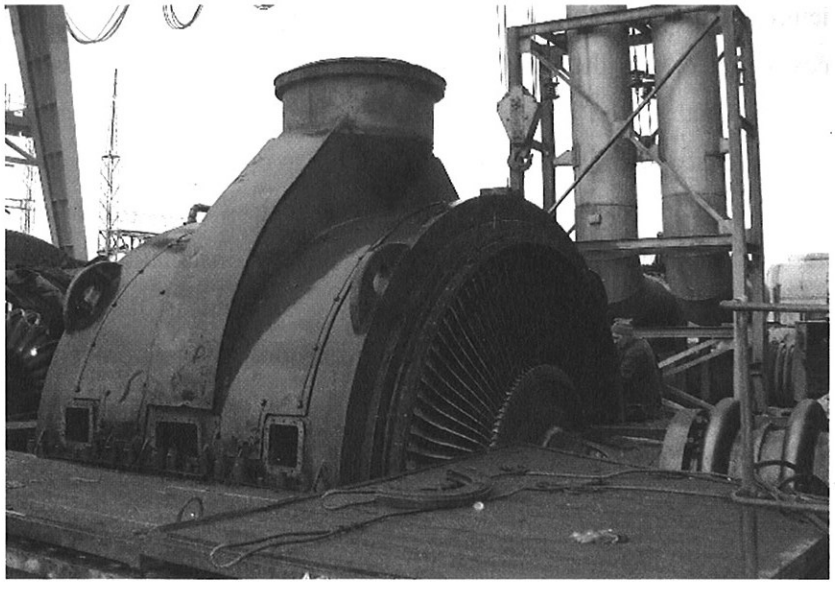

Picture 5.1-3 Outdoor Work Being Performed on a Turbine Casing

5.1.4 Electrical Equipment

On many occasions, unit shutdowns have been caused by electrical equipment failures. However, no failures have been reported to have been caused by hydrogen cooled generator or other hydrogen generating equipment. The 220 kV switchgear is an outdoor switching station that is primarily composed of an air blast circuit breaker. This is being appropriately maintained, and there do not appear to be any operational problems.

5.1.5 Control Equipment

Fundamentally, the plants are designed to be controlled automatically so that the prescribed values in systems such as the fuel system, air system, and steam temperature system are met in response to fluctuations in generator output. However, failures and deterioration in the regulator and drive mechanism have been a problem for the last twenty years, and it has not been possible to repair the equipment due to the difficulty in obtaining parts and devices. Except for some parts of automatic control systems, the equipment cannot be controlled automatically, so when the load changes, the modifications are made manually. Even generator output is manually controlled using the governor switch for the steam turbine. Consequently, the unit load fluctuation is low, at 2 MW/minute (in Japan it is 5 MW/minute), which means that there is little responsiveness to demand.

Various adjustment valves and most dampers are controlled manually from the central operating room.

5.1.6 Other Equipment

(1) Fuel Gas Equipment

Most of the fuel used in the power plant is natural gas that is transported via pipeline. The natural gas is from Uzbekistan, which has vast reserves, indicating a stable supply for many years to come. These circumstances leave open the possibility of causing a fire by igniting the fuel gas from static electricity sparks if there should be a gas leak, so remedial measures are necessary.

(2) Insulating Sheets

Within the grounds of the DC "TASHTPP", there are many places where the covers have been removed from the pipes, exposing the insulating material. Among these, there are some places where the insulation has also fallen away, and the hot pipes are directly in contact with the atmosphere. This means that not only is the heat held by the fluid in the pipes lost to the atmosphere; there is also the danger that staff members could be burned. Remedial measures are urgently needed. Picture 5.1-4 shows a pipe where the insulation has been lost.

Picture 5.1-4 Pipe Missing Insulation

(3) Work Environment

As shown in Picture 5.1-5, the inside of the turbine auxiliaries building is dimly lit, even during the day on sunny days. There are many places where the lighting is insufficient especially in the turbine auxiliaries building. There are even places where it is impossible to see one's feet for the pitch darkness, even in the daytime. It is very dangerous, as one must walk without being able to see what is at one's feet, and urgent improvement is needed.

Picture 5.1-5 Inside the Turbine Auxiliaries Building

There are no set work areas for conducting repairs or periodical maintenance, so it is easy for people who are not involved in the work to come close to the working area. Also, there are no barriers around openings in the ground, so the employees of the power plant are working in dangerous conditions.

5.1.7 Evaluation of Current Conditions

(1) Existing Power Plant as a Whole

Even though all the units have been operating for over thirty years and over 200,000 hours, the average number of operating hours per year is over 6,000 hours.

Figure 5.1-5 shows a graph of the availability for all the units, based on the operating time. Units with a high availability indicate 80% or more operation, and the average for all units is consistently high.