Border Environment Cooperation Commission

Construction of a Wastewater Treatment Plant and Rehabilitation of the Wastewater Collection System San Luis Río Colorado, Sonora.

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General Criteria

1. **Type of Project.** *The project consists of the construction of a wastewater treatment plant and rehabilitation of the wastewater collection system.*
2. **Location of Project.** *The City of San Luis Río Colorado is located in the northwestern part of the State of Sonora at an altitude of 45 m [147 ft] above sea level. The City is bound to the North by the United States of America; to the West by the Colorado River and the State of Baja California; to the East by the municipalities of Plutarco Elías Calles and Puerto Peñasco; and to the South by the State of Baja California and the Sea of Cortez. The project is located within the 100 km border region as defined by the La Paz agreement. The current population of San Luis Río Colorado is approximately 180,000 people, and is expected to reach 420,000 people by the year 2018. The location of the city is shown in the following map:*

Description of Project and Tasks. *The project consists of constructing a wastewater treatment plant with a capacity of 9.1 mgd (400 l/s); rehabilitation and expansion of an existing pump station, as well as the addition of a new one; and, rehabilitation and expansion of the wastewater collection system.*

The existing wastewater collection system has a total length of 26,855 meters and provides service to 37 percent of the City's service area. The total expansion of the system will be approximately 36,000 meters, to bring coverage of the wastewater collection system to 85 percent.

Compliance with International Treaties and Agreements. *The project complies with existing treaties established by the International Boundary and Water Commission.*

Human Health and Environment

1. **Human Health/Environmental Needs.** *The accelerated growth experienced by San Luis Río Colorado in the last few years, in addition to the lack of funds has resulted in a wastewater collection system with insufficient capacity and efficiency. The insufficient capacity in the*

wastewater collection system, as well as leaking and collapsed lines have led to the contamination of groundwater resources. The lack of funds has led to an incomplete level of maintenance, which has caused a rapid deterioration of the system.

In addition, the lack of adequate wastewater treatment facilities has given rise to the incidence of water-borne diseases. Currently, 37 percent of the population is connected to a wastewater collection system that discharges wastewater to the Colorado River, without receiving any treatment, while 63 percent of the population uses septic tanks or cesspools.

2. **Environmental Assessment.** *As part of the planning process, an environmental assessment (EA) was submitted to the Environmental Protection Agency (EPA) and is currently under review. In addition, a Manifestación de Impacto Ambiental was submitted to the State of Sonora Secretaría de Infraestructura Urbana y Ecología, SIUE [Department of Urban Infrastructure and Ecology] for their review. SIUE approved the document and submitted their project authorization on February 18, 2000.*

3. **Compliance with Ecology and Cultural Laws and Regulations**

As part of the environmental review process, the Instituto Nacional de Antropología e Historia, INAH [National Institute for Anthropology and History] was contacted to determine the existence of cultural and archaeological resources. The INAH submitted their concurrence for the project on February 9, 2000.

Technical Feasibility

1. **Appropriate Technology**. *A water and wastewater Master Plan was prepared for San Luis Río Colorado. The document identifies the following priority projects: 1) rehabilitation and expansion of the wastewater collection system; 2) rehabilitation and construction of a pump station; 3) construction of a wastewater treatment plant.*

WASTEWATER TREATMENT

The design of the wastewater treatment plant was based on the basic parameters specified under the Mexican Official Norm NOM-001-ECOL-1996, for discharge of effluent to rivers.

Parameter (in mg/L, unless otherwise noted)	Monthly Average	Daily Average
Temperature, ^{o}C	*40*	*40*
Grease and oils	*15*	*25*
Floating matter	*None*	*None*
Settleable solids, ml/l	*1*	*2*
TSS	*75*	*125*
BOD	*75*	*150*
Total nitrogen	*40*	*60*
Total phosphorous	*20*	*30*
Arsenic	*0.1*	*0.2*
Cadmium	*0.1*	*0.2*
Cyanides	*1*	*2*

Copper	*4*	*6*
Chromium	*0.5*	*1*
Mercury	*0.005*	*0.01*
Nickel	*2*	*4*
Lead	*0.2*	*0.4*
Zinc	*10*	*20*
Fecal coliform MPN/100ml	*1000*	*2000*

Several alternatives were evaluated during the planning process. These include:

1. *Stabilization lagoons [anaerobic, facultative, and maturation lagoons in series]*
2. *Stabilization lagoons [facultative and maturation lagoons in series]*
3. *Rapid infiltration*
4. *Overland flow*
5. *Slow infiltration*
6. *Activated sludge, conventional process*
7. *Activated sludge, extended aeration*

The selected alternative will consist of stabilization lagoons (alternative 1) and will have the following unit processes:

