



*Construction of  
Immediate Need ("Quick Fix")  
Projects in  
Mexicali, B.C., Mexico  
as Part of the  
Solution to the  
Sanitation of the New River*

**January 1997 Executive Summary**



## Introduction

The binational (United States and Mexico) Immediate Need "Quick Fix" (QF) Projects Program is an important first step towards upgrading the collection, conveyance, and treatment of wastewater in Mexicali, Baja California, Mexico. For decades, Mexicali has struggled to operate and maintain an inadequate and rapidly deteriorating wastewater sanitation system. Consequently, untreated and partially treated domestic and industrial wastewater are discharged daily into the New River (Rio Nuevo), which flows north through Mexicali into the United States and eventually to the Salton Sea in the heart of Imperial Valley, California.

Officials from both countries have agreed that considerable planning and work are required to meet the desired river water quality and sanitation conditions in the city. On the basis that long-term planning and construction activities would take several years to complete and implement, the imposing goal—while the long-term planning would take place—was to construct immediately needed works that would provide an immediate improvement to sanitary conditions in the region and the quality of the waters of the New River at the international boundary. To meet this objective, both countries identified and agreed to fund the short-term construction of 11 different wastewater works. The implementation of the works became a binational effort by the United States and Mexico's sections of the International Boundary and Water Commission (IBWC). Table 1 presents a brief description of the QF improvement projects to the Mexicali sanitation infrastructure.

| QF | Project Description   |
|----|---|
| 1  | Rehabilitation of the North Collector                                       |
| 2  | Replacement and extension of the Right and Left Bank collectors             |
| 3  | Replacement of key Mexicali I subcollectors                                 |
| 4  | Replacement of collectors in the southwest section of Mexicali I            |
| 5  | Rehabilitation and replacement of lift stations                             |
| 6  | Replacement and repair of pump units at pumping stations                    |
| 7  | Dredging and repair of diversion structures and works of Mexicali I lagoons |
| 8  | Acquisition of sewer cleaning equipment                                     |
| 9  | Removal of sludge from Gonzalez-Ortega lagoon                               |
| 10 | Installation of Alamo River diversion weir                                  |
| 11 | Installation of flowmeters at pumping stations 1, 1A, and 2                 |

*Table 1*

*Identification of Quick Fix projects as presented in the October 25, 1995, Joint Report of the IBWC Principal Engineers.*

To make it happen, the Environmental Protection Agency (EPA) made adequate funds available to the United States Section of the IBWC. These funds would be used to construct the immediately needed works in Mexicali and to advance the wastewater infrastructure facilities planning. This planning would be advanced to a level that would allow the project(s) to be certified by the Border Environment Cooperation Commission (BECC) and financed by its sister agency, the North American Development Bank (NADBank), or other international institutes that could honor BECC certification in lieu of their own certification requirements.

It was mutually agreed that the funds available to the United States Section of the IBWC to cover the cost of construction of the immediate need projects will not exceed 55 percent of the total cost, and that Mexico will provide the remaining 45 percent of the cost and will assume the total cost of their long-term operation and maintenance. It was also agreed that construction of the QF projects will be performed through contracts executed by Baja California's Secretariat of Human Settlements and Public Works (Secretaría de Asentamientos Humanos y Obras Públicas del Estado) or SAHOPE under the coordination of the IBWC on bilateral aspects. The sewerage services in Mexicali are under the jurisdiction of the State Commission of Public Services of Mexicali (Comisión Estatal de Servicios Públicos de Mexicali) or CESPM.

Construction of the QF projects started in July 1996. To date, the United States has spent approximately \$1.96 million (see Table 2) of an estimated cost-share contribution of roughly \$4.2 million. The QF projects are at different stages of completion (see Table 3), with the vast majority of the construction activities expected to be completed by the end of March 1997.

| Immediate Need (QF) Project Number | Approximate Amount Spent by the United States through January 1997 in U.S. Currency |
|------------------------------------|---|
| 1-4                                | \$870,000   |
| 5, 6, 11                           | \$298,000   |
| 8                                  | \$790,000   |
| 7 & 9                              | Pending   |
| <b>Total</b>                       | <b>\$1,958,000</b>  |

