Border Environment Cooperation Commission

Water Treatment Plant in Raymondville, Texas

General Criteria

Type of Project. *The project consists of the construction of a new 4.5 million gallon/day (MGD) water treatment plant for the city of Raymondville, Texas.*

Location of Project. *The City of Raymondville, Texas is located in Willacy County on U.S. Highway 77, approximately 20 miles north Harlingen, Texas in the lower Rio Grande Valley region of Texas. The project is located within the 100 km border region as defined by the La Paz agreement. The current water plant does not meet TNRCC standards and needs to be replaced to provide potable water for the costumers of the city of Raymondville. The current plant is rated at 2.5 MGD and was originally constructed in 1934 with an initial capacity of 0.75 MGD. Over the years the plant's capacity has been increased by various modifications and additional treatment trains. Currently, the plant is operated at 95% of capacity during normal usage. Peak usage is approximately 2.75 MGD, which is 0.25 MGD over the rated capacity of the treatment plant. According to the TWDB, the population in 2000 was 10,774. The project considers a total project population of 13,929 by the year 2030. The city has a water consumption of 169 gallons per capita per day (gpcd) average.*

Description of Project and Tasks. *The project considers the construction of a 4.5 MGD water treatment plant, the demolition of the existing plant, construction of a high service pump station, the construction of a 0.5 MGD ground storage for the plant and a new water line to tie the existing distribution system.*

Compliance with International Treaties and Agreements. *This project is within the Agreements, that the United States and Mexico have signed, such as the La Paz Agreement, Border Environmental Comprehensive Plan, Border XXI Program and the Free Trade.*

Human Health and the Environment

Human Health/Environmental Needs. *The development of a new WTP will address several human health and environmental issues for the residents of Raymondville, Texas. The existing WTP was originally built over 60 years ago with a treatment capacity of 0.75 MGD. Over the years the city has expanded the plant to its current treatment capacity of 2.5 MGD. Current demands on peak days exceed the treatment capacity of the plant. This creates a serious risk for potential contamination of the public water supply through breakdowns in the treatment train, and loss of pressure in the distribution system, which can produce contamination of the water supply. Also, new treatment regulations will be difficult if not impossible to meet. With a new WTP, the city will have the ability to meet its current and future demands as well as having the ability to meet new treatment regulations. The existing WTP cannot meet peak day demands. This situation creates a technical violation of the Water Hygiene Rules administrated by the TNRCC. These violations could put the city in a position of being fined by the TNRCC during upcoming inspections.*

Environmental Assessment. *An Environmental Information Document (EID) was prepared for the city of Raymondville project, in accordance with State and Federal requirements.Together with other project documents, the EID formed the basis of an Environmental Assessment conducted by the US Environmental Protection Agency, Region 6 (Dallas). On the basis of the EA and the other project documents, the EPA Regional Administrator has issued a preliminary determination that the project is not a major Federal action significantly affecting the quality of the human environment and that preparation of an Environmental Impact*

Statement (EIS) is not warranted. This preliminary finding was published August 4, 2001, and comments from the public will be accepted by the EPA over a 30 day period from that date. A copy of the EA and FONSI can be found here FNSI.

Compliance with Applicable Environmental and Cultural Resource Laws and Regulations. *As part of the preparation of the EID, comments were solicited from relevant Federal and State agencies, including: The Texas Archeological Research Laboratory, the Texas Historical Commission, the US Fish and Wildlife Service, Texas Parks and Wildlife Department, Federal Emergency Management Agency, and the United States Army Corps of Engineers. Project approval responses were obtained from all agencies contacted. The project is in compliance with all applicable environmental and cultural resource laws and regulations, including among others, Significant, Unique or Important Farmlands, National Natural Landmarks, Wilderness Protection, Wild and Scenic Rivers, Wetlands Protection, Floodplain Management, Fish and Wildlife Protection, Endangered Species Protection, Historical, Architectural, Archeological, and Cultural Sites, Air Quality, and Environmental Justice.*

