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**REQUEST FOR PROPOSALS**

**FEASIBILITY STUDY FOR THE**

**PUERTO PEÑASCO WATER DESALINATION FACILITY IN MEXICO**

**Submission Deadline: 4:00 PM**

**LOCAL TIME (PUERTO PEÑASCO, MEXICO)**

**APRIL 30, 2008**

**Submission Place: Comité de Coordinación de Proyectos de Desalación de Agua de Mar y Tratamiento de Aguas Residuales  
Municipio de Puerto Peñasco  
Blvd. Josefa Ortiz de Domínguez No. 321, Esq. Río Suchiate  
Col. Brisas del Golfo, C.P. 83553  
Puerto Peñasco, Sonora  
Mexico  
Phone: (52-1-638) 386-5412**

**SEALED PROPOSALS SHALL BE CLEARLY MARKED AND RECEIVED PRIOR TO THE TIME AND DATE SPECIFIED ABOVE. PROPOSALS RECEIVED AFTER SAID TIME AND DATE WILL NOT BE ACCEPTED OR CONSIDERED.**

## REQUEST FOR PROPOSALS

SECTION 1:	INTRODUCTION .....	4
1.1	BACKGROUND SUMMARY .....	4
1.2	OBJECTIVE.....	4
1.3	PROPOSALS TO BE SUBMITTED .....	5
1.4	CONTRACT FUNDED BY USTDA.....	5
SECTION 2:	INSTRUCTIONS TO PROPOSERS.....	6
2.1	PROJECT TITLE .....	6
2.2	DEFINITIONS.....	6
2.3	DEFINITIONAL MISSION REPORT .....	6
2.4	EXAMINATION OF DOCUMENTS .....	6
2.5	PROJECT FUNDING SOURCE.....	7
2.6	RESPONSIBILITY FOR COSTS .....	7
2.7	TAXES .....	7
2.8	CONFIDENTIALITY.....	7
2.9	ECONOMY OF PROPOSALS .....	7
2.10	SUBSTANTIVE PROPOSALS .....	7
2.11	CONDITIONS REQUIRED FOR PARTICIPATION .....	8
2.12	LANGUAGE OF PROPOSAL.....	8
2.13	PROPOSAL SUBMISSION REQUIREMENTS .....	8
2.14	PACKAGING.....	8
2.15	AUTHORIZED SIGNATURE .....	9
2.16	EFFECTIVE PERIOD OF PROPOSAL .....	9
2.17	EXCEPTIONS.....	9
2.18	OFFEROR QUALIFICATIONS .....	9
2.19	RIGHT TO REJECT PROPOSALS .....	9
2.20	PRIME CONTRACTOR RESPONSIBILITY .....	9
2.21	AWARD .....	10
2.22	COMPLETE SERVICES .....	10
2.23	INVOICING AND PAYMENT .....	10
SECTION 3:	PROPOSAL FORMAT AND CONTENT .....	11
3.1	SECTION 1: INTRODUCTION AND EXECUTIVE SUMMARY .....	11
3.2	SECTION 2: COMPANY INFORMATION.....	12
3.2.1	COMPANY PROFILE .....	12
3.2.2	OFFEROR'S AUTHORIZED NEGOTIATOR .....	12
3.2.3	NEGOTIATION PREREQUISITES .....	12
3.3	SECTION 3: ORGANIZATIONAL STRUCTURE, MANAGEMENT, AND KEY PERSONNEL .....	12
3.4	SECTION 4: TECHNICAL APPROACH AND WORK PLAN .....	13
3.5	SECTION 5: EXPERIENCE AND QUALIFICATIONS .....	13
SECTION 4:	AWARD CRITERIA.....	14

- ANNEX 1 FEDBIZOPPS ANNOUNCEMENT
- ANNEX 2 BACKGROUND DEFINITIONAL MISSION REPORT
- ANNEX 3 USTDA NATIONALITY REQUIREMENTS
- ANNEX 4 USTDA GRANT AGREEMENT, INCLUDING MANDATORY CONTRACT CLAUSES
- ANNEX 5 TERMS OF REFERENCE (FROM USTDA GRANT AGREEMENT)

## **Section 1: INTRODUCTION**

The U.S. Trade and Development Agency (USTDA) has provided a grant to the Municipality of Puerto Peñasco ("Grantee") to conduct a Feasibility Study on the proposed Puerto Peñasco Water Desalination Facility Project ("Project") in Mexico. The Grant Agreement is attached at Annex 4 for reference. The Grantee is soliciting technical proposals from qualified U.S. firms to provide expert consulting services to carry out the Feasibility Study.

### **1.1 BACKGROUND SUMMARY**

The Municipality of Puerto Peñasco (population 60,000) is located in the State of Sonora on the shores of the Gulf of California about 380 kilometers north of Hermosillo, the capital of Sonora. The Municipality of Puerto Peñasco obtains its water supply from 11 water wells located within the Sonoyta River watershed. Current recharge and extraction data indicates an overexploitation of groundwater resources in the region, in which only 8 of the 11 water wells are currently operational. The Municipality of Puerto Peñasco also reports critical water loss along the water conveyance system due to leaks that originate from a nearly 40-year-old pipeline.

The Feasibility Study would support the development of a water desalination facility to increase the supply of potable water for the Municipality of Puerto Peñasco. The Project supports the objectives of Mexico's 2007-2012 National Infrastructure Program.

A background Definitional Mission report is provided for reference in Annex 2.

### **1.2 OBJECTIVE**

The objective of the Puerto Peñasco Water Desalination Facility Feasibility Study is to assess the technical, economic, financial, environmental, and regulatory feasibility associated with seawater and brackish water desalination and conditioning for potable water use in the Municipality of Puerto Peñasco.

The Terms of Reference (TOR) for this Feasibility Study is attached as Annex 5.

### **1.3 PROPOSALS TO BE SUBMITTED**

Technical proposals are solicited from interested and qualified U.S. firms. The administrative and technical requirements as detailed throughout the Request for Proposals (RFP) will apply. Specific proposal format and content requirements are detailed in Section 3.

Cost will not be a factor in the evaluation and therefore, cost proposals should not be submitted; upon detailed evaluation of technical proposals, one firm will be selected for contract negotiations. The amount for the negotiated contract has been established by a USTDA grant of U.S. \$369,325 dollars.

### **1.4 CONTRACT FUNDED BY USTDA**

The negotiated contract will be funded by USTDA in accordance with the terms and conditions of its grant to the Grantee. The contract must include certain USTDA mandatory clauses relating to nationality, taxes, payment, reporting, and other matters. The USTDA nationality requirements and the USTDA mandatory clauses are attached at Annexes 3 and 4 for reference.

## **Section 2: INSTRUCTIONS TO PROPOSERS**

### **2.1 PROJECT TITLE**

The Project is called the "Puerto Peñasco Water Desalination Facility Feasibility Study."

### **2.2 DEFINITIONS**

Please note the following definitions of terms as used in this RFP.

The term "Request for Proposals" means this solicitation of a formal technical proposal including qualifications statement.

The term "Offeror" means the U.S. individual, or U.S. firm, including any and all subcontractors, which responds to the RFP and submits a formal proposal and which may or may not be successful in being awarded this procurement.

### **2.3 DEFINITIONAL MISSION REPORT**

USTDA sponsored a Definitional Mission to address technical, financial, sociopolitical, environmental, and other aspects of the proposed Project. A copy of the Report is attached at Annex 2 for background information only.

### **2.4 EXAMINATION OF DOCUMENTS**

Offerors should carefully examine this RFP. It will be assumed that Offerors have done such inspection and that through examinations, inquiries, and investigation they have become familiarized with local conditions and the nature of problems to be solved during the execution of the Feasibility Study.

Offerors shall address all items as specified in this RFP. Failure to adhere to this format may disqualify an Offeror from further consideration.

Submission of a proposal shall constitute evidence that the Offeror has made all the above mentioned examinations and investigations, and is free of any uncertainty with respect to conditions which would affect the execution and completion of the Feasibility Study.

## **2.5 PROJECT FUNDING SOURCE**

The Feasibility Study will be funded under a grant from USTDA. The total amount of the grant is not to exceed U.S. \$369,325 dollars.

## **2.6 RESPONSIBILITY FOR COSTS**

Offeror shall be fully responsible for all costs incurred in the development and submission of the proposal or any other cost incurred by Offeror prior to issuance of an agreement or contract. Neither USTDA nor the Grantee assumes any contractual obligation as a result of the issuance of this proposal request, the preparation or submission of a proposal by an Offeror, the evaluation of proposals, or final selection.

## **2.7 TAXES**

Offerors should submit proposals which note that in Annex 4, USTDA Mandatory Contract Provisions, USTDA funds are not to be used to pay taxes or duties under the laws of host country.

## **2.8 CONFIDENTIALITY**

The Grantee will use its best efforts to preserve the confidentiality of any business proprietary or confidential information submitted by the Offeror, which is clearly designated as such by the Offeror.

## **2.9 ECONOMY OF PROPOSALS**

Proposal documents should be prepared simply and economically, providing a comprehensive and concise description of the Offeror's capabilities to satisfy the requirements of the RFP. There is no necessity for expensive bindings, colored displays, or other promotional material unless such material is absolutely pertinent to the proposal. Emphasis should be placed on completeness and clarity of content.

## **2.10 SUBSTANTIVE PROPOSALS**

The Offeror shall certify (a) that its proposal is genuine and is not made in the interest of, or on the behalf of, any undisclosed person, firm, or corporation, and is not submitted in conformity with, and agreement of, any undisclosed group, association, organization, or corporation; (b) that it has not directly or indirectly induced or solicited any other Offeror to put in a false proposal; (c) that it has not solicited or induced any other person, firm, or corporation to refrain from submitting a proposal; and (d) that it has not sought by collusion to obtain for himself any advantage over any other Offeror or over the Grantee or USTDA or any employee thereof.

## **2.11 CONDITIONS REQUIRED FOR PARTICIPATION**

Only U.S. firms are eligible to participate in this tender. However, U.S. firms may utilize subcontractors from host country for up to twenty percent (20%) of the amount of the USTDA grant. USTDA nationality requirements are detailed in Annex 3.

## **2.12 LANGUAGE OF PROPOSAL**

All proposal documents shall be prepared and submitted in English and Spanish.

## **2.13 PROPOSAL SUBMISSION REQUIREMENTS**

The cover letter in the proposal must be addressed to:

**Jorge Ayala Soto**  
**Coordinador**  
**Comité de Coordinación de Proyectos de Desalación de Agua de Mar y Tratamiento de Aguas Residuales**  
**Municipio de Puerto Peñasco**  
**Blvd. Josefa Ortiz de Domínguez No. 321, Esq. Río Suchiate**  
**Col. Brisas del Golfo, C.P. 83553**  
**Puerto Peñasco, Sonora**  
**Mexico**  
**Phone: (52-1-638) 386-5412**

**An original in English, an original in Spanish, one (1) copy in English, and three (3) copies in Spanish of your proposal must be received at the above address no later than 4:00 PM (local time in Puerto Peñasco, Mexico), on April 30, 2008.**

Proposals may be either sent by mail, overnight courier, or hand-delivered. Whether the proposal is sent by mail, courier or hand-delivered, the Offeror shall be responsible for actual delivery of the proposal to the above address before the deadline. Any proposal received after the deadline will be returned unopened.

Upon timely receipt, all proposals become the property of the Grantee.

## **2.14 PACKAGING**

Each proposal must be sealed to ensure confidentiality of the information. The proposals should be individually wrapped and sealed, and labeled for content including "original" or "copy number x"; the original in English, the original in Spanish, one (1) copy in English, and three (3) copies in Spanish should be collectively wrapped and sealed, and clearly marked for content.

Neither USTDA nor the Grantee will be responsible for premature opening of proposals not properly labeled.

## **2.15 AUTHORIZED SIGNATURE**

The proposal must contain the signature of a duly authorized officer or agent of the Offeror empowered with the right to bind the Offeror.

## **2.16 EFFECTIVE PERIOD OF PROPOSAL**

The proposal shall be binding upon the Offeror for sixty (60) days after the proposal due date, and Offeror may withdraw or modify this proposal at any time prior to the due date upon written request, signed in the same manner and by the same person who signed the original proposal.

## **2.17 EXCEPTIONS**

Firms agree by their response to the RFP announcement to abide by the procedures set forth therein. Material modifications in the TOR or responsibilities of the parties will not be accepted.

Any exceptions in the proposal shall be clearly identified, and shall include the scope of such exception, and its impact, on the procurement. The Grantee shall make final determination as to the responsiveness of such exceptions and their acceptability.

## **2.18 OFFEROR QUALIFICATIONS**

As provided in Section 3, Offerors shall submit evidence that they have relevant past experience and have previously delivered advisory and Feasibility Study services similar to those required in the TOR.

## **2.19 RIGHT TO REJECT PROPOSALS**

The Grantee reserves the right to reject any and all proposals and to accept or reject any or all of the items in the proposal, and to award the contract in whole or in part if it is deemed in the best interest of the Grantee.

## **2.20 PRIME CONTRACTOR RESPONSIBILITY**

Offerors have the option of subcontracting parts of the services they propose. The Offeror's proposal must include a description of any anticipated subcontracting arrangements, including the name, address, and qualifications of consultants and subcontractors. USTDA nationality provisions are set forth in detail in Annex 3. The successful Offeror shall cause appropriate provisions of its contract, including all mandatory USTDA clauses, to be inserted in all subcontracts ensuing to ensure fulfillment of all contractual provisions by subcontractors.

## **2.21 AWARD**

An award resulting from this RFP shall be made to the best qualified Offeror, taking into consideration the evaluation factors set forth herein; however, the right is reserved to reject any and all proposals received and, in all cases, the Grantee will be the judge as to whether a proposal has or has not satisfactorily met the requirements of this RFP.

## **2.22 COMPLETE SERVICES**

The successful Offeror shall be required to (a) furnish all supplies, supervision, transportation, and other execution accessories, services, and facilities; (b) provide and perform all necessary labor; and (c) in accordance with good technical practice, with due diligence, and in accordance with the requirements, stipulations, provisions, and conditions of this RFP and the resultant contract, execute and complete all specified work to the satisfaction of the Grantee.

