occurred; there is no policy of performing preventive maintenance or planning ways to extend the life of the equipment.

Figure 5.1-1 shows the causes of unit shutdowns for each facility between 2000 and 2002. In particular, it must be noted that over 75% of the problems leading to unit shutdowns are related to boiler equipment.

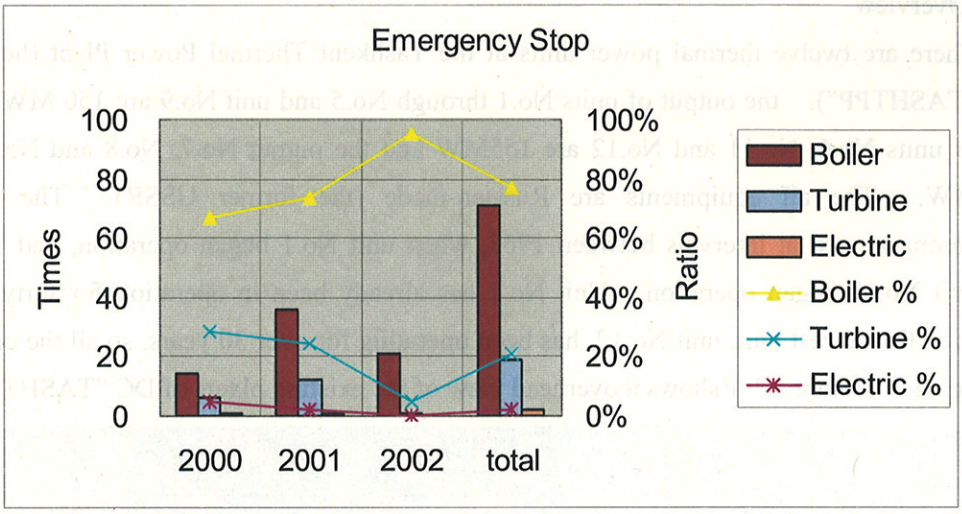

Figure 5.1-1 Causes of Unit Shutdowns by Facility

5.1.2 Boiler Equipment

As shown in Figure 5.1-2, breakages of boiler tubes are the biggest boiler problem related to unit shutdowns, at 70%. The problems with the next highest significance are damaged bearings and vibration in pumps and fans. This indicates that broken boiler tubes are the biggest cause of unit shutdowns, at over 50%.

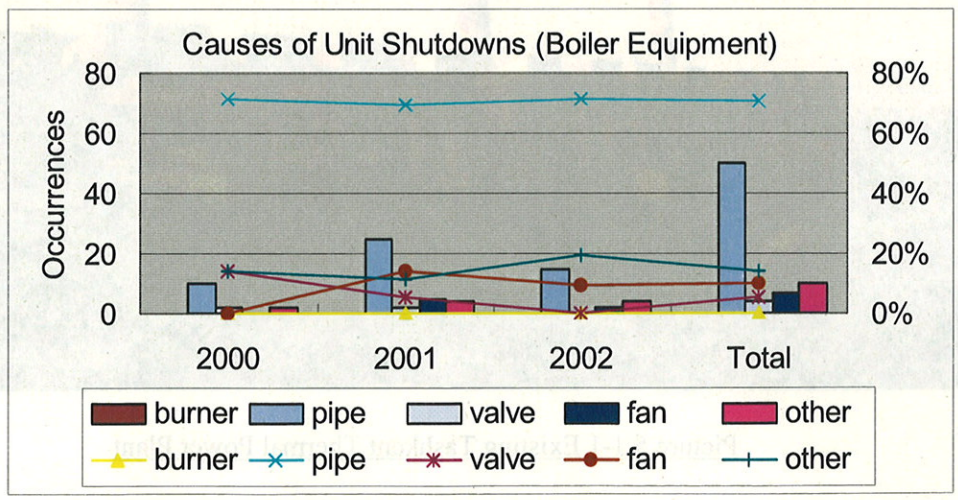

Figure 5.1-2 Boiler Equipment Causes of Unit Shutdowns

As a means of preventing these failures, a highly accurate inspection should be implemented at the time of periodical maintenance, in order to detect any problems in the early stages. All

problems detected should be repaired during the periodical maintenance work, and places where tube breakage is likely to occur should be tracked, so that planned reinforcement and updating of equipment can be performed.

Especially in the winter, when natural gas is used as the primary heating fuel in the region, the supply to the power plant is restricted, so the plant must perform multi-fuel firing, using heavy oil. This increases the amount of nitrogen oxides (NOx) and sulphur dioxide (SO_2) emissions to the extent that they exceed the emissions limits for Tashkent.

Another consequence of burning heavy oil is that soot adheres to the boiler tubes in the boiler, reducing the thermal conductivity to the steam and feed water. This means that the radiant heat from combustion is not absorbed by the fluid in the tubes but is lost, increasing the plant's consumption of fuel.

Moreover, there is a bad odour in the area around the boiler in some units. This would seem to originate in gas leaks from the boiler or the flue gas duct. It appears that auxiliary fans to the boilers are forced to consume more power due to the increased leaks. As a result of this increase, the house consumption (rate) of the plant is also increasing.

5.1.3 Turbine Equipment

In the turbine equipment, problems that have been major causes of unit shutdowns are damage and vibration in the bearings of the turbine itself and in the pumps. As with the boiler equipment, it is necessary to conduct thorough inspections when periodical maintenance is carried out, and to implement measures such as planned reinforcement and updating of equipment.

As in Figure 5.1-3, turbine efficiency has been declining in recent years.