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Technical Feasibility

Appropriate Technology. *The proposed water treatment plant will utilize standard water treatment processes including coagulation, sedimentation, filtration and disinfection. The final engineering design of the plant will include pilot studies to determine the potential of using membrane filtration and microfloc treatment as well as conventional treatment. These pilot studies will determine the most efficient and effective way of treating the water. While it is anticipated that headworks, building, etc., will be sized to handle 4.5 MGD, the treatment capacity will be phased in with a 3.5 MGD treatment capacity.*

Coagulation. This process uses chemicals to catalyze the aggregation of particulate matter in the raw water. It is important for coagulation that there be rapid mixing of chemical coagulant. This is first phase is called coagulation/mixing. The second part of coagulation phase is flocculation.

Pilot studies will determine the best process for coagulating the influent water to the plant. The preliminary engineering report for this project mentions the use of conventional coagulation, used by the city currently. Newer technologies, specifically membrane treatment and synthetic coagulant computer controlled technology (e.g. Microfloc) are already in use by some of the providers in the area with good results. These technologies will be primary focus of the pilot study.

Sedimentation. The process is based on the non-turbulent steady flow through a series of canals allowing the flocs to naturally settle out and collect on the bottom of the sedimentation basis. Sedimentation basins may have a rectangular shape with length being several times longer than width or circular design with radial flow from the inside to the outside. The basin will be provided with baffles to uniformly distribute flow. The system will be designed so that there are several settling basins in parallel, allowing for maximum flexibility and redundancy.

Filtration. The filtration process "polishes" the water by removing the remaining flocs using granular material, usually sand. Filters are differentiated by the rate of filtration they allow. Slow sand filters are the older technology. Rapid sand filters is the other technology, in which beds tend to be smaller and shallower than slow sand filters. Another trend in filtration, which may be considered in the design of Raymondville WTP, concerns use of dual media. Multiple media are being used increasingly to attain the greater chemical removal standards required under recent regulations. The usual alternate media are anthracite or activated carbon. The alternate media may be placed in a different layer than the sand or mixed with it. If a synthetic coagulate process is used, the coagulation and filtration processes will be combined into one factory made module. There is not a sedimentation process with this type of treatment. Rather the floc is embedded in the media and must be periodically washed out. Backwash timing is critical for a good final result, so a computer is used to monitor the module for head increase as the filters become occluded.

Disinfection. The oxidants used in disinfection include chlorine gas, chloramines, chlorine dioxide, ozone or ultraviolet light. The final method of disinfection will be decided after the pilot studies. Currently the city is using chloramines as a disinfecting agent.

O&M Plan. *The city of Raymondville has an operations manual for the present plant. The engineer will be responsible for development of an operation and maintenance manual. This O&M manual will be completed prior to completion of construction. All personnel will receive training prior to start up of the WTP manual. The staff has long-term experience in WTP operation with the average time working in plant operation of almost 20 years. The Chief Operator has a B license and all operators have at least a C license. The design*

engineer will prepare a new O&M plan as part of the design engineering contract with the city. Initial startup of the system will include testing of the components prior to acceptance by the owner to assure that they properly perform their intended function. If there are new procedures used in WTP operation, the company providing the equipment will be required to conduct training on site for city staff in operating and maintaining the new equipment.

Compliance with applicable design norms and regulations. *The TNRCC has regulatory authority for water treatment plants in the State of Texas. Permits will be required for the closure of the existing WTP and a permit will be required for the new plant. The TNRCC will also have review authority along with the TWDB on the design of the project, which must meet State design criteria.*

Financial Feasibility and Project Management

Financial Feasibility.

The financial analysis to determine the funding structure of the project and the user rates to guarantee the financial sustainability of the operating agency has been completed.