## **2.23 INVOICING AND PAYMENT**

Deliverables under the contract shall be delivered on a schedule to be agreed upon in a contract with the Grantee. The Contractor may submit invoices to the designated Grantee Project Director in accordance with a schedule to be negotiated and included in the contract. Upon approval of each invoice, the Grantee will forward the invoice to USTDA which will process payment to the Contractor. All payments by USTDA under the Grant Agreement will be made in U.S. currency.

### **Section 3: PROPOSAL FORMAT AND CONTENT**

To expedite proposal review and evaluation, and to assure that each proposal receives the same orderly review, all proposals must follow the format described in this section.

Proposal sections and pages shall be appropriately numbered and the proposal shall include a Table of Contents. Offerors are encouraged to submit concise and clear responses to the RFP. Proposals shall contain all elements of information requested without exception. Instructions regarding the required scope and content are given in this section. The Grantee reserves the right to include any part of the selected proposal in the final contract.

The proposal shall consist of a technical proposal only. No cost proposal is required as the value of the USTDA grant is established at U.S. \$369,325 dollars.

Offerors shall submit one (1) original in English, one (1) original in Spanish, one (1) copy in English, and three (3) copies in Spanish of the proposal. Proposals received by fax cannot be accepted.

The following sections and content are required for each proposal:

- Transmittal Letter,
- Cover/Title Page,
- Table of Contents,
- Introduction and Executive Summary,
- Company Information,
- Organizational Structure, Management Plan, and Key Personnel,
- Technical Approach and Work Plan,
- Experience and Qualifications, and
- Miscellaneous.

Detailed requirements and directions for the preparation of each section are presented below.

#### **3.1 SECTION 1: INTRODUCTION AND EXECUTIVE SUMMARY**

An Executive Summary should be prepared describing the major facts or features of the proposal, including any conclusions, assumptions, and generalized recommendations the Offeror desires to make. Offerors are requested to make every effort to limit the length of the Executive Summary to no more than five (5) pages.

## **3.2 SECTION 2: COMPANY INFORMATION**

### **3.2.1 Company Profile**

Provide the information listed below relative to the Offeror's firm. If the Offeror is proposing to subcontract some of the proposed work to another firm(s), similar information must be provided for each subcontractor. Offerors are requested to limit the length of the Company Profile Information to one (1) page per firm.

1. Name of firm and business address, including telephone and fax numbers.
2. Year established (include former firm names and year established, if applicable).
3. Type of ownership and parent company, if any.
4. Project Manager's name, address, telephone and fax number, if different from (1).

### **3.2.2 Offeror's Authorized Negotiator**

Provide name, title, address, telephone, and fax number of the Offeror's authorized negotiator. The person cited shall be empowered to make binding commitments for the Offeror and its subcontractors, if any.

### **3.2.3 Negotiation Prerequisites**

1. Discuss any impact of any current or anticipated commitments which may impact the ability of the Offeror or its subcontractors to complete the Feasibility Study as proposed and within the Project schedule.
2. Identify any specific information which is needed from the Grantee before commencing contract negotiations.

## **3.3 SECTION 3: ORGANIZATIONAL STRUCTURE, MANAGEMENT, AND KEY PERSONNEL**

Describe the Offeror's proposed Project organizational structure. Discuss how the Project will be managed including the principal and key staff assignments for this Feasibility Study. Identify the Project Manager who will be the individual responsible for this Project. The Project Manager must have the responsibility and authority to act on behalf of the Offeror in matters related to the proposed Feasibility Study.

Provide a listing of personnel (including subcontractors and consultants) to be engaged in the Project, either U.S. or local with the following information for key staff: position in the Project; pertinent experience; curriculum vitae; other relevant information. If subcontractors are to be used, the organizational relationship between the firms must be described.

A manpower schedule and the level of effort for the Project period, by activities and tasks, as detailed under the Work Plan shall be submitted. A statement confirming the availability of the proposed Project Manager and key staff over the duration of the Project must be included in the proposal.

### **3.4 SECTION 4: TECHNICAL APPROACH AND WORK PLAN**

Describe in detail the proposed technical approach and work plan. Discuss the Project requirements as perceived by the Offeror. Include a brief narrative of tasks within each activity series. Begin with the information gathering phase and continue through delivery and approval of all required reports.

Prepare a detailed schedule of performance that describes all activities and tasks within the Technical Work Plan, including periodic reporting or review points, incremental delivery dates, and other Project milestones.

Based on the Technical Work Plan, and previous project experience, explain when and where Offeror will require support from the Grantee. Detail the amount of staff time required by the Grantee or participating agencies and any work space or facilities needed to complete the Feasibility Study.

### **3.5 SECTION 5: EXPERIENCE AND QUALIFICATIONS**

Provide a discussion of the Offeror's experience and qualifications which are relevant to the objectives and TOR for the Feasibility Study. If a subcontractor(s) is being used, similar information must be provided for the prime and each subcontractor firm proposed for the Project. Relevant experience and qualifications of key staff proposed shall be provided including letters of commitment from the individuals proposed concerning their availability for contract performance.

As many as possible but not more than six (6) relevant and verifiable project references must be provided, including the following information:

- Project name,
- Name and address of client (indicate if joint venture),
- Client contact person (name/ position/ current phone and fax numbers),
- Period of contract,
- Description of services provided,
- Dollar amount of contract, and
- Status and comments.

Offerors are strongly encouraged to include in their experience summary primarily those projects that are similar to or larger in scope than the Feasibility Study as described in this RFP.

#### **Section 4: AWARD CRITERIA**

Individual proposals will be initially evaluated by a Procurement Selection Committee of representatives from the Grantee. The Committee will then conduct a final evaluation and completion of ranking of qualified Offerors, and the Grantee shall promptly negotiate a contract with the best qualified Offeror. If a satisfactory contract cannot be negotiated with the best qualified Offeror, negotiations will be formally terminated. Negotiations shall then be undertaken with the second most qualified Offeror and so forth.

The selection of the Contractor will be based on the following criteria and their corresponding assigned weights:

1. Offeror's qualifications and experience relevant to the objectives and TOR of the Feasibility Study (25 points maximum)
  - Overall experience of the Offeror (15 points)
  - Overseas experience of the Offeror (10 points)
2. Proposed technical approach and work plan (25 points maximum)
  - Appropriateness of proposed technical approach and work plan (15 points)
  - Knowledge of proposed work and understanding of tasks (10 points)
3. Qualifications and experience of key personnel (30 points maximum)
  - Project management experience on similar projects (5 points)
  - Project engineering experience on similar projects (5 points)
  - Mechanical and civil engineering experience on similar projects (5 points)
  - Electrical engineering and IT experience on similar projects (5 points)
  - Economic and financial analysis experience on similar projects (5 points)
  - Experience and ability to work in the Spanish language (5 points)
4. Past performance (20 points maximum)
  - Six relevant and verifiable projects (20 points)
  - Five relevant and verifiable projects (15 points)
  - Four relevant and verifiable projects (10 points)
  - Three relevant and verifiable projects (5 points)

Proposals which do not include all requested information may be considered non-responsive.

Price will not be a factor in Contractor selection.

**A N N E X 1**

**FEDBIZOPPS ANNOUNCEMENT**

Jorge Ayala Soto, Coordinador, Comité de Coordinación de Proyectos de Desalación de Agua de Mar y Tratamiento de Aguas Residuales, Municipio de Puerto Peñasco, Blvd. Josefa Ortiz de Domínguez No. 321, Esq. Río Suchiate, Col. Brisas del Golfo, C.P. 83553, Puerto Peñasco, Sonora, Mexico, Phone: (52-1-638) 386-5412, Fax: (52-638) 102-0004.

#### B – Mexico: Puerto Peñasco Water Desalination Facility Feasibility Study

POC Evangelina Kunene, USTDA, 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901, Tel.: (703) 875-4357, Fax: (703) 875-4009. Puerto Peñasco Water Desalination Facility, Mexico. The Grantee (Municipality of Puerto Peñasco) invites submission of qualifications and proposal data (collectively referred to as the "Proposal") from interested U.S. firms that are qualified on the basis of experience and capability to conduct a Feasibility Study for the Puerto Peñasco Water Desalination Facility Project.

The objective of the Puerto Peñasco Water Desalination Facility Feasibility Study is to assess the technical, economic, financial, environmental, and regulatory feasibility associated with seawater and brackish water desalination and conditioning for potable water use in the Municipality of Puerto Peñasco.

The Terms of Reference (TOR) for the Feasibility Study include the following tasks: 1) Detailed Background Review; 2) Study Management Plan; 3) Desalination and Water Treatment Technologies Evaluation; 4) Feasibility Analysis of the Water Desalination Project; 5) Analysis of U.S. Manufacturers of Desalination and Water Treatment Technology; 6) Project Implementation Plan; and 7) Final Report.

The U.S. firm selected will be paid in U.S. dollars from a \$369,325 grant to the Grantee from the U.S. Trade and Development Agency (USTDA).

A detailed Request for Proposals (RFP), which includes requirements for the Proposal, the TOR, and a background Definitional Mission report, is available from USTDA, at 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901. To request the RFP in PDF format, please go to: <https://www.ustda.gov/businessopps/rfpform.asp>. Requests for a mailed hardcopy version of the RFP may also be faxed to the IRC, USTDA at 703-875-4009. In the fax, please include your firm's name, contact person, address, and telephone number. Some firms have found that RFP materials sent by U.S. mail do not reach them in time for preparation of an adequate response. Firms that want USTDA to use an overnight delivery service should include the name of the delivery service and your firm's account number in the request for the RFP. Firms that want to send a courier to USTDA to retrieve the RFP should allow one hour after faxing the request to USTDA before scheduling a pick-up. Please note that no telephone requests for the RFP will be honored. Please check your internal fax verification receipt. Because of the large number of RFP requests, USTDA cannot respond to requests for fax verification. Requests for RFPs received before 4:00 PM will be mailed the same day. Requests received after 4:00 PM will be mailed the following day. Please check with your courier and/or mail room before calling USTDA.

Only U.S. firms and individuals may bid on this USTDA financed activity. Interested firms, their subcontractors and employees of all participants must qualify under USTDA's nationality requirements as of the due date for submission of qualifications and proposals and, if selected to carry out the USTDA-financed activity, must continue to meet such requirements throughout the duration of the USTDA-financed activity. All goods and services to be provided by the selected firm shall have their nationality, source, and origin in the U.S. or host country. The U.S. firm may use subcontractors from the host country for up to 20 percent of the USTDA grant amount. Details of USTDA's nationality requirements and mandatory contract clauses are also included in the RFP.

Interested U.S. firms should submit their Proposal in English and Spanish directly to the Grantee by 4:00 PM (local time in Puerto Peñasco, Mexico), April 30, 2008, at the above address. Evaluation criteria for the Proposal are included in the RFP. Price will not be a factor in contractor selection, and therefore, cost proposals should NOT be submitted. The Grantee reserves the right to reject any and/or all Proposals. The Grantee also reserves the right to contract with the selected firm for subsequent work related to the project. The Grantee is not bound to pay for any costs associated with the preparation and submission of Proposals.

**ANNEX 2**

**BACKGROUND DEFINITIONAL MISSION REPORT**

# DEFINITIONAL MISSION REPORT

## MUNICIPAL WATER SUPPLY AND WASTEWATER TREATMENT PROJECTS IN MEXICO

USTDA 2007510016/2007-51022A

Presented to:

**U.S. Trade and Development Agency**  
**Attn.: Mr. Keith Eischeid, Country Manager**  
1000 Wilson Boulevard, Suite 1600  
Arlington, VA 22209-3901  
Phone 703-875-4357 Fax 703-875-4009

Submitted by:

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January 31, 2008



This report was funded by the U.S. Trade and Development Agency (USTDA), an agency of the U.S. Government. The opinions, findings, conclusions, or recommendations expressed in this document are those of the author(s) and do not necessarily represent the official position or policies of USTDA. USTDA makes no representation about, nor does it accept responsibility for, the accuracy or completeness of the information contained in this report.

**Mailing and Delivery Address:** 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901  
**Phone:** 703-875-4357 • **Fax:** 703-875-4009 • **Web site:** [www.ustda.gov](http://www.ustda.gov) • **email:** [info@ustda.gov](mailto:info@ustda.gov)



## **The U.S. Trade and Development Agency**

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle income countries. The agency funds various forms of technical assistance, early investment analysis, training, orientation visits and business workshops that support the development of a modern infrastructure and a fair and open trading environment.

USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit from U.S. exports of goods and services.