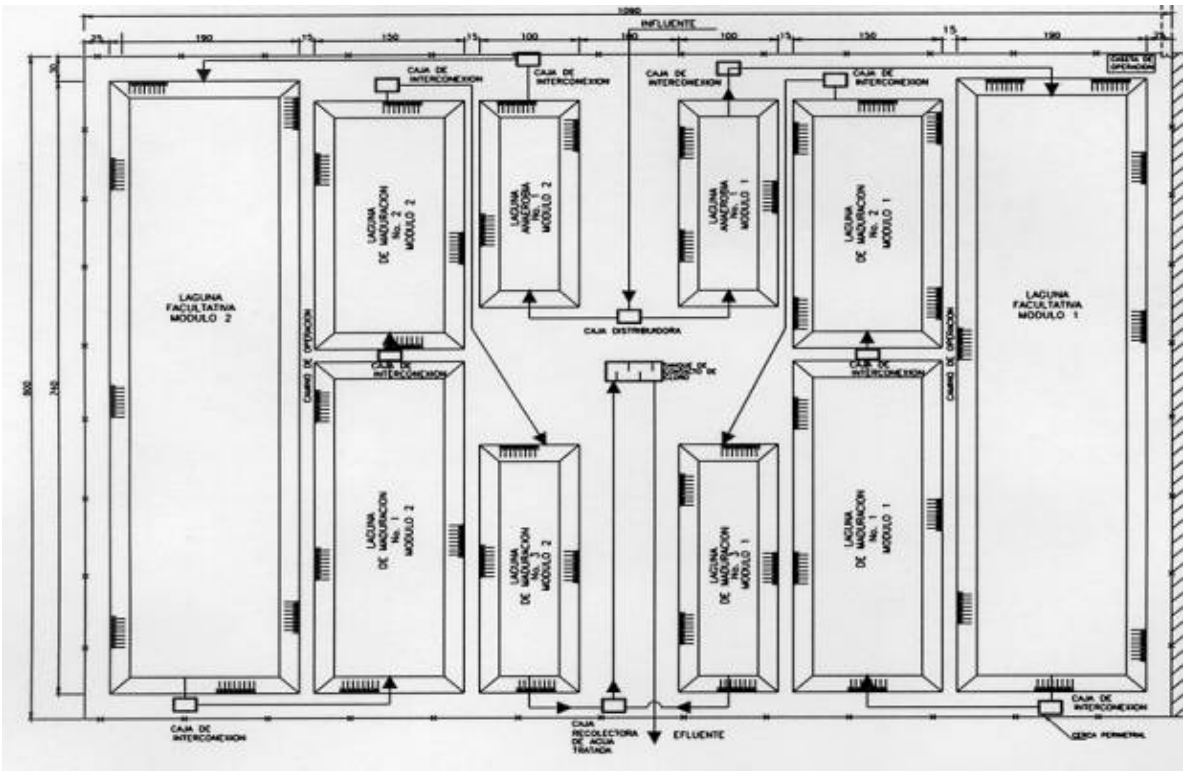
1. *Pretreatment*
2. *Wastewater diversion structure*
3. *Anaerobic lagoon*
4. *Facultative lagoon*
5. *Maturation lagoon*
6. *Splitter box*
7. *Disinfection system*

The treatment capacity of the wastewater treatment plant will be 400 l/s (9.1 mgd) and will be comprised of two modules of 200 l/s each. The City expects to add two more 200 l/s modules at a future date to accommodate population growth.

The stabilization lagoons treatment process was selected for several reasons: 1) the costs is lower than mechanical processes; 2) operation and maintenance costs are minimal; 3) the system is capable of receiving large variations in the influent loads; 4) produces stable sludge. The selected alternative would require 175 Ha of land. For this purpose, the wastewater treatment site has been selected in the southern part of the City with a total area of 200 Ha.

No-Action Alternative. *Under this alternative, no wastewater treatment plant would be implemented and the City would continue discharging untreated wastewater to the Colorado River. This could worsen environmental conditions in the area.*

The following process train will be used for the proposed wastewater treatment plant.



WASTEWATER COLLECTION SYSTEM

Several of the collectors and subcollectors in San Luis Río Colorado, Sonora would be rehabilitated. Currently, the City has a total of 26,855 meters in sewer lines, providing service to 37 percent of the population. The project consists of adding 36,000 meters of wastewater collection lines, cleaning of 104 manholes and 10,300 meters of the wastewater collection system, replacement of 60 manholes and rehabilitation of an additional 60, removal of roots from 54 manholes and installation of 173 manhole covers

2. **O&M Plan.** *The Master Plan identifies the requirements of O&M of all unit processes, including human resources, the frequency of maintenance and cost estimates. The O&M plan would be developed once the final design for the project is completed.*

3. **Compliance with applicable design norms and regulations.** *The technology used for construction of the sewer system and wastewater treatment plant has been authorized by the Comisión Nacional del Agua, CNA [National Water Commission].*

Financial Feasibility and Project Management

1. Financial Feasibility.

The NADB is currently analyzing the project to determine its financial feasibility. This analysis will help determine the contributions for each funding source, as well as credit and/or grant components, and the final rate structure.