**Table 2**  
*Current United States Share in the Immediate Need Projects Program.*

| QF Project Number | Approximate Percent Complete |
|-------------------|------------------------------|
| 1                 | 80%                          |
| 2                 | 95%                          |
| 3                 | 45%                          |
| 4                 | 87%                          |
| 5                 | 70%                          |
| 6                 | 50%                          |
| 7                 | 20%                          |
| 8                 | 100%                         |
| 9                 | 30%                          |
| 10                | 90%                          |
| 11                | 80%                          |

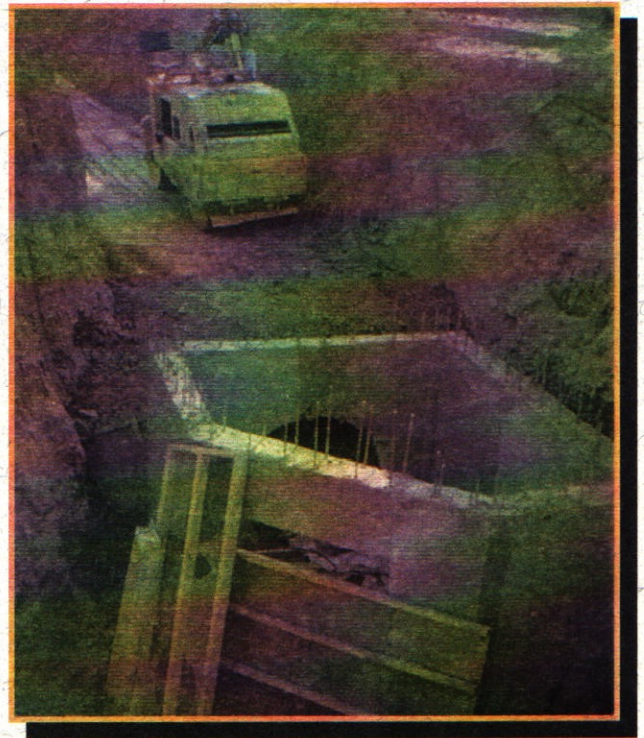
**Table 3**  
*Completion Status of the QF Projects Through January 1997.*

## Sewer Collector Improvements

The sewer collection system serves about 87 percent of the Mexicali area. Prior to the Immediate Need Projects Program, certain areas of the Mexicali I sanitation system (older area of the city) were operating over their actual capacity. Many sewer pipe segments were either severely deteriorated or obstructed with debris and sludge buildup, which caused overflows of raw sewage directly into the New River or into channels that are tributary to the New River. Several of the QF projects consist of improvements to the Mexicali I sewer system to increase reliability and capacity of that infrastructure. These comprise the lining or replacement of existing sewer pipes (QFs 1 through 4) and the acquisition of state-of-the-art sewer cleaning equipment (QF 8).

QFs 1 through 4 are currently being implemented under contracts with three separate Mexican contractors. All four projects (each consisting of several work subelements) are at different stages of completion, ranging from 45 to 95 percent complete. The vast majority of the sewer pipe replacement work subelements (corroded concrete collectors being replaced with plastic, more durable sewer pipes) is essentially completed. Nonetheless, there is a handful of existing concrete sewer segments originally targeted for lining that may get replaced due to their advanced stage of deterioration. The sewer lining work subelements (placement and grouting of a high-density polyethylene liner inside an existing concrete collector) have taken longer than initially anticipated. This is due in part to the cleaning and clearing of the target sewer segments being more complex and involved than expected, thus resulting in significant project completion delays.

The responsibility of preparing sewer collector segments prior to lining activities rests on CESPM. To do so, CESPM uses the sewer cleaning equipment that was transferred to them by late September 1996 as part of QF 8. The equipment consists of three vacuum/tank trucks and six sewer jet trailers.