## TABLE OF CONTENTS

TABLE OF CONTENTS .....	1
Appendices .....	2
A. EXECUTIVE SUMMARY .....	4
A.1 Background .....	4
A.2 FS Proposals .....	5
A.3 Developmental Priority .....	5
A.4 Sponsor's Commitment .....	5
A.5 U.S. Trade and Development Agency Technical Assistance .....	6
A.6 U.S. Export Potential .....	6
A.7 Implementation Financing .....	6
A.8 Qualifications of Project Sponsor's Team .....	7
A.8 FS Terms of Reference .....	7
A.9 Recommendations .....	7
B. PROJECT DESCRIPTION .....	8
B.1 Background .....	8
B.1.1 Guaymas .....	8
B.1.1.1 Water Supply .....	8
B.1.1.2 Wastewater .....	11
B.1.2 Puerto Peñasco .....	14
B.1.2.1 Water Supply .....	14
B.1.1.2 Wastewater .....	16
B.2 Proposed Actions .....	16
B.2.1 Water Supply Issues .....	16
B.2.2 Wastewater Management Issues .....	18
B.3.1 Guaymas Priority with Regard to Technical Assistance .....	18
B.3.2 Puerto Peñasco Priority with Regard to Technical Assistance .....	19
C. PROJECT SPONSOR'S CAPABILITIES AND COMMITMENT .....	19
C.1 Guaymas .....	19
C.2 Puerto Peñasco .....	19
D. IMPLEMENTATION FINANCING .....	20
D.1 Guaymas .....	21
D.2 Puerto Peñasco .....	21
E. U.S. EXPORT POTENTIAL .....	21
E.1 Guaymas Water and Wastewater Systems SCADA .....	21
E.1.1 U.S. Export Potential .....	22
E.2 Puerto Peñasco Desalination Facility .....	23
E.2.1 U.S. Export Potential .....	23
F. FOREIGN COMPETITION AND MARKET ENTRY ISSUES .....	24
G. DEVELOPMENTAL IMPACT .....	25
G.1 Infrastructure .....	25
G.2 Human Capacity Building .....	26
G.3 Technology Transfer and Productivity Improvements .....	26
G.4 Market-Oriented Reforms .....	26
H. IMPACT ON THE ENVIRONMENT .....	27
I. IMPACT ON U.S. LABOR .....	27
J. QUALIFICATIONS .....	28
K. JUSTIFICATION .....	29

I.	TERMS OF REFERENCE.....	30
M.	RECOMMENDATIONS .....	30
N.	CONTACTS.....	32

## APPENDICES

Appendix 1	Water/Wastewater Service Tariff
Appendix 2	Fitch Ratings
Appendix 3	Sub-sovereign Guaranteed Loan Approval Process for Water projects in Puerto Peñasco
Appendix 4	Guaymas Municipality USTDA Assistance Support Letter
Appendix 5	Guaymas SCADA Upgrade and Expansion Capital Cost
Appendix 6	Puerto Peñasco Planning Level RO Seawater Desalination Capital Cost
Appendix 7	Proposed Terms of Reference for the Puerto Peñasco Desalination Plant Project
Appendix 8	Proposed Budget for the Feasibility Study of the Puerto Peñasco Project
Appendix 9	Proposed Terms of Reference for the Guaymas Telemetry/SCADA Project
Appendix 10	Proposed Budget for the Feasibility Study of the Guaymas Project

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## A. EXECUTIVE SUMMARY

### A.1 Background

The U.S. Trade and Development Agency requires the assessment of potential technical assistance to the Comision Nacional de Agua de Mexico (CNA or CONAGUA) and the Municipalities of Puerto Peñasco and Guaymas in the state of Sonora, Mexico. The CONAGUA representatives contacted as part of this Definitional Mission (DM) indicated a possible interest in USTDA technical assistance but did not provide specific areas or projects that could be assessed for this DM. In our last conversation with CONAGUA on December 10, 2007, the CONAGUA representative discussed the possibility of future technical assistance; however, nothing has been solidified at this point. Specific proposals were submitted by the municipalities of Guaymas and Puerto Peñasco. Both municipalities are located in an arid area, the Sonoran Desert, characterized by low precipitation, high evaporation losses and very limited surface water resources. Both municipalities depend on groundwater aquifers to meet their growing potable water demands. In both cases, aquifers are being exploited beyond their safe yields. A review of the information provided by both Comision Estatal de Agua (CEA-Guaymas) and the municipality of Puerto Peñasco shows that current water supply operations at both communities involve considerable water losses, though this is of specific concern in the case of the Guaymas municipality. Both utilities operate water supply systems that are struggling to recover the cost of supplying water to customers who do not pay their water bills. About 40 percent and 20 percent of the water users do not pay their water/wastewater management bills in Guaymas and Puerto Peñasco, respectively.

The "Comision Estatal del Agua del Estado de Sonora" (CEA, Project Sponsor, Grantee) operates the Guaymas municipal potable water and wastewater management systems. With the support of the Municipality of Guaymas, the Guaymas office of CEA (CEA-Guaymas) submitted a proposal for the assessment of a seawater desalination facility. This project is needed to increase the availability of water in Guaymas and its environs. The DM fieldwork revealed that officials of CEA-Guaymas do not have immediate plans for a desalination facility. Instead, CEA-Guaymas is embarking on the modernization of its potable water supply system. The current and planned CEA-Guaymas capital investment plan is oriented toward eliminating pipeline leaks and optimizing the water supply system operation.

Consequently, DM and CEA-Guaymas discussions focused on assessing opportunities for USTDA assistance to advance the study and implementation of automatic water supply and wastewater management systems that rely on Supervisory Control and Data Acquisition (SCADA) System. Automation of the water supply and wastewater systems will avoid the inefficiencies that come with manually controlled water supply and wastewater systems in which operators have to physically travel throughout the systems to open and close valves, as well as turn pumps on and off. Such a manually controlled operation ultimately results in water spills at holding tanks and pump stations.

The municipality of Puerto Peñasco (Project Sponsor) requests technical assistance to carry out a feasibility study (FS) that examines the viability of a desalination facility to meet its potable water demands. Additionally, its potable water conveyance and distribution systems are plagued

with water leaks. As such, a substantial percentage of the water pumped from the aquifers is lost before it reaches water users.

Information provided by the municipalities of Guaymas and Puerto Peñasco shows that aquifers are in danger of becoming useless due to subsidence. In fact, Guaymas reports that several of its water wells are no longer operational. The Municipality of Puerto Peñasco is also aware of the seriousness of the groundwater depletion situation and is carrying out a feasibility study to investigate the technical details of seawater intakes and the location of desalination facilities that will meet their current and future water demand.

Municipal wastewater management in Guaymas utilizes oxidation ponds. This is the typical wastewater treatment system utilized under the environmental and climatologic conditions prevailing in Sonora. Specifically, this type of wastewater management relies on low-tech biological treatment that does not require a large capital investment in hardware and, thus, it is of low commercial trading value. Additionally, there is vast professional experience in the siting, design and implementation of these types of facilities in Mexico.

## **A.2 FS Proposals**

The CEA-Guaymas agrees that USTDA technical assistance is necessary to study the automation of the water supply system as discussed above. The Municipality of Guaymas fully supports the implementation of projects that could originate from the requested USTDA technical assistance.

The proposal submitted by Puerto Peñasco involves the technical, financial, economic and environmental assessment of saline water desalination to meet the current and future potable water demands of its growing community.

## **A.3 Developmental Priority**

According to information researched for this report, groundwater depletion in the study area has become a serious drawback to the socioeconomic development in both communities. Groundwater overexploitation trends needs to be controlled effectively to avoid the permanent loss of a valuable natural resources.

Documentation provided in support of the proposals for technical assistance indicates that the project sponsors understand their situation and are committed to implementing projects that ameliorate the current water supply shortfall.

## **A.4 Sponsor's Commitment**

In their proposals and subsequent communications the project sponsors have indicated their dedication to groundwater resource protection. In several follow-up meetings they have stressed their desire to develop the proposed actions with the goal of meeting their respective potable water demands. In fact, Guaymas has been investing in the modernization of its water supply

system since 2004 while Puerto Peñasco is already conducting a feasibility study on the seawater intake and siting of the desalination facility.

### **A.5 U.S. Trade and Development Agency Technical Assistance**

The DM assessment of the project sponsors' proposals indicates that support to carry out the activities related to the FS of the Guaymas SCADA and Puerto Peñasco desalination facility meets USTDA technical assistance criteria and is warranted for commercial reasons. The DM estimates the U. S. Trade and Development Agency grant assistance at \$369,325 and \$176,400 for the Puerto Peñasco and Guaymas projects, respectively.

### **A.6 U.S. Export Potential**

This DM estimates that the technical requirements of the Guaymas SCADA will require a \$790,902 capital investment. The Puerto Peñasco seawater desalination facility translates into a capital investment of approximately \$35 million dollars. Investment in technology not available in Mexico is estimated at 0.5 and 17.5 million dollars for Guaymas and Puerto Peñasco, respectively. Additionally, the potential consulting service needed for the design and implementation of the projects is estimated at about \$3 million dollars including consulting services.

U.S. manufacturers of desalination technology and consulting firms specializing in SCADA and desalination engineering who were contacted as part of the DM expressed an interest in participating in the Guaymas and Puerto Peñasco bidding process.

### **A.7 Implementation Financing**

The DM contacted the Inter-American Development Bank (IADB), the World Bank and the Export-Import Bank of the United States (Ex-Im Bank) to discuss the financial prospects of the proposed actions. The World Bank representative was not available to discuss the projects. However, Mr. Jose Gomez, the IADB Coordinator of the Mexico portfolio indicated that his institution is highly interested in the Guaymas and Puerto Peñasco water projects and, as such, IADB is willing to initiate conversations concerning the matter. In fact, an IADB delegation has already met with the Puerto Peñasco Municipal President to discuss the IADB's interest in Puerto Peñasco infrastructure projects.

Additionally, Mr. Sergio Rivera a Relationship Manager with Ex-Im Bank discussed several avenues by which funds might be available for the implementation of the Puerto Peñasco project. He indicated that the Engineering Multiplier Program is available to U.S. Firms that enter contractual agreements for the design and implementation phases of environmental projects such as the ones under consideration. The financial terms for Ex-Im Bank loans include a grace period of up to six months after the completion of the construction of the facility. This will benefit Design-Build and Operate contractors as repayment of the loan will not occur until after the facility is in operation and generating revenues.

## **A.8 Qualifications of Project Sponsor's Team**

CEA-Guaymas has the technical support of the State of Sonora CEA, and has been carrying out projects of similar magnitude. In Puerto Peñasco, the municipality has appointed a committee to oversee the desalination project. This committee is composed of engineers and scientists, developers and municipality personnel and includes representatives of the Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento (OOMAPAS). Both Project Sponsors have indicated that they will execute a contractor selection process that meets U.S. Trade and Development Agency and international guidelines. Thus, there is assurance that a reputable consulting firm with ample international experience will be selected to assist with the feasibility study and implementation of the proposed projects.

## **A.8 FS Terms of Reference**

Appendices 7 and 9 contain the Terms of Reference for the feasibility studies including the assessment, selection and preparation of the technical specifications and procurement documents for the SCADA and desalination systems. Appendices 8 and 10 contain the budget for the feasibility studies.

## **A.9 Recommendations**

The DM concurs with the sponsors' proposals that the projects have significant developmental priorities for socioeconomic and environmental reasons. The project will have significant U.S. commercial value if desalination technology manufactured by US companies are specified and selected for the projects.

The referenced desalination facility will likely be of interest to European companies who have demonstrated interest in providing their services and technology for these types of projects. Degremont, a French water company, is currently involved in several water projects in Mexico and Biwater International, an English water company, has a regional office in Mexico City. Also, Union Fenosa, a Spanish company, operates the Cabo San Lucas desalination facility. These companies have in-country business experience and are likely competitors for water projects. Siemens is presently working on a significant marketing effort to introduce water desalination technology. Accordingly, the proposal documents municipal capital investments that will be subject to significant foreign competition from European companies and, therefore, USTDA support addresses foreign competitive elements.

The size of U.S. exports for the Guaymas SCADA project does not meet the required export potential for USTDA consideration. Consequently, the DM recommends USTDA grant assistance for the FS and preparation of the procurement documents of the Puerto Peñasco seawater desalination project only.

## **B. PROJECT DESCRIPTION**

### **B.1 Background**

U.S. Trade and Development Agency requires the assessment of potential technical assistance to the Comisión Nacional de Agua de México (CNA or CONAGUA), the Comisión Estatal de Agua (CEA) of the State of Sonora (which operates the Municipality of Guaymas's water supply and wastewater management systems), and the Municipality of Puerto Peñasco in the state of Sonora, Mexico. CONAGUA, CEA-Sonora and the municipality of Puerto Peñasco (the three potential Grantees) were contacted as part of the DM activities.

CONAGUA has indicated an interest in USTDA assistance in all telephone conversations beginning in September 04, 2007. However, the DM discussion with CONAGUA did not lead to the identification of CONAGUA's specific areas or projects of interest. They committed to preparing and sending a list of technical assistance priorities, however, this did not come to fruition. The Definitional Mission met with CONAGUA on December 10, 2007 in Mexico City but the discussions focused on future potential areas of interest and not on specific proposals. On the other hand, specific projects were submitted by CEA and Puerto Peñasco. A description of each of the potential projects follows.

#### **B.1.1 Guaymas**

The City of Guaymas (population 150,000) is located in the state of Sonora on the shores of the Gulf of California about 117 km south of Hermosillo, the state capital city (see Figures B.1.1 and B.1.1a). Fishing is the primary industry with Guaymas having one of the largest fishing fleets in Sonora. The fishing industry in Guaymas generates about 70 percent of the seafood production in the state. Cattle ranching and agriculture are also significant economic staples. Additionally, Guaymas and its environs is one of the most important tourist destinations in Sonora.

Guaymas is located in an arid region known as the Sonoran Desert. Temperatures reach 42 degrees centigrade (108 degrees Fahrenheit) during the summer months. Lower temperatures in the 18 degrees centigrade (65 degrees Fahrenheit) occur during the winter season. Annual average precipitation is approximately 150 mm (6 inches).

##### **B.1.1.1 Water Supply**

Although in Mexico federal regulations require that municipalities be responsible for the operation of their water and wastewater services, the Guaymas CEA of the State of Sonora (referred to as CEA-Guaymas in this report) acts as the Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento (OOMAPAS) and operates Guaymas's water supply and wastewater management systems.

