

TECHNICAL COOPERATION PROFILE

BOLIVIA

February 3, 1998

PROJECT NAME: Water Quality Management and Control Study for Pirai River

PROJECT NUMBER: TC-98-01-17-8 (BO)

TEAM MEMBERS: Jean Payen, COF/CBO; Raul Tuazon, RE1/EN1; and Sandra Whiting, RE1/EN1.

EXECUTING AGENCY: Prefecture of the Department of Santa Cruz

BENEFICIARIES: Prefecture of the Department of Santa Cruz, River Pirai Water Channels and Regularization Service

FINANCING PLAN:

BID (Danish Trust Fund)	US\$ 200.000
Local:	<u>US\$ 30.000</u>
Total:	US\$ 230.000

TENTATIVE DATES:

Loan Committee:	Second Quarter 1998
Approval of President:	Second Quarter 1998

I. BACKGROUND

- 1.1 The Pirai River basin, with an approximate area of 10660 km², is the most important in the Department of Santa Cruz. Some 76% of the total population of the Department is located within the basin, as are 75% of the agricultural and 90% of the industrial activities (mostly agro-industries, such as sugar refineries).
- 1.2 The river basin has experienced a significant population growth in the last fifty years, but the provision of basic sanitation services and industrial waste treatment has not kept pace with the increase. During the 1980s the volume of waste being discharged began to exceed the river's capacity to assimilate the waste, and evidence of pollution problems in the form of fish kills began to surface.
- 1.3 In response to a major flood in 1983, the Pirai River Water Channels and Regularization Service (SEARPI) was created to develop a flood control program. SEARPI collected hydrologic, geologic, and sedimentologic, and topographic data on the river basin and augmented an existing network of hydrologic stations to continue to monitor river flows.
- 1.4 The Commission for the Monitoring and Control of the Quality of Water in the Pirai River (COMVIRAI) was created in 1994, to study the causes of the repeated fish kills. COMVIRAI is made up of various government agencies with interest and responsibility in

the river basin (Department of Forest Development, Fisheries Development Center, National Meteorological and Hydrological Service, and SEARPI). COMVIRAI has documented the contamination of two tributaries (Colorado and Chané Rivers) which exhibited dissolved oxygen levels of zero.

- 1.5 COMVIRAI succeeded in requiring industries to construct oxidation ponds for pretreatment of wastes. However, minimal reduction in industrial contamination was achieved, as little oxidation occurs and industry discharges the wastes into the river during the first rains to try and achieve the greatest dilution possible.
- 1.6 Despite the data obtained by SEARPI and COMVIRAI, information regarding pollution sources and water quality in the river basin is inadequate for planning for the management of the basin. This lack of information and the lack of understanding of the river basin hydrologic regime, limit the Department of Santa Cruz's ability to determine the most efficient and effective approach for control of pollution.

II. PROJECT OBJECTIVES AND DESCRIPTION

A. Objectives

- 2.1 The general objective of the proposed project is to provide the Prefecture of Santa Cruz with the technology and knowledge necessary for the analysis and management of the current and future contamination problems in the Río Pirai basin, generating in this way the optimal conditions for planning approaches for minimizing the contamination of the river.
- 2.2 The specific objective of the project is to develop an overall pilot-scale mathematical model of the river basin, using existing data and data to be collected in the field, to depict the hydrology and water quality of the Río Pirai basin. The model will be able to enable the understanding of the existing situation, will be able to predict future conditions, and will allow for the evaluation of various scenarios for the control of pollution.

B. Description

- 2.3 The program will have three components: mathematical modeling; water quality monitoring; and follow-up and institutionalization.
 1. The mathematical modeling will consist of a three inter-related mathematical sub-models: a) a hydrological model; b) a hydrodynamic model; and c) a water quality model. These models will be developed with existing data to quantify the hydrology and water quality of the river. The work will include review of previous studies, compilation of existing hydrologic and water quality data, and a preliminary hydrological analysis.

2. The water quality monitoring program will include the collection and analysis of water samples to augment existing information and for calibrating the model. A detailed work plan will be prepared for the field sampling program after the preliminary hydrological analysis.
3. As part of the follow-up and institutionalization component, SEARPI will designate two engineers with experience in the contamination problems of the Pirai River basin who will actively work with the consultant during the model development and will receive training and technical equipment provided by the consultant. In addition, the consultant will be in charge of organizing two seminars to provide information about the project, discuss the scenarios that should be modeled, and distribute conclusions and recommendations.

C. Execution

- 2.4 The project will be carried out over a 10-month period. The Prefecture of Santa Cruz will contract a consultant with experience in hydrological and water quality modeling. The consultant will work under the supervision of SEARPI.

III. SPECIAL ASPECTS

- 3.1 As a result of this project, the Prefecture of Santa Cruz will have available technical personnel with detailed knowledge of the topic and a tool for the mathematical modeling for application in decision-making for the Pirai River basin management and control of pollution.
- 3.2 There is a complementary project funded by the World Bank for a water quality monitoring program in the Pirai River Basin. That project will ensure future continuity in water quality sampling for three years, thus generating a data base that will permit the optimization of the water quality model.

IV. ACTION PLAN

- 4.1 The project team will prepare a Plan of Operations and Terms of Reference for the consultant.
- 4.2 The Plan of Operations will include a detailed description of the mechanisms for technology transfer and institutionalization.

Approved by:



Ricardo Santiago, Manager RE1

Date:



21/6/98