Estimated Cost

Concept	Amount (US$)
Water Treatment Plant	**4,525,000**
Demolition of existing plant	**200,000**
High Service Pump Station	**400,000**
Ground Storage	**375,000**
Distribution System	**130,000**
modifications	**939,200**
Engineering fees	**876,143**
Other Items	
Total	$7,445,343

Current Water Expenses (Annual)

Concept	Amount (US$)
Treatment	**390,276**
Distribution	**235,702**
Office Expenses	**123,588**
TOTAL	749,565

Financial Structure

Source	Amount (US$)	%
Texas Department of Agriculture (loan)	**3,245,478**	**43.6**
BEIF (grant)	**4,199,865**	**56.4**
Total	7,445,343	100%

Rate Model: *It will be a $ 1.00 increase during the first year and a 5% adjustment for the average residential rate during the next 7 years. Additionally the city will receive Transitional Assistance Funds from BEIF for $ 258,268 during the next 7 years.*

Project Management. *The City has adequate personnel to handle the proposed infrastructure and to respond to any potential emergency that might arise during operation and maintenance of the project.*

SINGLE FAMILY RATES (US$)			
	2001	2002	2003
Average Monthly Water Bill	**$ 23.75**	**$ 25.45**	**$ 26.75**
	2004	2005	2008
Average Monthly Water Bill	**$ 28.09**	**$ 29.50**	**$ 34.15**

***considering a typical consumption of 10,000 gallons per month**

Public Participation

Comprehensive Public Participation Plan. *The Raymondville public participation plan was submitted on November 17, 2000 following the public participation guidelines and subsequently approved per BECC requirements.*

Steering Committee: *The steering committee was formed on October 18, 2000, and includes Alma Chavez, of the local Chamber of Commerce; Viola Vasquez, of Amigos Del Valle; Guy Fambrough, of the Willacy County Industrial Foundation; Alicia de la Paz, of Su Clinica Familiar; Cristina Caldera, Richard MacDonald, Aurora Pedraza and Rafael Cisneros of Valley Interfaith.*

Local Organizations: *Organizations to be contacted include Valley Interfaith, Chamber of Commerce, Industrial Foundation, Raymondville Rotary and Lions Clubs, Amigos Del Valle, the Independent School District, the Parent Teachers Organization, the Ministerial Alliance and the Spanish Ministerial Alliance.*

Public Information: *Project information has been available at City Hall and the local public library. Fact sheets have been available that include general information on the project such as, technical, environmental and financial components of the project. The fact sheet has been made available to service organizations, community groups and available at the City Hall, County Courthouse, and local library.*

Public Meetings: *A public meeting took place on November 28, 2000 to present the technical information of the project. The financial public meeting was held on July 23.*

Sustainable Development

Definition and Principles. *The project complies with BECC's definition of Sustainable Development: "Conservation oriented social and economic development that emphasizes the protection and sustainable use of resources, while addressing both current and future needs, and present and future impacts of human actions". This project is to provide potable water for the costumers of the city of Raymondville, Texas. Present and future generations will benefit from this project by connecting to a safe and dependable water supply by providing sufficient treatment capacity to meet current and future demands. The water treatment system project is centered on providing an improved quality of life for human beings.*

The project provides environmental protection by providing water with the quality standards that the costumers require.

Institutional and Human Capacity Building. *The project will be managed by the local sponsor and will be constructed and operated in conformance with the requirements of both regulatory and funding agencies. An aspect of this project that will build institutional capacity is the creation of reserves for any potential emergencies.*

Conformance with Applicable Local/Regional Conservation and Development Plans. *The project is in conformance with the approved Water and Wastewater Master Plan developed for the city in 1998. The city reviewed and the TWDB the Plan for compliance with generally accepted engineering principals. The project was listed as a top priority of the city in order to meet current and future water demands. The project was also included in the Regional Water Plan developed by the Brown-Lewis planning effort and approved by the TWDB.*

Natural Resource Conservation. *The Drought Contingency Ordinance was approved by the city on August 22, 2000. This plan identifies methods to save water, which has the additional impact of decreasing wastewater flows by providing methods of reducing water usage. In addition to the Drought Management Ordinance, this project will allow the city to operate the new plant more efficiently which will save operating costs as well as water that is currently lost in the treatment process at the existing plant.*

Community Development. *The development of this new water treatment plant will provide sufficient capacity to meet the water needs of the city's costumers for the next 25 – 30 years. With sufficient water treatment capacity, the city will be able to manage growth within its available resources, while providing an affordable water supply to costumers.*