# Sonoran Desert Region

The Sonoran Desert Region consists of the Sonoran Desert itself plus the surrounding biological communities, including the Sea of Cortez (Gulf of California) and its islands

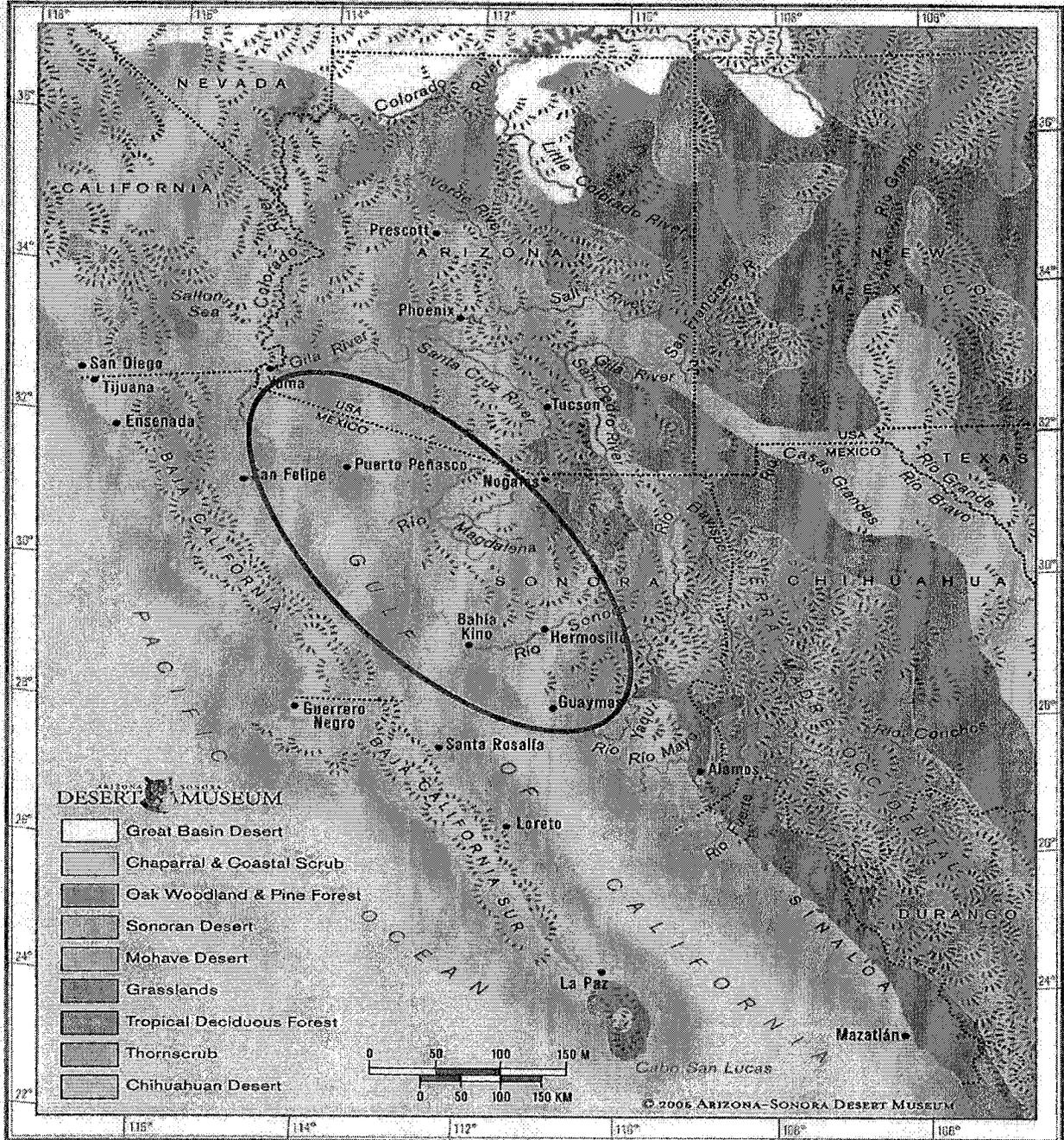
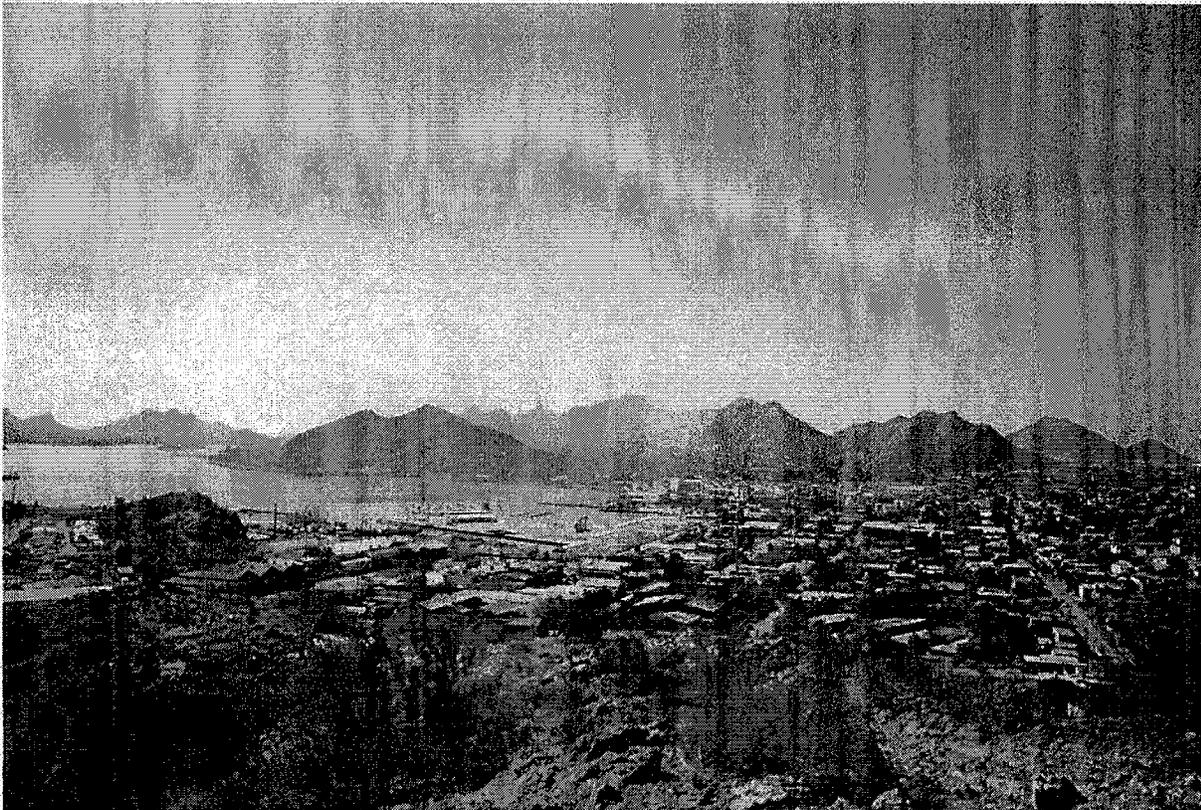


Figure B.1.1 Location of Guaymas and Puerto Peñasco



**Figure B.1.1a Panoramic View of Guaymas**

According to information provided by CEA-Guaymas, the City of Guaymas obtains its water supply from water wells located at the Yaquis and Boca Abierta water well fields (130 km from Guaymas). An estimated 26.21 million cubic meters (18.971 MGD or 831.18 liters per second) were pumped from these water well fields in the year 2005. Table B.1.1.1a summarizes the Guaymas water demand data provided by CEA-Guaymas. The water system is operated manually in cumbersome operations that result in water spills at both holding tanks and pump stations and create excessive water pressure within the distribution network. Figure B.1.1.1 depicts the Guaymas potable water system and Figure B.1.1.1a shows a pump station in the San Carlos area.

**Table B.1.1.1a Guaymas Water Supply and Demand CNA Data (Liters per Second, lps)**

Water Wells Supply	Average Water Demand	Maximum Water Demand
831.18	465.81	605.55

CEA reports that 440 lps are obtained from the 300 km Guaymas water supply network. This suggests that there is considerable water loss within the water pipeline system. Guaymas Commission Estatal de Agua (CEA-Guaymas) engineers confirmed the high magnitude of the water losses. The water supply system suffers from interruptions due to pipeline downtime during repairs and water well maintenance.

Information researched for this Definitional Mission indicates that annual groundwater recharge in the Yaquis region is estimated at 792 million cubic meters (209,088. million gallons), annual groundwater extraction is estimated at 633 million cubic meters (167,112. million gallons). CEA reports that two of the ten wells in the Yaqui water well field are no longer operational due to excessive drawdown. In addition, two other wells are being stressed beyond their safe yield.

Water quality monitoring data shows that groundwater from the Yaqui water well field contains manganese in excess of the 0.15 ppm allowed for human consumption by the "Norma Oficial Mexicana, NOM -127-SSA<sup>1</sup>." In Guaymas, the water supply system produces a water quality within NOM -127-SSA by mixing waters from the Yaqui and the Boca Abierta well fields.

The cost of water supply and wastewater management services are combined into a single charge. The water/wastewater service charge is based on the volume of water used. Appendix 1 shows the current approved tariff. It is noted that the minimum charge is 38.50 Mexican Pesos (\$3.54) per 10 m<sup>3</sup> or 3.85 Mexican Pesos (\$0.35) per cubic meter. Water users that use between 11 and 20 cubic meters pay the minimum charge plus 3.60 Mexican Pesos per each cubic meter above 10 m<sup>3</sup>. Thus, the current tariff reduces the water charge for water users that use between 11 and 20 m<sup>3</sup>.

In a recent article published by Water and Waste BNamericas, CONAGUA's Director, Jose Luis Luege, stated that over 60 percent of the population in Mexico fails to pay its water bills. This situation is apparent in Guaymas where, as shown in Table B.1.1.1b, the uncollected water/wastewater bills account for nearly 40 percent of the water/wastewater charges. Additionally, in Guaymas only 11,277 (33.6%) of the current 33,571 domestic water users have water meters. The shortage of water meters compound the collection of the water supply charges as there is limited control over the amount of water used by a large percentage of water users. There are 1,596 industrial water users, 1,596 commercial customers and 92 special water users.

**Table B.1.1.1b Water/Wastewater Bills Collected and Uncollected**

Year	Water/Wastewater Charges, Mexican Pesos	Collected,		Uncollected,	
		Mexican Pesos	%	Mexican Pesos	%
2003	47,478,424.87	25,544,017.05	53.80	21,934,407.82	46.20
2004	50,266,418.56	31,393,194.29	62.45	18,873,224.27	37.55
2005	48,903,276.21	31,560,792.16	64.53	17,342,484.05	35.47
2006	53,573,070.66	32,854,680.01	61.32	20,718,390.65	38.68

### B.1.1.2 Wastewater

Information on the wastewater system provided by CEA-Guaymas is limited. The sewerage system collects and transports approximately 285 lps (6.5 MGD). A 42" pipeline outfall discharges the wastewater to the oxidation ponds (see Figure B.1.1.2). The oxidation ponds are designed to process about 350 lps (8 MGD). Analytical data provided by the CEA shows that the effluent from the oxidation ponds does not meet the NOM-001-SERMANAT 1996 Fecal Coliform water quality standard.

<sup>1</sup> In the United States (U.S.), manganese is a National Secondary Drinking Water Standard with a 0.05 ppm limit for water supply purposes.

In addition, there is another oxidation pond with the capacity to treat 26 lps (0.60 MGD) in the Buenos Aires area. Industrial waste is treated onsite and discharged to the sea. Several neighborhoods operate septic tanks.

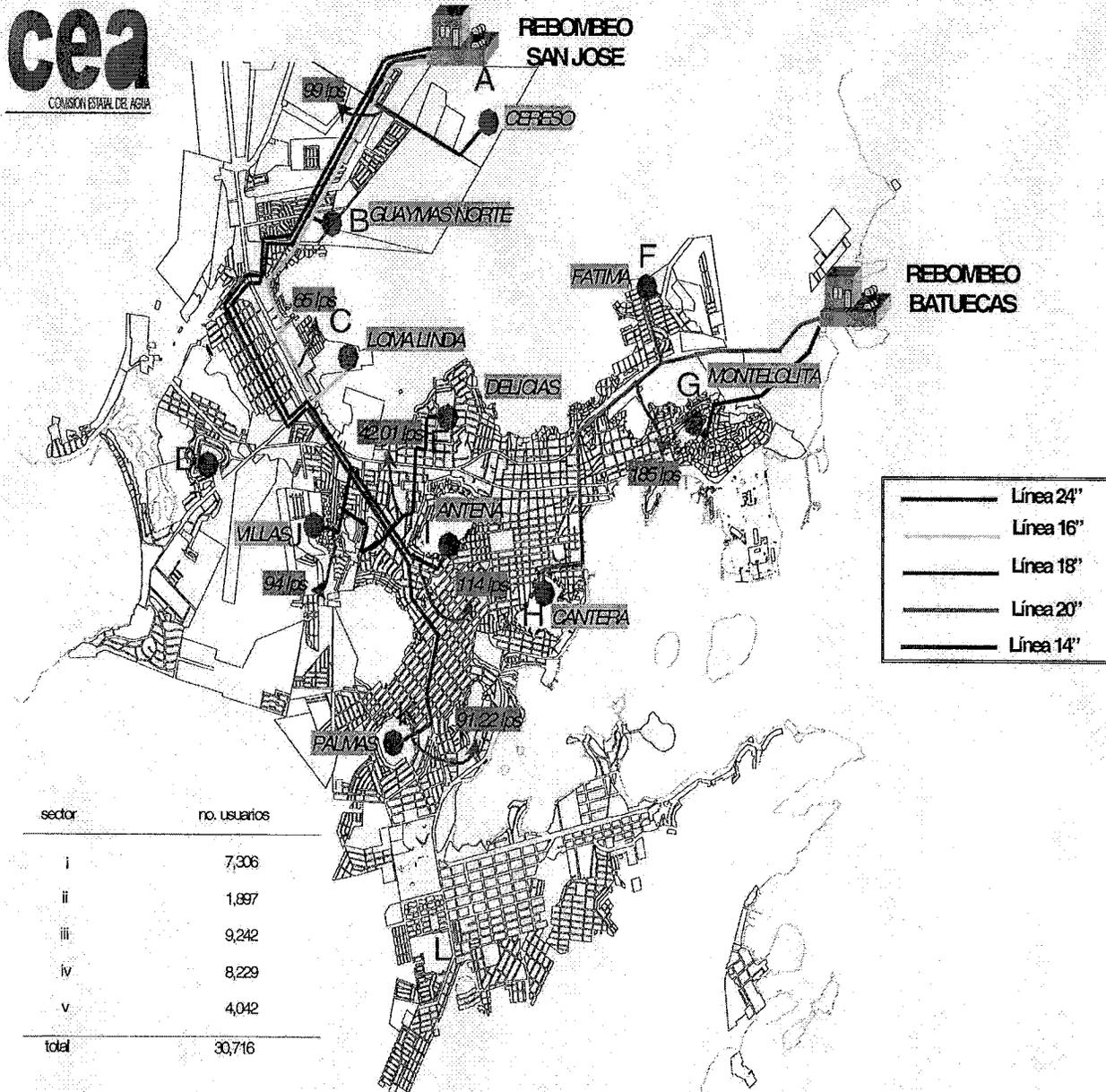


Figure B.1.1.1 Guaymas Water Distribution System



Figure B.1.1.1a Water Supply Pump Station in the San Carlos Area



Figure B.1.1.2 – Guaymas Oxidation Ponds

## B.1.2 Puerto Peñasco

The City of Puerto Peñasco (population 60,000) is located in the state of Sonora on the shores of the Gulf of California about 380 km north of Hermosillo, the state capital city, see Figure B.1.1. Main industries are fishing and tourism. Figure B.1.2 shows part of the growing number of expensive condominium buildings along the Sandy Beach area of Puerto Peñasco.