Further more, Figure 5.1-3 also shows that there has been a recent severe decline in the condenser vacuum. Presentations from the DC "TASHTPP" representatives indicate that they are fully aware of this problem. They also agreed with us that the probable cause was air inflow to the condenser. During the periodical maintenance conducted at the power plant, the staff always inspects and repairs the vacuum ejector, and the vacuum level is restored as a result immediately following the maintenance. However, it seems that the vacuum decreases again during operation shortly thereafter. This loss of condenser vacuum diminishes turbine efficiency, which in turn has the direct effect of reducing unit efficiency. Therefore, urgent measures such as those described below are required.

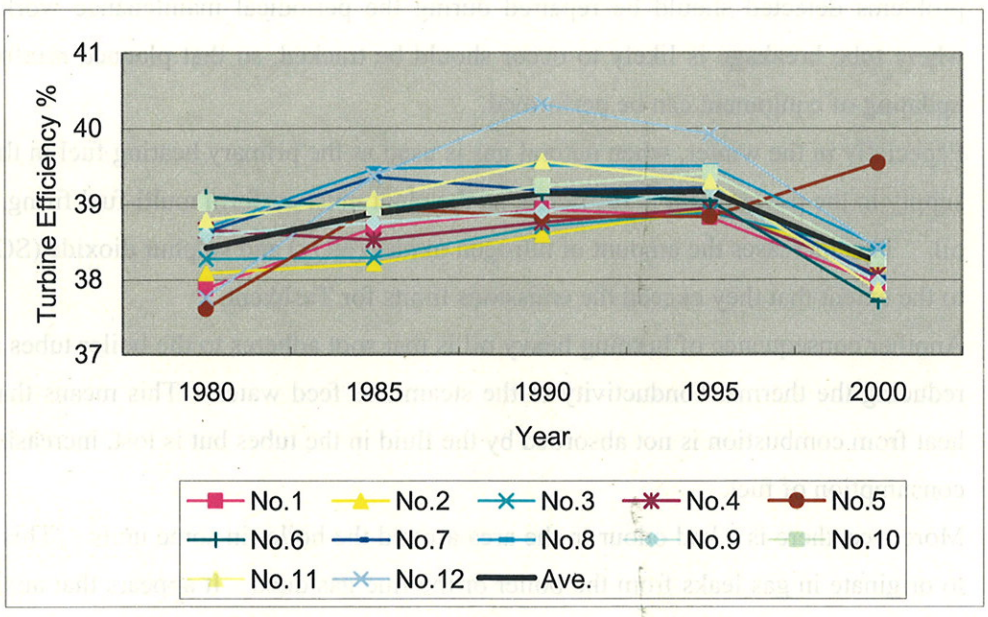

Figure 5.1-3 Trend of Turbine Efficiency

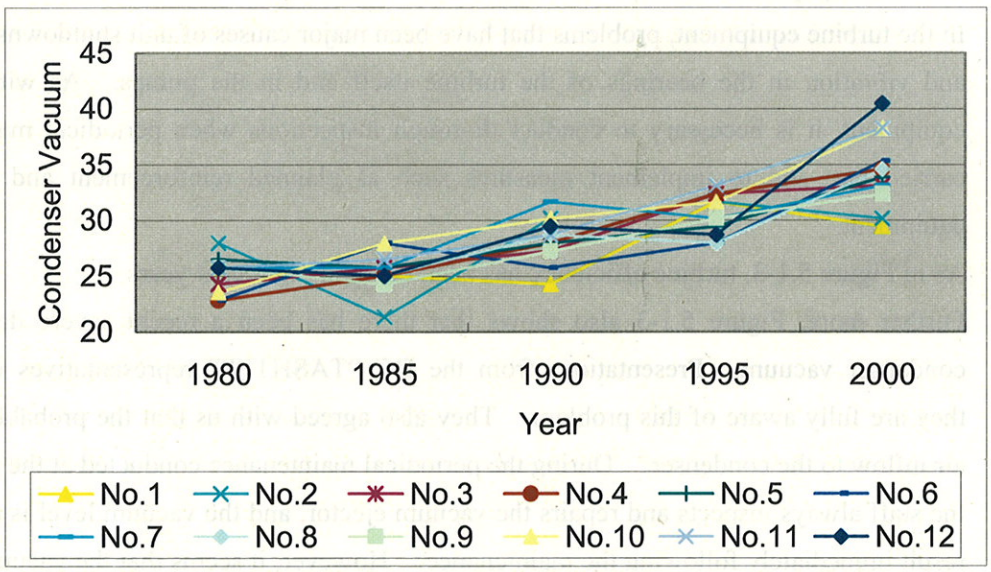

Figure 5.1-4 Trend of Condenser Vacuum

By updating this equipment, its efficiency can be improved.

Additionally, there are holes in the condenser and heater tubes, due to aging and the lack of materials, which cause problems such as allowing the internal fluid to leak out. The staff of the DC "TASHTPP" plugs at both ends of these tubes when this occurs. But they have not been able to replace the heater tubes due to the high cost of materials. To prevent further decreased efficiency, it is very important that data is collected and analyzed during the next scheduled maintenance and that a planned replacement of tubes is carried out.

As Picture 5.1-3 shows, the turbine equipment is not indoor type, as is not common in Japan. The cover that covers the whole turbine has not been maintained, so the turbine casing is virtually exposed to the rain. The outdoor type of equipment has the merit of keeping construction costs down, but it is also susceptible to corrosion caused by rain during operation. There is also the possibility that foreign matter such as dust, which must be kept out of the turbine, may get into the equipment. This type of installation is too harsh for precision equipment such as turbines. Because the equipment is taken apart during scheduled maintenance, if this work is performed outdoors more stringent procedures than usual must be followed. As can be seen from Picture 5.1-3, the turbine, one of the most important facilities, is wet from the rain. The problem of rust is naturally a concern.

Picture 5.1-2 Turbine Cover