$$X_N = X_0 \quad (0.07 + 0.87 \ \frac{CP(N)}{CP(O)} + 0.06 \ \frac{WP(N)}{WP(O)})$$

Where Xo and X_N are the annual O&M expenditure in the first year and in Nth year respectively.

CP(O) and CP (N) are the consumer price index in first year and Nth year of operation respectively .

WP (O) & WP (N) are the whole sale price Index of the first year and Nth year of operation respectively.