The Puerto Peñasco fishing industry includes 12 seafood packing plants that produce over three thousand tons of foodstuffs per year, which is mostly exported to Arizona and California. Additionally, Puerto Peñasco is an important sports fishing destination.

Puerto Peñasco is located in an arid region known as the Sonoran Desert. Temperatures reach 40 degrees centigrade (105 degrees Fahrenheit) during the summer months. Lower temperatures in the 18 degrees centigrade range (65 degrees Fahrenheit) occur during the winter season. Annual average precipitation is approximately 200 mm (8 inches).



Figure B.1.2 Puerto Peñasco Sandy Beach Area

### B.1.2.1 Water Supply

According to information provided by its municipality, Puerto Peñasco obtains its water supply from eleven deep water wells (85 m (280 feet) to 200 m (656 feet) in depth) located within the Sonoyta River watershed. Annual groundwater recharge and extraction within this watershed are estimated at 136 millions cubic meters (35,904 million gallons) and 293 million cubic meters

(77,352 million gallons), respectively, which indicates an overexploitation of the groundwater resource.

Only eight of the eleven water wells are operational. Three of the eight water wells are located in the Ortiz Garza area 23 km (14.4 miles) from Puerto Peñasco. The other five are located in the John F. Kennedy water well field area about 45 km (28 miles) from Puerto Peñasco. Approximately 360 lps (31,104 m<sup>3</sup>/day, 8.21 MGD) are pumped out of both water well fields.

The municipality of Puerto Peñasco reports critical water loss along the water conveyance system due to leaks that originate from a nearly 40 year old 30" pipeline.

**Table B.1.2.1a Puerto Peñasco Water Supply and Demand Data (Liters per Second, lps)**

Water Wells Supply	Average Water Demand	Maximum Water Demand
360	280	600

The cost of water supply and wastewater management services are combined into a single charge. The water/wastewater service charge is based on the volume of water used. Appendix 1 shows the current approved tariff. It is noted that the minimum charge for domestic customers is 77.74 Mexican Pesos (\$7.15) per 20 m<sup>3</sup> or 3.89 Mexican Pesos (\$0.36) per cubic meter. Water users that use between 21 and 30 cubic meter pay the minimum charge plus 6.57 Mexican Pesos (\$0.60) per each cubic meter between 21 and 30 m<sup>3</sup>. The current tariff increases the water charge to a maximum of 8.12 Mexican Pesos (\$0.75) for water users that uses more than 51 m<sup>3</sup>. There are 14,422 registered water users connected to the municipal water supply system. About 13,380 water users are charges a fixed fee. There are 1,042 water meters (see Table B.1.2.1b). Table B.1.2.1c, shows that the uncollected water/wastewater bills account for about 20 percent of the water/wastewater charges.

**Table B.1.2.1b Puerto Peñasco Water Users Breakdown**

Type of Water User	Users Charged a Fixed Fee	Fee Based on Water Metered	%
Domestic	11,763	659	86
Commercial	844	248	8
Industrial	15	81	1
Tourism Related	758	54	6
Totals	13,380	1,042	100

**Table B.1.2.1c Water/Wastewater Bills Collected and Uncollected**

Year	Water/Wastewater Charges, Mexican Pesos	Collected, Mexican Pesos / %		Uncollected, Mexican Pesos / %	
2003	28,683,137.01	21,782,813.76	75.94	6,900,323.25	24.06
2004	31,019,946.49	25,334,093.38	81.67	5,685,853.11	18.33
2005	35,024,069.08	28,402,541.95	81.09	6,621,527.13	18.91
2006	45,047,589.51	35,674,073.53	79.19	9,373,515.98	20.81

### **B.1.1.2 Wastewater**

The Municipality of Puerto Peñasco estimates that 9,062 water users are connected to the wastewater management system. About 85%, 10%, 1.15% and 3.04% of the 9,062 connections correspond to domestic, commercial, industrial and tourism businesses, respectively. The sewerage system collects and transports approximately 240 lps (5.47 MGD). A 30" force main discharges the wastewater to two wastewater treatment facilities (see Figure B.1.1.2). One of them is an oxidation pond system operated by a private concessionaire, the Mayan Palace, a tourism development enterprise. The other is an activated sludge system operated by a group of tourism businesses. In both cases the treated effluent is used to irrigate golf courts and other green areas.

## **B.2 Proposed Actions**

The proposals presented to the United States Trade and Development Agency (USTDA) by the Municipalities of Guaymas and Puerto Peñasco entail obtaining U.S. technical assistance for feasibility studies that will investigate short- and long-term solutions to anticipated water supply shortages and wastewater management in accordance with established regulations. Both the CEA-Guaymas and the municipality of Puerto Peñasco proposals emphasize the need for the feasibility studies of desalination facilities as a means to ameliorate potential water supply shortages.

### **B.2.1 Water Supply Issues**

A review of the information provided by CEA-Guaymas and the municipality of Puerto Peñasco shows that current water supply operations at both communities involve considerable water losses. In both cases the water supply depends on aquifers that are being exploited beyond their safe yields. Both utilities operate water supply systems that are struggling to recover the cost of supplying water to customers who do not pay their water bills. Under these circumstances the priorities of the municipalities are to:

1. Investigate and assess technology for repairing pipeline water leaks. This may entail the replacement of pipeline and related appurtenances such as air release valves, blow off valves and hydrants.
2. Study and operate an automatic water supply system that relies on SCADA to avoid the inefficiency of the current manually controlled water supply system.
3. Devise an administrative mechanism for collecting the payment of water bills from all domestic, commercial and industrial customers.
4. Study the feasibility of increasing the water supply using desalination technology.

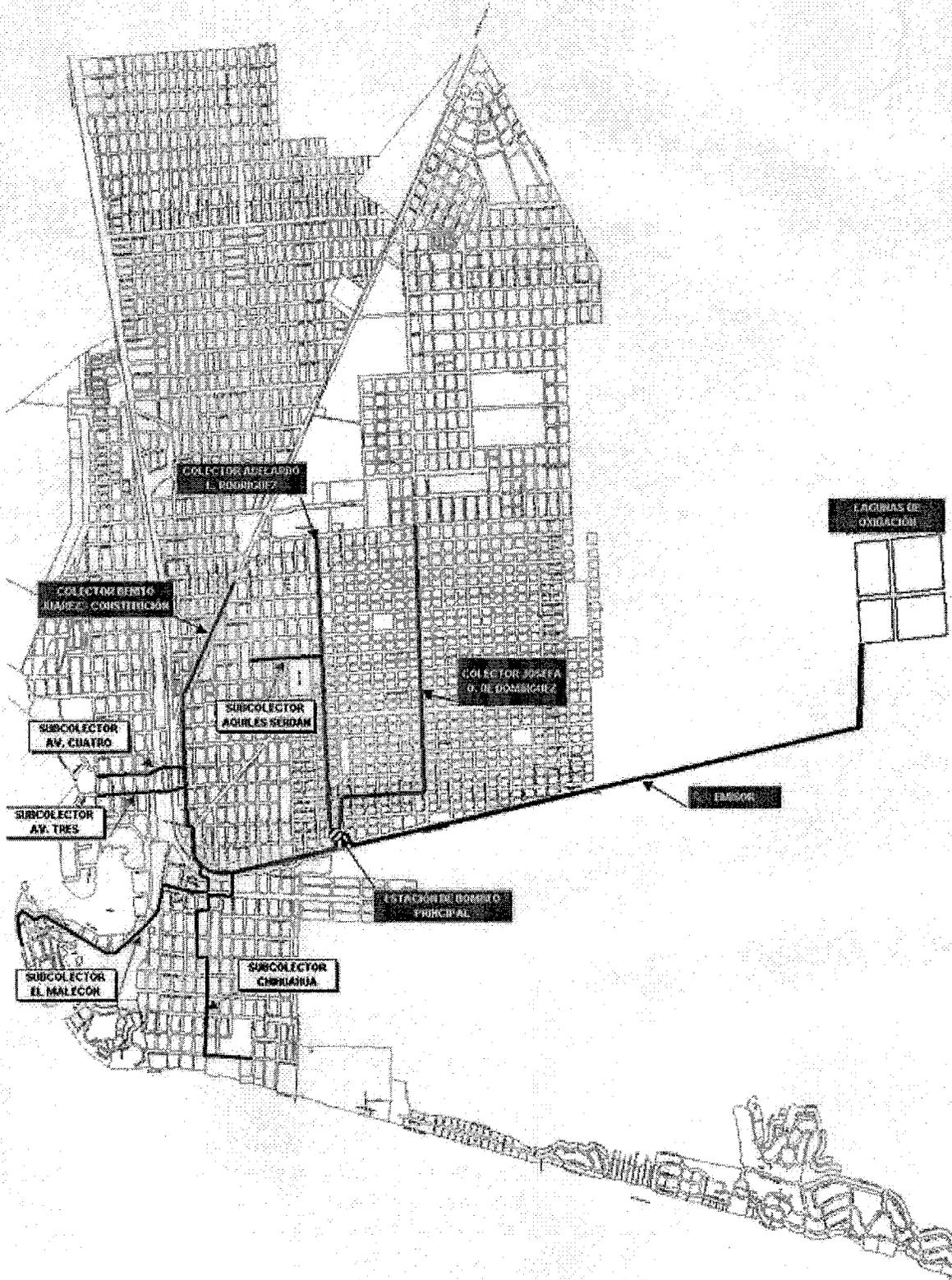


Figure B.1.1.2 Puerto Peñasco Wastewater Management System

### **B.2.2 Wastewater Management Issues**

Current Guaymas and Puerto Peñasco wastewater management systems collect and process approximately 60 percent of the wastewater produced in their respective communities. The wastewater management portion is estimated at 21% and 35% of the total water bill by the municipalities of Guaymas and Puerto Peñasco, respectively. Effluent water quality data confirms that improved pollutant removal capability at the existing wastewater treatment systems is necessary. The following issues are municipality priorities:

1. Assessing the possibility of increasing the number of wastewater customers.
2. Assessing whether the current wastewater management system is capable of meeting water quality treatment requirements for current and future wastewater flows.
3. Studying tertiary wastewater treatment systems for treated wastewater reuse. This appears to be necessary for increasing the availability of water for green area maintenance and irrigation.
4. Automating wastewater systems using SCADA.
5. Assessing whether the current wastewater management bill is sufficient to cover all wastewater management costs including O&M and replacement costs.

Studying water supply system leaks and devising the mechanism for an efficient collection of the water/wastewater bills does not require professional services and/or technology outside of what is available in Mexico. Similarly, the resolution of issues pertaining to wastewater management systems for compliance with Mexican regulations does not require professional expertise and technology that is not available in Mexico. Conversely, the feasibility study, design and implementation of desalination facilities and tertiary treatment systems, as well as the study and installation of water and water systems automation using SCADA would require the type of expertise provided by U.S. companies.

Justification for investing in desalination facilities requires ensuring that water losses are eliminated and that water/wastewater bills are paid by all customers. Otherwise the capital investment may not have the technical and financial support anticipated for the addition of seawater desalination assets.

### **B.3.1 Guaymas Priority with Regard to Technical Assistance**

CEA-Guaymas indicated that its priority is the feasibility study on upgrading and expanding its Supervisory Control and Data Acquisition (SCADA) System for the real time control and management of its water supply and wastewater management systems. The DM agrees that SCADA will provide CEA-Guaymas with the remotely monitored water supply and wastewater management operation needed for optimal service and minimization of potable water spills and wastewater management inefficiencies.

### **B.3.2 Puerto Peñasco Priority with Regard to Technical Assistance**

In Puerto Peñasco the water supply system relies on an overexploited aquifer. Economic growth will stagnate unless a new water source is added to the system. Because Puerto Peñasco is located in the Sonoran Desert and the study of additional sources of fresh water is not a practical option, seawater desalination is a priority.

## **C. PROJECT SPONSOR'S CAPABILITIES AND COMMITMENT**

CEA-Sonora, on behalf of CEA-Guaymas, and the municipality of Puerto Peñasco are the project sponsors. The municipality of Guaymas is working closely with CEA-Guaymas on all aspects related to the water and wastewater infrastructure. In fact, the municipality of Guaymas has been providing funds for improving and rehabilitating the water and wastewater network. One of its most important actions was completed in 2004 when, in a joint effort with CEA-Guaymas, the Municipality provided funds for installing a new wastewater outfall to discontinue discharging raw sewage to the Guaymas Bay.

### **C.1 Guaymas**

CEA-Guaymas is part of the "Comision Estatal de Agua del Estado de Sonora (www.ceasonora.gob.mx)" and, as such, a project carried out by CEA-Guaymas has the technical support of CEA-Sonora engineers and technicians with water and wastewater management related experience. CEA-Guaymas demonstrated a high interest in USTDA technical assistance for carrying out projects that may enhance the quality of its water supply service and wastewater management operation.

A meeting with Mr. Renato Ulloa Valdez, Vocal Ejecutivo de CEA-Sonora and the state official in charge of CEA-Sonora confirmed that CEA-Sonora is interested in USTDA technical assistance for the study of a SCADA system for the automation of the Guaymas water supply and wastewater management systems.

The DM was not able to meet with Mr. Antonio Astiazaran Gutierrez, the president of the municipality of Guaymas. However, the DM fieldwork was able to gather specific information on the interest, commitment and support that the key municipal decision maker will offer to the proposed study and project implementation (see Appendix 4). Moreover, discussions with CEA-Guaymas representatives who are in contact with Mr. Astiazaran indicate that he is interested in providing support that will lead to the modernization of the water supply management system.