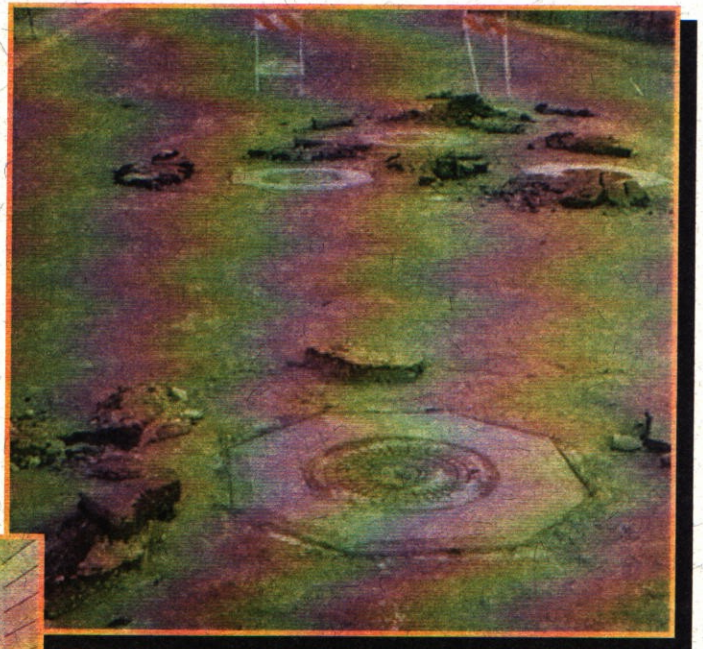


*Because of its diameter, the replacement of portions of the concrete collector "Calle 10ma" requires the construction of reinforced concrete vaults to serve as pipe nodes and the substructure to manholes. The vault shown in the photo connects to a recently installed 54-inch, high-density polyethylene pipe segment. Remaining to be constructed is the top of the vault, which will be a flat, reinforced concrete surface with a 3-foot diameter opening to allow manhole access into the vault.*



This photo shows a metal cone-like device (called "el testigo" by the Mexican contractor) being pulled through a concrete collector that is targeted for lining. The outside diameter of the metal device is the same outside diameter as the liner pipe, thus assuring the existing sewer collector is free of debris and the liner pipe will slide through it without any complications. In this case, the liner pipe is a 54-inch, high-density polyethylene "Bell and Spigot" sewer pipe. <

One of the final tasks by the contractor in completing a given sewer collector improvement is the leveling and positioning of the manhole covers to be flush with the surrounding pavement. Shown are four manholes rims/covers that have been removed and repositioned, and later encased in concrete for added strength and durability. >



One of the several construction activities that took place this month consisted of the asphalt paving of several street sections that were previously excavated and backfilled as part of the sewer collector improvements. >



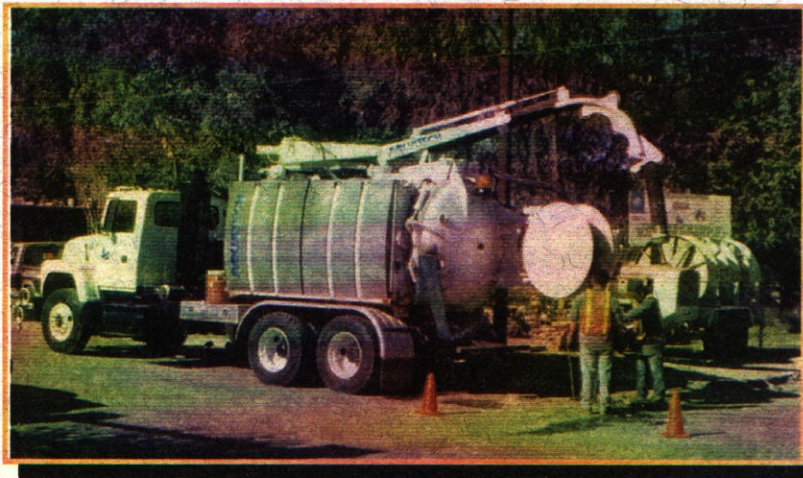
**Improvements to the  
Sewer Collector System  
in Mexicali, B.C.**



The majority of the small-diameter sewer collector improvements requires the contractor to reconstruct or build new access manholes. These are constructed in-place using clay bricks and mortar. Their height (or how deep they extend into the ground) depends on the depth of the sewer collector. <