The table below summarizes the project construction costs.

Estimated Cost

Concept	Amount (US$)
Improvements to the wastewater collection system	**$7,640,814**
Pump station and force main	**$2,202,206**
Wastewater treatment plant	**$5,645,755**
Total	**$15,488,775**

Estimated Operation and Maintenance Costs (Annual)

Concept	Amount (pesos)
Wastewater collection system	**$42,105**
Wastewater pump stations	**$131,580**
Wastewater treatment plant	**$84,210**
Total	**$257,895**

Based on the analysis developed by the NADB, the grant and loan amounts for the project were be determined.

Financial Structure

Source	Amount (US$)	%
Local, State and Federal Funds	**$6,525,081**	**42**
NADB - BEIF	**$7,744,388**	**50**
NADB - Loan		
Operating Agency	**$1,219,307**	**8**
Total	**$15,488,775**	**100%**

2. **Project Management**. *The project will be managed by the Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento, OOMAPAS [Municipal Operating Agency for Water, and Wastwater Collection and Treatment] As part of the program, several institutional development strategies will be implemented. The system is expected to operate in a self-sufficient manner, supporting itself through user fees.*

3. **Rate Model.** *The proposed fee increase is from 0.80 pesos to 2.40 pesos per cubic meter of water consumed. This rate increase applies in a period of 4 years.*

Public Participation

Comprehensive Public Participation Plan. *The public participation plan (Plan) was submitted to the BECC for approval last month. The plan includes a press campaign, meetings with local organizations and neighborhoods. Also, as part of the process, a survey was conducted to measure public opinion on the project before the implementation of the public participation plan.*

Steering Committee*: A steering committee was formed on August 6, 1999 and is in the process of performing the tasks outlined in the public participation plan. These tasks were completed successfully.*

Local Organizations*: Several local organizations have taken part in the Steering Committee for the project. Outreach to other community organizations was performed as part of the public participation plan.*

Public Information*: Project materials are available in City Hall and the OOMAPAS' (operating agency) offices.*

Public Meetings*: A public meeting was held on March 1st, 1996, as part of the ECOBOSQUE project that previously pursued BECC certification. The second meeting is scheduled for April 25, 2000 and the third meeting for May 3, 2000.*

Sustainable Development

1. **Definition and Principles.** *The project complies with BECC's definition of Sustainable Development:* "*An economic and social development based on the conservation and protection of the environment and the rational use of natural resources, but considering current and future needs, as well as present and future impacts of human activities*".

   The principles of sustainable development are satisfied. These include: Human beings are the central point of all concerns for sustainable development; they have the right to a healthy and productive life in harmony with nature. The project complies with the principles' objectives, which are to solve human health problems by improving the potable water system, and decreasing pollution of the environment and health risks to the population, through sewerage improvements and sanitation.

2. **Institutional and Human Capacity Building.** *The investment of approximately $154 million pesos in improvements to the infrastructure in San Luis Río Colorado, as well as an institutional development program will have a positive impact on government institutions and local economy, as well as on the community residents.*

3. **Conformance with Applicable Local/Regional Conservation and Development Plans.** *The rehabilitation of the wastewater collection system and the construction of a wastewater treatment plant is consistent with the City's Urban Development Program.*

4. **Natural Resource Conservation.** *The construction of a wastewater treatment plant in San Luis Río Colorado will prevent the discharge of untreated wastewater to the Colorado River. Thus it will help preserve precious groundwater resources, as well as riparian habitats located downstream of the City.*

5. **Community Development.** *The construction of approximately $154 million pesos in infrastructure will be the foundation for the future growth of the community. Without an adequate infrastructure, the city could not sustain the development of new businesses or the current population growth. The positive impacts related to the project are short as well as long term.*

List of Available Documents

Water and Wastewater Master Plan prepared by CIEPSA.

San Luis Rio Colorado, Sonora Project Certification Document.

San Luis Rio Colorado, Sonora Public Participation Plan.

San Luis Rio Colorado, Sonora Final Public Participation Report.

San Luis Rio Colorado, Sonora Project Survey.

San Luis Rio Colorado, Sonora Environmental Impact Analysis submitted to Secretaria de Infraestructura Urbana y Ecologia.

San Luis Rio Colorado, Sonora Transboundary Impact Analysis prepared by Geo-Marine for BECC and submitted to the Environmental Protection Agency.

Environmental Assessment of the Effect on San Luis, Arizona by the Proposed Construction of a Wastewater Treatment Plant and Improvements to the Wastewater Collection System for San Luis Rio Colorado, Sonora.