### **C.2 Puerto Peñasco**

The municipality of Puerto Peñasco has retained an engineer who is dedicated to the study and implementation of desalination and wastewater management projects. Additionally, Puerto Peñasco has been working with the "Centro de Investigación Científica y de Educación Superior de Ensenada, CICESE" on an \$182,300 feasibility study to investigate seawater intakes and concentrate disposal facilities for a desalination plant in Puerto Peñasco. The CICESE study

started in September 2007 and is to be completed in the first quarter of 2008. The CICESE study also includes the assessment of the environmental impact of the concentrate management and disposal operation.

A meeting with Mr. Heriberto Renteria Sanchez, the municipal president of Puerto Peñasco, revealed that the municipality is aware that the current deficient water supply system is curtailing economic development in Puerto Peñasco. Mr. Renteria is interested in USTDA technical assistance and is "convinced" that seawater desalination is the only option for this desert community at this point in time. Mr. Renteria indicated full commitment to seeking funds for the implementation of the desalination project.

The municipality in Puerto Peñasco has created a committee to oversee all activities related to the study and implementation of the desalination project. The committee is composed of the Director of the Desalination Project Office, a representative of CICESE, a member of the Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento (OOMAPAS) and a representative from the association of Puerto Peñasco Developers. CICESE is a think tank organization with engineers and scientists of high professional reputation in Mexico. Accordingly, the Puerto Peñasco desalination project committee is composed of professionals with the technical capability to oversee the implementation of the proposed action.

## **D. IMPLEMENTATION FINANCING**

According to Fitch Ratings ([www.fitchratings.com](http://www.fitchratings.com)), a global rating agency providing independent assessment and credit opinion, Guaymas and Puerto Peñasco are rated AA and BBB, respectively. The Puerto Peñasco rating is adequate (see Appendix 2).

The DM contacted several organizations to gauge their potential interest in providing financial support to the municipal projects that may originate from USTDA technical assistance. These organizations include the Inter-American Development Bank (IADB), the World Bank (WB) and the Export-Import Bank of the United States (Ex-Im Bank). According to discussions with Mr. Juan Jose Gomez Lorenzo and Federico Basañes, the IADB Senior Official for Mexico water projects and the Chief of Infrastructure Projects, respectively, IADB is very interested in providing financial support for the Puerto Peñasco and Guaymas water sector projects. In fact, IADB representatives have already visited the Municipality of Puerto Peñasco as part of the FORTEM Program which is being carried out conjunctively with the Banco Nacional de Obras y Servicios Publicos (BANOBRAS).

Mr. Basañes, and his fellow IADB Bank officers are receptive to discussing the funding prospects of the projects' implementation phases that may result from USTDA technical assistance. The IADB is making plans to send a consultant to Puerto Peñasco to discuss the project with the municipal authorities.

The DM team attempted to discuss the scope of the DM with Mr. Gustavo Saltiel, the senior official of the World Bank focusing on the Mexico country program, but Mr. Saltiel was not available. As a result, the assessment of the WB's interest in the DM projects was not possible.

Mr. Sergio Rivera a Relationship Manager with the Ex-Im Bank discussed several avenues by which funds might be available for the implementation of the Puerto Peñasco project. He

indicated that the Engineering Multiplier Program is available to U.S. Firms that enter contractual agreements for the design and implementation phases of environmental projects such as the ones under consideration. The financial terms for Ex-Im Bank loans include a grace period of up to six months after the completion of the construction of the facility. This will benefit Design-Build and Operate contractors as repayment of the loan will not occur until after the facility is in operation and generating revenues.

The Ex-Im Bank also discussed the possibility of lending funds to the municipality of Puerto Peñasco, in the case that other sources did not provide complete financial support.

### **D.1 Guaymas**

CEA-Guaymas has been implementing water supply and wastewater related capital improvement projects with the financial support of CNA, CEA-Sonora and the municipality of Guaymas. Annual capital investment averaged \$7 million dollars from 2004-2007. CEA-Guaymas is currently requesting \$13 million dollars for water/wastewater related capital improvements (see Appendix 5). The 2008 planned work includes automation of the water supply management system. Additionally, the IADB has expressed interest in discussing the possibility of a loan for water and wastewater related projects with Guaymas. CEA-Sonora has indicated its interest in IADB financial support to expedite its commitment to improve of the water supply system in the municipality of Guaymas. The DM has discussed the Guaymas project with the IADB on several occasions, most recently on December 10, 2007, and can confirm the IADB'S interest in the referenced project. In fact, the IADB is planning a trip to Sonora to meet with Guaymas representatives.

### **D.2 Puerto Peñasco**

The Municipality of Puerto Peñasco is interested in IADB financial assistance and has begun discussing the possibility of expediting approval of a potential loan agreement with state and local decision makers. Mr. Heriberto Renteria Sanchez, the President of the Municipality Puerto Peñasco, indicated full support of USTDA technical assistance and an IADB loan for the desalination project. Appendix 3 shows the approval process followed by sovereign guaranteed public capital investment water projects in the State of Sonora.

## **E. U.S. EXPORT POTENTIAL**

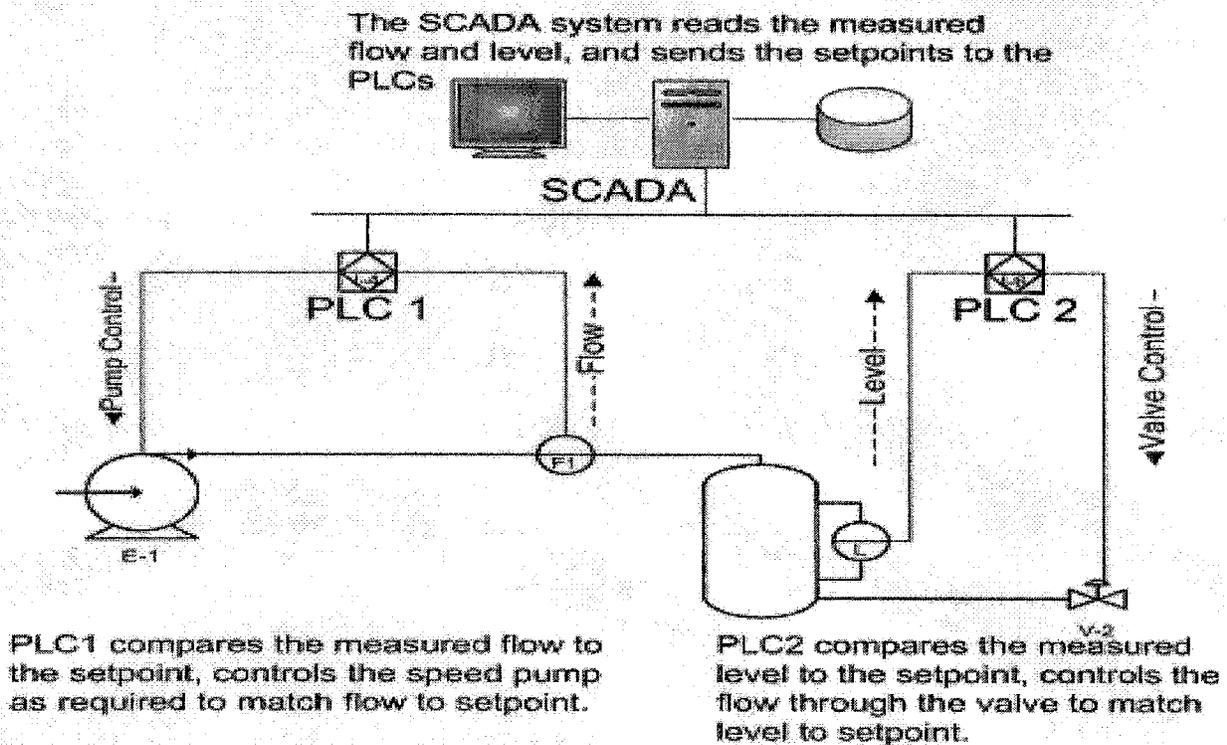
### **E.1 Guaymas Water and Wastewater Systems SCADA**

SCADA technology includes input-output signal hardware, controllers, interface devices and related communication software. SCADA allows the automatic monitoring of remote terminal units. In the case of the Guaymas SCADA, it will allow operators to modify water flow conditions at specific points (pumps, valves, and holding tanks) within the water supply and wastewater management systems using Programmable Logic Controllers (PLC). Figure E.1 shows a schematic of the SCADA system for a water supply application. Complete SCADA

systems may be acquired from a single supplier, but they are more frequently assembled from hardware and software components available from U.S. and European suppliers of industrial automation and information software. Table E.1 below list several U.S. suppliers of automation technology along with information on the main foreign competitors.

**Table E.1 Suppliers of Automation Technology**

SCADA Technology Supplier	Country
GE Enterprises Solutions	Charlottesville, Virginia
Honeywell	Morristown, New Jersey
Rockwell Automation	Milwaukee, Wisconsin
Wonderware	Lake Forest, California
ABB	Zurich, Switzerland
Citect	Sydney, Australia
Schneider Electric	Paris, France
Siemens AG	Berlin, Germany



**Figure E.1 Example of Water Supply SCADA**

### E.1.1 U.S. Export Potential

As indicated in Section B, CEA-Guaymas is interested in upgrading and expanding its SCADA system for the automation of both potable water and wastewater management systems. Currently 17 of its 24 water wells, half of its potable water conveyance system, two of its six

main pump stations, 12 of its 16 holding tanks and its entire potable distribution network are manually operated. The entire wastewater management system is manually operated. CEA-Guaymas estimates the capital investment on the Guaymas SCADA and related data transmission system at \$790,902 (see Appendix 5). The DM estimates the export potential associated with the Guaymas SCADA at about 60% of the capital investment or \$500,000. The estimated cost for the USTDA grant to assist with the feasibility study is \$176,400. The planning level US Exports/USTDA Technical Assistance ratio is estimated at about 3.

## **E.2 Puerto Peñasco Desalination Facility**

The Project Sponsor estimates the size of the Puerto Peñasco water desalination project at 500 lps (11.41 MGD). The DM estimates the planning level cost for the Puerto Peñasco desalination reverse osmosis construction at about \$19.843 million, see Appendix 6. The capital cost of saline water conditioning for potable use is based on the assumption that Ultra Filtration/Reverse Osmosis (UF/RO) treatment will be selected. The capital cost estimated by the DM does not include the cost of the intake and associated piping. The capital cost for desalination systems, including intake and reject infrastructure, typically ranges between three and nine million dollars per one MGD depending on the size of the facility. Thus, the total capital cost may exceed \$35 million dollars. A breakdown of the capital investment in terms of the desalination system equipment is provided in Appendix 6.

### **E.2.1 U.S. Export Potential**

U.S. technology export potential has been estimated based on the assumption that US export will not be necessary for the conveyance and distribution of desalinated potable water. Thus, only the desalination treatment facility, saline water intake and instrumentation and controls will generate U.S. exports. Based on the information provided in Appendix 6, the DM estimates that the potential U.S. exports in engineering services for desalination system design and technology needed for saline water conditioning for potable use may range between \$15 and \$20 million dollars (\$17.5 million dollars) or about 75% of the total capital investment. The estimated cost for the USTDA grant to assist with the feasibility study is \$369,325. The planning level US Exports/USTDA Technical Assistance ratio is estimated at 47.

AJGB International, Inc. has discussed this type of project with several U.S. consultants and manufacturers of water desalination technology. Our preliminary assessment indicates that several US companies would be interested in participating in seawater desalination projects in Puerto Peñasco. Six of the seven companies contacted were definitely interested in the project. The companies contacted are the following:

- Black and Veatch, Kansas City, MO
- Greely and Hansen , Phoenix, AZ
- Hansen & Sawyer, Miami, FL
- HDR, Omaha, NE
- Louis Berger, Washington, D.C.
- R. W Beck, Seattle, WA
- TetraTech, Kansas City, MO

The DM contacted several U.S. manufacturers of membrane technology (UF and RO). Koch Membranes, one of the larger manufacturers of UF/RO membranes, indicated interest in the referenced projects. U.S. engineering services and technology needed for the implementation of desalination projects are readily available. Potential U.S. suppliers of water desalination technology and equipment are listed in Table E.2.1 below:

**Table E.2.1 Desalination Technology Providers**

<b>Technology</b>	<b>Suppliers</b>
Water Desalination and Treatment Equipment, Membranes	Aquatech International Corp, Smith and Loveless, Waterlink, Savern Trent Services, The Dow Chemical Company, Filtronics, Inc., GE Infrastructure, Koch Membrane Systems, Inc.
Pump and Controls	Fairbanks Morse Pumps, Gorman Rupp, Smith and Loveless.
Cartridge Filters and Membranes Pretreatment Systems	F.B. Leopold Co., Inc., JWC Environmental, Pall Corporation, Smith and Loveless, Inc. Toray Membrane America.
Desalination Systems	Membrane System Corporation, Pure Aqua.

The DM assumes that the municipality of Puerto Peñasco would be prepared to invest a separate amount in the improvement and expansion of the storage, conveyance and distribution system.

## **F. FOREIGN COMPETITION AND MARKET ENTRY ISSUES**

European consulting firms and water companies, specifically Union Fenosa from Spain, Degremont from France and Biwater from the United Kingdom are strong competitors in Mexican water management practices and technologies. Degremont of France is a network of manufacturers of water related equipment and is currently operating facilities in Puebla and San Luis Potosi, Mexico, while Union Fenosa operates the Cabo San Lucas seawater desalination facility.

The DM interviews with representatives of the Municipalities of Puerto Peñasco clearly revealed that the cost of the water management operation provided by current European contractors is an important matter. Notably, Puerto Peñasco indicated that it would not consider proposals for turn-key projects from private water systems management contractors. The acceptable desalination projects development plan is summarized as follows:

1. USTDA technical assistance for FS
2. IADB/BANOBRAS sovereign guaranteed loan for the implementation of a design-build project that will be operated by the design-build contractor (DBC) during a period of approximately two years, while personnel from OOMAPAS receives on-hand training for the permanent operation of the facility.