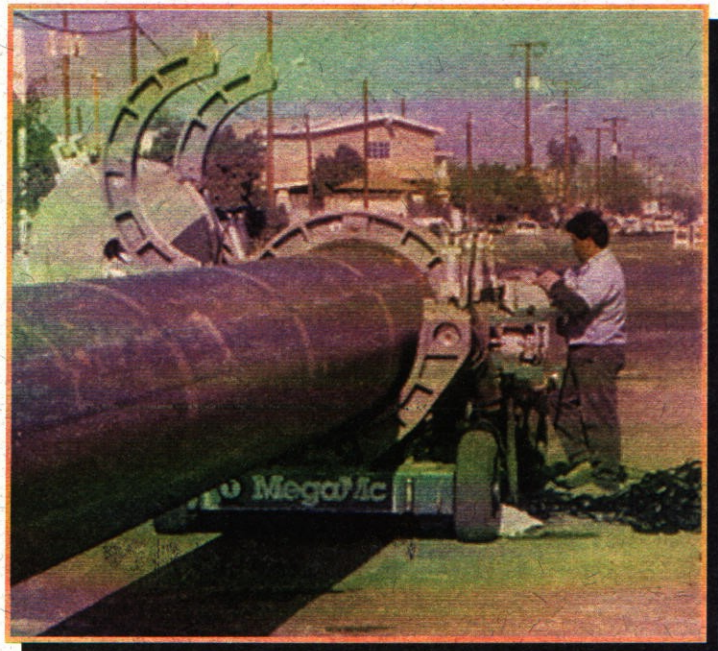


The high density polyethylene "liner" pipes that are part of the Immediate Need Projects Program, range between 16-inch and 42-inch diameter stock. ^



A CESPM crew uses state-of-the-art sewer cleaning equipment that was transferred to Mexico last year (QF 8) to prepare a sewer collector for lining. ^

The high density polyethylene liner pipes are delivered in short segments and are welded together at or near the jobsite before installation. Typically, only two people are needed to perform the welding, which requires a special welding machine and a forklift or backhoe to move the pipe segments. >



## Treatment Facility (Lagoon) Improvements

The sewerage system is divided into two zones known as Mexicali I and Mexicali II. Sewage collected from Mexicali I (older, mostly urban area of the city) is conveyed to a 430-acre (174 hectares) stabilization facility located in the southwestern part of the city. This facility is known as the Ignacio-Zaragoza lagoon system. Sewage collected from Mexicali II (newer, more industrial area of the city) is conveyed to a 7.5-acre (3 hectares) stabilization facility located in the southeastern part of the city. This facility is known as the Gonzalez-Ortega lagoon system. Both lagoon systems are performing poorly due to high sludge and debris accumulation, heavy overloading of the system (organic as well as hydraulic), and inadequate diversion headwork. Improvements to both wastewater treatment facilities are the goal of QFs 7 and 9.



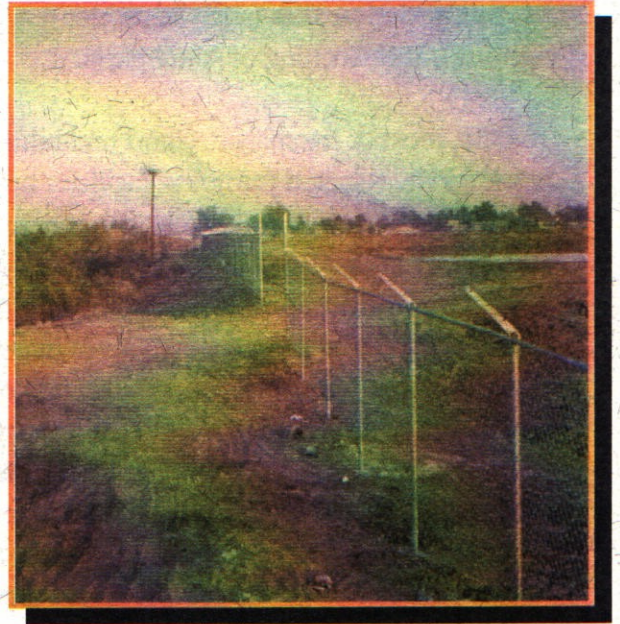
*The rehabilitation of the treatment facilities in Mexicali calls for the onsite disposal of the dredged lagoon sludges. Thus, earthen basins must be constructed within the facility before dredging operations can begin. To do so, bulldozers are used to move large quantities of soil to construct the berms of the basin.*

Improvements include the removal and onsite disposal of accumulated sludges in the lagoons, as well as the removal of vegetation in and around the lagoons. In addition, the rehabilitation of some of the flow control structures in the Ignacio-Zaragoza treatment facility and the installation of a chain link fence around the Gonzalez-Ortega facility are also included. A contract to do this work was issued by SAHOPE to a Mexican contractor in November 1996, but little progress has been achieved by the contractor so far regarding dredging activities. Nonetheless, notable portions of the fencing and vegetation removal tasks have been completed. The rehabilitation work and most of the dredging activities are still pending.

