CHAPTER 5 WATER QUALITY CONTROL PLAN COMPONENT(1)

5.1 Basic Policy

The water quality control activities carried out for the Patos and Mirim lakes have been in the form of monitoring by FEPAM, DMAE and CORSAN, which focused on rivers and wastewater discharges. However, a comprehensive and quantitative water quality control plan by basin has never been formulated. As a basic policy, the master plan aims to solve the main issues pointed out in Chapter 4 regarding the preservation of the water quality of Patos Lake, through comprehensive and quantitative water control measures. The following methods to solve these problems were decided based on the deteriorating environmental conditions of the Mar de Dentro area as indicated in Chapter 2, and the environmental management system specified in Chapter 3.

(1) Solving Contamination by Human Excreta

Immediate solutions to this problem are expected as they would not only restore the use of the water section for recreation and prevent water borne diseases, but would also improve the urban sanitary environment. In this regard, the treatment of domestic wastewater from urban areas located near the lake shore should be given priority.

(2) Prevention of Eutrophication

Eutrophication does away with the multiple benefits that can be derived from the use of Patos Lake. Since it is difficult to counteract, this problem will be given emphasis in the water quality control plan and will be considered as one of the long term targets of the master plan. From the breakdown of the load flowing into Patos Lake, the countermeasures to be adopted will focus on non-point sources. For soil runoff prevention, a countermeasure that would bring about a certain impact will be adopted.

(3) Solving Contamination by Organic Substances

Since contamination by organic substances is progressive in a water area that is quite close in structure, measures to counteract this contamination problem will focus on the treatment of the domestic wastewater from urban areas located in the rear of this type of water area. However, if the treatment is unsatisfactory, improving the circulation of the water and dredging of bottom materials will be considered.

(4) Actual Understanding of Contamination by Agro-chemicals and Heavy Metals

Since actual contamination by agro-chemicals and heavy metals has not been fully grasped yet, studies on the amount of agro-chemicals and heavy metals in bottom materials and aquatic organisms should be continued.

(5) Strengthening Monitoring of Industrial Pollution Sources

Since the actual conditions of industrial pollution sources in the Mar de Dentro area have not been fully determined as yet, an inventory of industrial pollution sources will be made and wastewater monitoring activities will be strengthened.

(6) Joint Use of Information on Water Quality

To effectively carry out water quality control, a database will be constructed to store the information of every sector, and an information network will be established to promote the joint use of information among sectors.

(7) Promote Environmental Education

To gain the cooperation of every relevant sector, landowners and the residents, an environmental education program focusing on water quality preservation will be promoted, and information related to water quality will be made public.

5.2 Allowable Inflow Load and Target Reduction Load

As of this moment, nutrient salt is the water quality parameter clearly measured to have widely exceeded the water quality standard stipulated in Chapter 4 for Patos Lake. TN/TP levels in most sections of the lake were found below 10. Based on these measurements, the prevention of eutrophication would be significantly important to the water quality of the lake, and the most effective method considered is reducing phosphorous levels in the water. Accordingly, the TP inflow load (allowable inflow load) that would meet the safety standards set for Patos Lake was calculated using the runoff load simulation model and the water quality and hydrological simulation model.

Based on the calculation results, it is estimated that reducing the TP runoff load from Camaqua River and San Goncalo canal to 20%, respectively, and the TP runoff load from medium and small rivers to 50% would almost help attain the TP level designated for the central and southern sections of Patos Lake—excluding parts that are close to the western coast of the lake (see **Fig. 5-1**).

The difference between the current inflow load and the allowable inflow load is the target reduction load at this point. The future target reduction load will be calculated by adding any increase in the inflow load to the target reduction load.

5.3 Load Reduction Measures

Load reduction measures involve direct and indirect measures. The former includes the improvement of machinery, facilities and land use conditions, while the latter includes improvements in the organizational, institutional and educational system. This section mainly deals with the former and details their applicability and the policies to be taken to apply these measures in the Mar de Dentro area.

In view of applicability, the measures were categorized as: measures for generation sources, measures for runoff process, and measures to be applied within the lake. Removing pollutants that have already flown into the rivers and lakes would necessitate the treatment of large amounts of water and sludge. It is, therefore, desirable to as much as possible reduce load from the generation source, in view of energy conservation. Since measures for the runoff process and measures within the lake are both attainable within a short term and can be restricted to a particular place, their effects can be increased. However, these effects are not permanent unless the measures for the