Under this project development plan the municipalities will maintain ownership of the facilities at all times and the DBC will be responsible for the design and construction of a facility that delivers the water quantity and quality specified in the design-build contract. The DBC will demonstrate the facility's compliance with contractual requirements during the two-year

operation phase that serves the purpose of a "hands-on" training period for OOMAPAS staff. The project implementation plan presupposes that municipalities will engage the DBC contractors via a long-term on-call maintenance agreement that will provide the technical support needed for the uninterrupted operation of the facilities.

U.S. companies may offer desalination equipment and water systems information technology not readily available from other countries. In fact, one of the main advantages of U.S. firms and manufacturers is the extensive and readily available IT options for optimizing the water system operation.

Given the traditionally strong competitive commercial efforts of the European community in Mexico, there may be European foreign competition interested in participating in the development of the Puerto Peñasco desalination facility. Therefore, the competitive nature of the project is considered high and, as such, incentives for the participation of U.S. companies in the economic development of Mexico are necessary to ensure that U. S. water companies remain a strong presence in Mexico.

## **G. DEVELOPMENTAL IMPACT**

As discussed in Section B Background, the economic wellbeing of two important tourist destinations are threatened by a condition associated with overexploitation of limited groundwater resources. As documented earlier in this report, the proposals for technical assistance presented by the municipalities illustrate a dismal water supply situation that, if left unattended, could render two aquifers useless. USTDA technical assistance will provide scientific and engineering expertise to make decisions regarding the course of action needed to meet future water demand in these two growing tourist destinations. Furthermore, automation of the current water supply system at Guaymas is the precursor of its optimization. The siting, design and construction of a water desalination facility at Puerto Peñasco will avoid continued overexploitation of aquifers that have already shown the signs of permanent subsidence.

USTDA technical assistance is geared toward providing safe technology for water supply systems that in turn improve economic and environmental conditions, as well as enhance the quality of life of residence and business alike. In addition, USTDA technical assistance offers positive developmental impacts related to human capacity building. The following is a summary of the anticipated developmental impact of the proposed projects in Guaymas and Puerto Peñasco.

### **G.1 Infrastructure**

The Guaymas SCADA and Puerto Peñasco seawater desalination projects feature the introduction of technology not common in the area. Smaller SCADA and desalination projects (5 lps, 0.11 MGD) have been constructed or are being planned in Guaymas and Puerto Peñasco. None of them, however, have fully capitalized on the economies of scale impact that larger projects such as the ones that could be implemented with USTDA technical assistance.

The water supply systems in both communities are reaching dire conditions due to the lack of a reliable water sources. Consequently, the proposed water supply infrastructure is imperative for

both communities. Additionally, in the case of Puerto Peñasco, the proposed infrastructure will prevent full dependency on groundwater resources being exploited beyond their safe yield. Thus, the proposed actions will promote restoration of valuable aquifers and, as such, produce inherent positive environmental impacts.

## **G.2 Human Capacity Building**

Planning, design, construction and operation of SCADA in Guaymas and seawater desalination projects in Puerto Peñasco will certainly create technological knowledge and expertise that is not currently available in these communities. Several professionals will be needed for the planning aspects of the projects. Additionally, local construction companies and specialty contractors such electrical and electromechanical contractors will participate in design and related construction activities. The Puerto Peñasco OOMAPAS is already planning the hiring of several engineers and technicians that will be delegated to working with the desalination facility contractors. Through these projects, local professionals and technicians will gain first hand knowledge and experience in installation and operation of SCADA and seawater desalination equipment. Moreover, precarious water supply groundwater sources in other Sonoran Desert communities and elsewhere in Mexico will provide opportunities for trained professionals to put their expertise into practice in other similar projects.

## **G.3 Technology Transfer and Productivity Improvements**

The proposed projects are classical technology transfer examples that offer multiple benefits to the sponsor's communities. As discussed above, the projects will provide the technological means to improve water supply shortages that have become a drawback to economic development. An improvement in water supply will aid business growth and should enhance productivity especially in the seafood packing industrial sector, which requires water for the processing of their products.

## **G.4 Market-Oriented Reforms**

As discussed in Section F, implementation of the Puerto Peñasco project will feature a Design-Build project delivery system that is not customary in the project area. This system is used to minimize the project risk to the municipalities (owners) and to reduce the delivery schedule by overlapping the Design Phase and Construction Phase of the projects. In this way, the projects will be implemented using a delivery system that fully benefits from increased accountability under a market-oriented contractor selection process.

## H. IMPACT ON THE ENVIRONMENT

Implementation of these projects provides substantial positive socioeconomic and environmental impacts. A reduction in groundwater pumping will contribute to halting the loss of an irreplaceable resource.

The implementation of the desalination projects could generate temporary water quality impacts due to the installation of equipment, instrumentation and construction of related infrastructure. The proposed desalination facility requires the intake of saline water. About half of the intake is discharged in the form of a highly concentrated liquid waste "reject stream" that may contain all or some of the following constituents: high salt concentrations, chemicals used during defouling of plant equipment and pretreatment and toxic metals. Liquid wastes are generally discharged directly into the ocean, or dried out and disposed of in a landfill. Desalination plants also produce a small amount of solid waste (i.e., spent pretreatment filters and solid particles that are filtered out in the pretreatment process).

In addition, desalination systems require substantial amounts of energy, about 7,500 kWh/1MLD (28,383 kWh/1MGD). Accordingly, these types of projects require an environmental impact study to identify, investigate, control, mitigate and recommend management procedures in accordance with environmental quality standards. Thus, it is anticipated that an environmental impact study in compliance with the "Secretaria de Medio Ambiente y Recursos Naturales, SEMARNAT" will be conducted and approved for these projects. Nonetheless, the environmental impacts associated with the implementation phase of the project could be avoided or mitigated using standard construction management and pollution prevention techniques.

The project implementation should not have negative impacts on river or sea water uses. Other uses such as commercial fishing and industrial activities should remain unobstructed throughout the life of the project.

## I. IMPACT ON U.S. LABOR

The prospective technical assistance is for feasibility studies and preparation of contracting documents for the implementation of SCADA and saline water desalination systems. It does not include direct assistance in establishing or expanding production of any commodity in Mexico. In fact, the prospective USTDA technical assistance for the development of SCADA and desalination facilities in Mexico has the objective of promoting U.S. made SCADA and saline water desalination equipment and services, which, in turn, aims at creating new demands for U.S. made equipment and services.

This new demand for U.S. equipment and services would have a net positive impact on the U.S. trade balance, as expansion of the current volume of desalination equipment and related export would most likely increase employment in the U.S.

Technical personnel from the U.S. would be required to travel to Mexico in order to provide technical assistance for the projects. However, it does not appear that U.S. based

manufacturers or service providers would need to relocate outside the U.S. for an extended period of time to meet the demands created by the proposed USTDA technical assistance.

The DM considers that USTDA funding of the prospective technical assistance will not contradict any of the clauses of the Foreign Operations, Export Financing and Related Program Appropriations legislation.

## J. QUALIFICATIONS

It is proposed that the FS be conducted by an expert U.S. company with ample experience in the field of SCADA and the siting, study, design and implementation of saline water desalination facilities. Therefore, it is inferred that the companies selected for work on the Guaymas and Puerto Peñasco projects will have demonstrated qualifications, experience and the required capability to carry out these projects. The suggested selection criteria for the firm and team that will execute the USTDA grant assistance is the following:

1. Firms' specific experience related to the assignment: 25 points maximum
  - 1.1 Overall experience of the firm: 15 points
  - 1.2 Overseas experience of the firm: 10 points
2. Adequacy of proposed work plan and methodology in responding to the TOR: 25 points maximum
  - 2.1 Knowledge of proposed work and understanding of service: 10 points
  - 2.2 Appropriateness of proposed methodology and workplan: 15 points
3. Qualifications and competence of the key staff for the assignment: 25 points maximum
  - 3.1 Experience of Team Leader in similar projects: 5 points
  - 3.2 Experience of Project Engineer in similar projects: 5 points
  - 3.3 Experience of Mechanical / Communication Engineer in similar projects: 5 points
  - 3.4 Experience of Electrical Engineer / IT/ in similar projects: 5 points
  - 3.5 Experience of Economist / Financial Analyst in similar projects: 5 points
4. Past performance: 25 points maximum
  - 4.1 Six relevant and verifiable projects: 25 points
  - 4.2 Five relevant and verifiable projects: 20 points
  - 4.3 Four relevant and verifiable projects: 15 points
  - 4.4 Three relevant and verifiable projects: 10 points
  - 4.5 Two relevant and verifiable projects: 5 points

## K. JUSTIFICATION

The DM finds grounds for the USTDA grant assistance for the FS of the Guaymas SCADA and Puerto Peñasco saline water desalination projects for the following reasons:

1. The implementation phases of the proposed actions are likely candidates for receiving implementation financing from the IADB, which facilitates the participation of U.S. companies. Furthermore, the size of the yearly influx of tourists to each community provides a potential source of revenue that would likely offset the capital investment and annual O&M of the projects. For example, The Association of Puerto Peñasco Developers reports that over a million tourists visit Puerto Peñasco annually and if each tourist were to pay a \$10 dollars stay fee, the capital investment and O&M of the desalination facility would be financed.
2. The projects have a positive developmental impact on long-term socioeconomic development. The projects will contribute to the prevention of irreparable damage to the groundwater environment in the study areas.
3. The capital investment needed for the acquisition of technology manufactured in the U.S. represents an opportunity for US product sales and services. Although the planning level US Exports/USTDA Technical Assistance ratio for the construction of the project is estimated at only 3 and 47 for Guaymas and Puerto Peñasco, respectively, there is a potential for increasing U.S. exports during the implementation due to O&M requirements. In fact, membrane replacement will be a considerable recurrent expenditure, and is currently estimated at nearly 1 million dollars per year.
4. The projects are the sponsors' developmental priority as they provide the technology needed to meet their functional responsibilities in their communities.
5. The projects promote U.S. exports and increase labor occupation and sustainable economic growth in the U.S. and Mexico.
6. USTDA grant assistance is likely to generate support for U.S. companies that face strong competition from European Union companies that receive subsidies and other aid from their governments.
7. There are no indications that the project sponsor will deviate from an openly contested procurement process that provides equal opportunity to U.S. companies.

USTDA funding would prevent foreign government from providing grant assistance for the development of the projects. It would also strengthen the U.S. position as Mexico's top economic partner. Moreover, implementation of the project would stimulate economic growth and foreign trade beneficial to both the U.S. and Mexico. It would also contribute and support the emergence and consolidation of the global economy in which the U.S. is a major participant.

## L. TERMS OF REFERENCE

The objective of the prospective technical assistance is to give support to a feasibility study requested by the municipalities of Guaymas and Puerto Peñasco to investigate the viability of SCADA technology and seawater water desalination.

The primary goal is to provide technical guidance for assessing and confirming the technical, financial and economic attractiveness of developing the proposed action. The technical assistance will provide the foundation for the expeditious implementation of a water desalination facility using a Design-Build project development plan. Appendices 7 and 9 contain the proposed Terms of Reference for the requested feasibility studies. Appendices 8 and 10 present a detailed budget and task breakdown for the feasibility studies. The DM estimates that the completion of the FS will take approximately three (3) months and seven (7) months for the Guaymas SCADA and the Puerto Peñasco desalination project, respectively.

## M. RECOMMENDATIONS

The DM assessment of the proposed actions indicates that the projects are important to the U.S. commercial policies. They also serve as significant marketing avenues for SCADA, desalination and tertiary treatment technologies manufactured in the U.S. These types of technologies are rapidly becoming a preferred option throughout the world due to water supply shortages and environmental constraints.

Nonetheless USTDA support for the Guaymas technical assistance cannot be recommended due to the limited size of U.S. export potential. However, support for USTDA funding of the Puerto Peñasco FS is justified for the following reasons:

- The Project Sponsor offers logistical and technical support for the execution of the FS including cost sharing for water quality laboratory work, topography, and geotechnical surveys including seawater intake feasibility assessments;
- The Project Sponsor offers technical personnel, local transportation and office space for logistical support;
- The Project Sponsor indicates its intention to proceed with the project implementation in terms acceptable to U.S. companies providing technology and services for the implementation of Design-Build projects;
- The Puerto Peñasco project represents a potentially significant commercial transaction in terms of capital investment and the long-term export potential needed for its expansion. Additionally, there is a recurrent revenue element due to membrane replacement and maintenance activities.

In addition, as discussed in Section E, U.S. manufacturers of desalination technology technologies are facing strong competition from Canadian, European and Japanese companies worldwide. USTDA technical assistance offers a significant opportunity for U.S. companies to exert their competitive presence in Mexico and the Latin America region which will help provide

a future competitive advantage and business opportunities. Accordingly, USTDA technical assistance addresses a relatively important business element as it counteracts marketing efforts of foreign companies in Mexico and Latin America. Also, the project will offer the opportunity to demonstrate the capability of U.S. water desalination technologies to support their cost-effectiveness.

Consequently, the DM recommends supporting the technical assistance (FS) requested by the municipality of Puerto Peñasco to investigate the technical, financial and economic merits of the Puerto Peñasco desalination facility.