*Dredging operations at the Ignacio-Zaragoza treatment facility began this month. These were done using a small, winch-pulled pontoon dredger and drag line. The dredged materials were being pumped through pipe to nearby earthen basins constructed specifically to dispose of the materials. The supernatant water from the basins will be pumped back into the headworks of the facility.*



*View of a recently constructed earthen basin in the Ignacio-Zaragoza treatment facility receiving dredged sludge from one of its stabilization lagoons. The cement wall shown in the photo is part of the main feeder canal to the facility (which runs along the north end of the property). ∨*



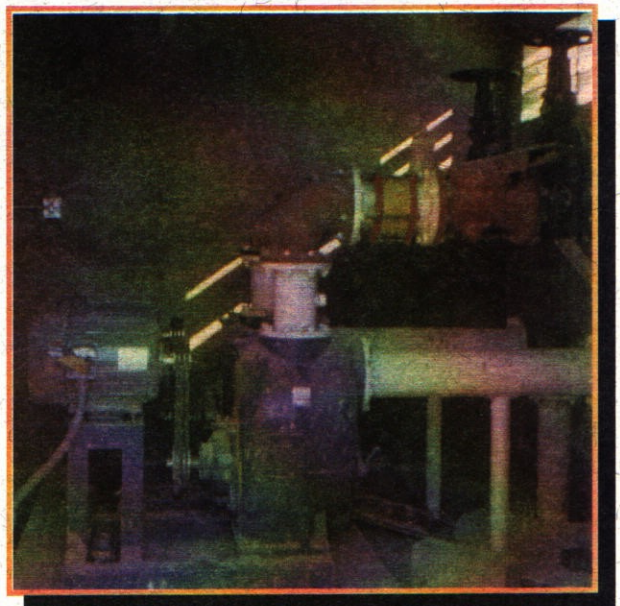
*One of the improvements to the Gonzalez-Ortega treatment facility is a chain link fence and barbed wire protection along the perimeter of the facility. ^*

## *Pumping Facility Improvements*

Three of the QF projects (Nos. 5, 6, and 11) were developed to increase the effectiveness and reliability of the wastewater pumping facilities in Mexicali, and thus reduce the amounts of untreated wastewater that currently spills into the New River due to inadequate pumping facilities. These QF projects involve three sewerage pump stations (known as PS 1, 1A, and 2) and two lift stations (known as "Jardines del Lago" and "Right Bank of the New River") located in the Mexicali I sanitation zone. These projects are currently under contract with one Mexican contractor.

The improvements being implemented include new motor/pump units (each with emergency electric power systems), appropriate foundations/flooring and housing for the new equipment, installation of flow-measuring equipment, physical rehabilitation to

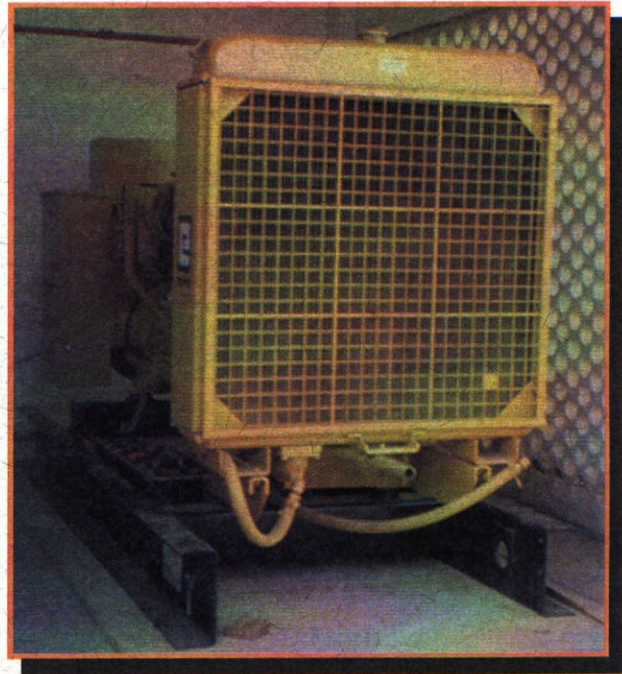
*The "Jardines del Lago" lift station has undergone significant rehabilitation. One of the many improvements includes a completely reconditioned pumping facility, consisting of new motors and pumps, new intake/outflow manifolds, and a better reinforced concrete pad supporting this equipment. In addition, the new equipment is now being housed in a cement block building.*



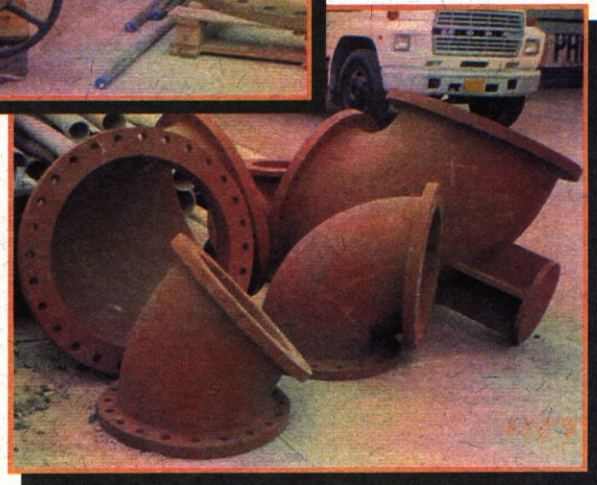
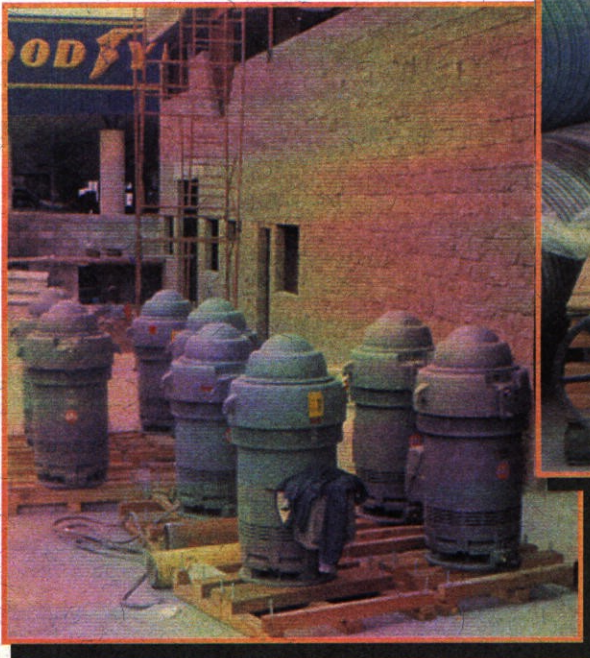


the pump station sites (such as proper fencing and lighting), and stocking of spare parts.

To date, most of the masonry and rehabilitation work for the selected pumping facilities has taken place. In addition, all of the electric generators and their diesel tanks (three of each), the electric motors (which run the pumping equipment, eight total), the cast-iron pipe fittings and flow valves necessary for the new pump manifolds, and nearly half of the flowmeters (8 of 15 units) have been received by the contractor. A late request for changes to the pump equipment specifications and exhaustive testing requirements of the custom manufactured equipment will delay the completion of these QF projects to late March 1997.



To increase the operational reliability of the main pump stations in Mexicali, QF 6 calls for the installation of emergency electric power generators (diesel) at each of the facilities. Shown here is a 350-kilowatt electric generator being installed at Pump Station No. 2. The generator rests on a new reinforced concrete foundation designed to support the weight and vibration of the unit. A 1,000-gallon diesel tank to supply fuel to the generator sits on the other side of the wall with holes. ↑



Many of the new pieces of equipment and pipe fittings to be used in the rehabilitation of the main pump stations arrived this month. Shown are some of the electric motors, cast-iron pipe elbows, flow valves, and other fittings that were delivered to the contractor's warehouse in Mexicali.