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 federicob@iadb.org

YuJung.Chang@hdrinc.com

**Louis Berger**

Mr. Carlos Marcenaro, Vice-President  
2445 M Street, NW  
Washington, D.C. 20037  
Ph: 202-331-7775 / 202-912-0200  
Cmarcenaro@louisberger.com

**R.W. Beck**

Mr. R. Alan Bushley, Principal  
1001 Fourth Ave., Suite 2500  
Seattle, WA 98154  
Ph: 206-695-4575  
rbushley@rwbeck.com

**TetraTech**

Mr. Rick Wilson, Vice-President  
415 Oak St., Kansas City, MO 64106  
Ph: 816-412-1932 / 913-549-3876  
Richard.wilson@tetrattech.com

Mr. Sergio Urrea Molina

Especialista Sectorial  
Avenida Horacio No. 1855 – 6to Piso  
Colonia Morales – Polanco  
C.P. 11510, Mexico, D.F.  
Ph: 011 – 52-55-9138-6217  
SergioU@iadb.org

**World Bank**

Mr. Gustavo Saltiel  
Senior Water Sector Official for Mexico  
1816 H Street, N.W.  
Washington, D.C. 20433  
Ph: 202-473-2008  
GSaltiel@worldbank.org

**Ex-Im Bank**

Mr. Sergio Rivera, Relationship Manager  
811 Vermont Ave.  
Washington, D.C. 20571  
Ph: 202 565 3215  
Sergio.Rivera@exim.gov

**Appendix 1 Water/Wastewater Service Tariff****LOCALIDAD GUAYMAS, SONORA**

1. Con respecto a los usuarios con medidores hasta agosto del 2007 se cuenta 33,571 tomas domiciliarias de las cuales 11,277 tiene medidor, es decir un 33.59%

2. Con lo de las tarifas aqui te envio lo que marca la ley del presente año:

Artículo 39.- Las cuotas por pago de los servicios de agua potable y alcantarillado, que se prestan a los usuarios de estos servicios en la localidad del Municipio de Guaymas, Sonora, son las siguientes:

**A: PARA USO DOMESTICO**  
**RANGOS DE CONSUMOS VALOR**  
0 Hasta 10 M3 38.50 Cuota Mínima  
11 Hasta 20 M3 3.60 Por M3  
21 Hasta 30 M3 4.00 Por M3  
31 Hasta 40 M3 5.80 Por M3  
41 Hasta 70 M3 8.50 Por M3  
71 EN ADELANTE 15.00 Por M3

**B: PARA USO COMERCIAL,**  
**HOTELES MOTELES, CONDOMINIOS, TRAILER PARK, MARINAS (SERVICIOS A**  
**GOBIERNOS, ORGANIZACIONES PÚBLICAS Y PRIVADAS).**  
**RANGOS DE CONSUMOS VALOR**  
0 Hasta 20 M3 175.27 Cuota Mínima  
21 Hasta 30 M3 11.70 Por M3  
31 Hasta 40 M3 12.49 Por M3  
41 Hasta 70 M3 13.79 Por M3  
71 Hasta 200 M3 20.02 Por M3  
201 EN ADELANTE 21.59 Por M3

**C: TARIFA ESPECIAL TIPO A**  
**(INDUSTRIA PESQUERA)**  
**RANGOS DE CONSUMOS VALOR**  
0 Hasta 20 M3 160.03 Cuota Mínima  
21 Hasta 30 M3 10.68 Por M3  
31 Hasta 40 M3 11.40 Por M3  
41 Hasta 70 M3 12.59 Por M3  
71 Hasta 200 M3 16.68 Por M3  
201 En Adelante 18.00 Por M3

## LOCALIDAD PUERTO PEÑASCO, SONORA

## TARIFAS 2007

DOMESTICO		AUMENTO 2007			TARIFA MINIMA EN METROS	
RANGOS	TARIFA 2006	%	IMPORTE	TOTAL	2006	2007
0 - 20	\$ 77.74	15%	\$ 11.66	\$ 89.40	\$ 3.89	\$ 4.47
21 - 30	\$ 5.72	15%	\$ 0.86	\$ 6.57		
31 - 50	\$ 6.21	15%	\$ 0.93	\$ 7.14		
51 EN ADELANTE	\$ 7.06	15%	\$ 1.06	\$ 8.12		
R. TURISTICO		AUMENTO 2007			TARIFA MINIMA EN METROS	
RANGOS		%	IMPORTE	TOTAL	2006	2007
0 - 20	\$ 226.36	12%	\$ 27.16	\$ 253.52	\$ 11.32	\$ 12.68
21 - 30	\$ 9.00	12%	\$ 1.08	\$ 10.08		
31 - 50	\$ 9.74	12%	\$ 1.17	\$ 10.91		
51 - 100	\$ 10.15	12%	\$ 1.22	\$ 11.37		
101 - 200	\$ 10.78	12%	\$ 1.29	\$ 12.07		
202 EN ADELANTE	\$ 11.21	12%	\$ 1.34	\$ 12.55		
COMERCIAL		AUMENTO 2007			TARIFA MINIMA EN METROS	
RANGOS		%	IMPORTE	TOTAL	2006	2007
0 - 20	\$ 175.74	12%	\$ 21.09	\$ 196.83	\$ 8.79	\$ 9.84
21 - 30	\$ 8.30	12%	\$ 1.00	\$ 9.30		
31 - 50	\$ 8.89	12%	\$ 1.07	\$ 9.96		
51 - 100	\$ 9.48	12%	\$ 1.14	\$ 10.62		
101 - 200	\$ 9.67	12%	\$ 1.16	\$ 10.83		
202 EN ADELANTE	\$ 9.88	12%	\$ 1.19	\$ 11.06		
INDUSTRIAL		AUMENTO 2007			TARIFA MINIMA EN METROS	
RANGOS		%	IMPORTE	TOTAL	2006	2007
0 - 20	\$ 249.64	12%	\$ 29.96	\$ 279.60	\$ 12.48	\$ 13.98
21 - 30	\$ 10.05	12%	\$ 1.21	\$ 11.25		
31 - 50	\$ 10.99	12%	\$ 1.32	\$ 12.30		
51 - 100	\$ 11.43	12%	\$ 1.37	\$ 12.80		
101 - 200	\$ 12.05	12%	\$ 1.45	\$ 13.50		
202 EN ADELANTE	\$ 12.27	12%	\$ 1.47	\$ 13.74		

TARIFAS 2008				
DOMESTICO - MEDIDO				
RANGOS	TARIFA 2008			
0 - 10	\$ 44.70			
11 - 20	\$ 6.57			
21 - 30	\$ 7.14			
31 - 40	\$ 7.52			
41 - 50	\$ 8.02			
51 - 100	\$ 8.52			
101 - 200	\$ 8.52			
201 - 500	\$ 10.52			
501 EN ADELANTE	\$ 11.52			
DOMESTICO				
RANGOS	TARIFA 2007	PORCENTAJE	AUMENTO	TARIFA 2008
0 - 20	59.40	10%	0.94	\$ 60.34
21 - 30	6.57	10%	0.66	\$ 7.23
31 - 30	7.14	10%	0.71	\$ 7.86
31 EN ADELANTE	8.12	10%	0.81	\$ 8.93
R. TURISTICO				
RANGOS	TARIFA 2007	PORCENTAJE	AUMENTO	TARIFA 2008
0 - 20	253.52	10%	25.35	278.87
21 - 30	10.08	10%	1.01	11.09
31 - 40	10.91	10%	1.09	12.00
41 - 100	11.37	10%	1.14	12.51
101 - 200	13.07	10%	1.31	14.38
201 EN ADELANTE	17.55	10%	1.76	19.31
COMERCIAL				
RANGOS	TARIFA 2007		RANGOS	TARIFA 2008
0 - 20	106.63		0 - 10	\$ 98.42
21 - 30	9.35		11 - 20	\$ 10.34
31 - 40	9.96		21 - 30	\$ 10.64
41 - 100	10.62		31 - 40	\$ 11.34
101 - 200	10.83		41 - 50	\$ 11.84
201 EN ADELANTE	11.06		51 - 100	\$ 12.34
			101 - 200	\$ 12.84
			201 - 500	\$ 13.34
			501 EN ADELANTE	\$ 13.84
INDUSTRIAL				
RANGOS	TARIFA 2007	PORCENTAJE	AUMENTO	TARIFA 2008
0 - 20	270.60	10%	27.06	307.66
21 - 30	11.25	10%	1.13	12.38
31 - 40	12.16	10%	1.23	13.39
41 - 100	12.80	10%	1.28	14.08
101 - 200	13.50	10%	1.35	14.85
201 EN ADELANTE	13.74	10%	1.37	15.12

## Appendix 2 Fitch Ratings

# Fitch Ratings

Av. San Pedro 502 Pte.  
Carre. Mex. a L. Peñasco 81201  
T. 52 5256 7179 F. 52 5270 440X

Shel. Indust. And. Base. Av. No. 18 Pte. 1  
Puebla, C. 71250  
T. 52 2222 6555 F. 52 2222 7322

Noviembre 13, 2007

## MUNICIPIO DE PUERTO PEÑASCO, SONORA

### TESORERÍA MUNICIPAL

Bvld. Benito Juárez y Freemont  
Ccl. Centro  
CP 83550 Puerto Peñasco, Son.

A/cn. Ocean. Federico López Reyes  
Tesorero Municipal

REF: Calificación a la Calidad  
Crediticia del Municipio  
de Puerto Peñasco, Son.

Con referencia a la calificación asignada por esta Institución Calificadora a la calidad crediticia del Municipio de Puerto Peñasco, Sonora, nos permitimos comunicarles que de acuerdo con el análisis que hemos venido realizando de la información financiera y de operación que nos fue proporcionada, Fitch Ratings ha determinado ratificar la calificación de **BBB(mex)** 'Triple B', en la escala nacional con perspectiva estable. El significado de la calificación es como sigue:

#### Deuda Pública

##### Calidad Crediticia, Escala Doméstica.

**Calificación:** **BBB(mex):** Adecuada calidad crediticia. Agrupa a entidades, emisores o emisiones con una adecuada calidad crediticia respecto a otras del país. Sin embargo, cambios en las circunstancias o condiciones económicas, tienen una mayor probabilidad de afectar la capacidad de pago oportuno que para obligaciones financieras calificadas con categorías superiores.

**Vigencia:** Hasta el 21 de septiembre de 2008  
No obstante, Fitch México, S.A. de C.V. se reserva el derecho de modificar la calificación asignada en cualesquier tiempo, por la que refleje adecuadamente la calidad crediticia de la misma. Asimismo, cuando la entidad contemple obtener un nuevo financiamiento, la carta de calificación deberá ser actualizada o estar fechada con al menos 30 días anteriores a la operación.

**Fundamentos:** Ver Anexo I

Para propósitos de referencia, la calificación del Gobierno Federal por su deuda en pesos, en la escala doméstica, es de AAA(mex).

### **Appendix 3 Sub-sovereign Guaranteed Loan Approval Process for Water Projects in Puerto Peñasco**

Below is the list of approvals required for sovereign guaranteed loan for public investment water projects in order of occurrence:

1. Approval by the President of the Municipality
2. Approval by OOMAPAS Council
3. Approval by a Government of the State of Sonora Committee composed of:
  - A CONAGUA Delegate
  - CEA Delegate
  - President of the Municipality
4. Approval by the Municipal Council
5. Approval by the State Council

**Appendix 4 Guaymas Municipality USTDA Assistance Support Letter**



21 de Noviembre del 2007

U.S. Trade and Development Agency  
1000 Wilson Boulevard, Suite 1600  
Arlington, VA 22209-2131

Atención: **Mr. Paul Marin, Acting Regional Director**  
**Mr. Keith Eischeid, Country Manager**

Estimados Señores:

Nos es muy grato dirigirnos a ustedes para hacerles saber sobre el gran interés que el Municipio de Guaymas tiene en el apoyo técnico que en nombre de este Municipio la Comisión Estatal del Agua (CEA-Sonora) ha solicitado a su institución. El Municipio tiene las mejores intenciones de ayudar a la concretización del estudio de factibilidad y la implementación de los proyectos que resulten de este. Para este fin el municipio respalda a CEA en lo relacionado a la adquisición del financiamiento y otros aspectos ligados con la puesta en marcha de las obras.

Estos proyectos servirán de ejemplo de acciones que generan impactos positivos que benefician a nuestra comunidad, promueven intercambio comercial, transferencia de tecnología y avances en el desarrollo de nuestros técnicos.

Quedamos a sus órdenes y por favor no duden en contactarme si hubiese algo en lo que les podamos ser de apoyo para la pronta ejecución de la referida asistencia técnica.

Me es muy grato suscribirme,

AVE. SERDÁN ENTRE CALLE 22 Y 23. C.P. 85400, COL. CENTRO  
TELS. 01 622 22 4 00 31 y 4 04 00  
GUAYMAS, SONORA, MÉXICO.



[www.guaymas.gob.mx](http://www.guaymas.gob.mx)

**Appendix 5 Guaymas SCADA Upgrade and Expansion Capital Cost**

COMISIÓN ESTATAL DEL AGUA  
Unidad Operativa Guaymas

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7 / Diciembre / 2007

# Proyecto para la Automatización del Sistema de Agua en Guaymas Sonora México.

**CONTENIDO:****I. DESCRIPCIÓN DEL SISTEMA.****1. SUMINISTRO DE AGUA POTABLE.**

- 1.1 Captaciones.
  - 1.1.1 Localización.
  - 1.1.2 Fuentes.
  - 1.1.3 Requerimientos de automatización de pozos.
- 1.2 Conducciones.
  - 1.2.1 Localización
  - 1.2.2 Líneas principales de conducción.
  - 1.2.3 Requerimientos de automatización de líneas principales de conducción.
- 1.3 Rebombes de agua.
  - 1.3.1 Localización.
  - 1.3.2 Rebombes de agua potable.
  - 1.3.3 Requerimientos de automatización en rebombes.
- 1.4 Tanques reguladores.
  - 1.4.1 Localización.
  - 1.4.2 Tanques reguladores.
  - 1.4.3 Requerimientos de automatización en tanques reguladores.
- 1.5 Red de distribución. Proyecto de control de sectores hidrométricos.
  - 1.5.1 Localización de estaciones para control de presión y flujo en la red.
  - 1.5.2 Estaciones para control de presión y flujo en la red.
  - 1.5.3 Requerimientos para automatización de estaciones para control de presión y flujo en la red.

**2. DESALOJO DE AGUAS RESIDUALES.**

- 2.1 Cárcamos de bombeo.
  - 2.1.1 Localización.
  - 2.1.2 Cárcamos.
  - 2.1.3 Requerimientos para automatización de cárcamos.

## **II. PRESUPUESTO PARA AUTOMATIZACIÓN.**

- 3.1 Pozos de agua potable
- 3.2 Líneas principales de conducción.
- 3.3 Rebombes de agua.
- 3.4 Tanques reguladores.
- 3.5 Estaciones para control de presión y flujo en la red.
- 3.6 Cárcamos para bombeo de aguas residuales.
- 3.7 Resumen de presupuestos.

## **III. ANEXOS.**

- 4.1 Red de drenaje.
- 4.2 Lagunas de oxidación.
- 4.3 Fotos del sistema actual SCADA.

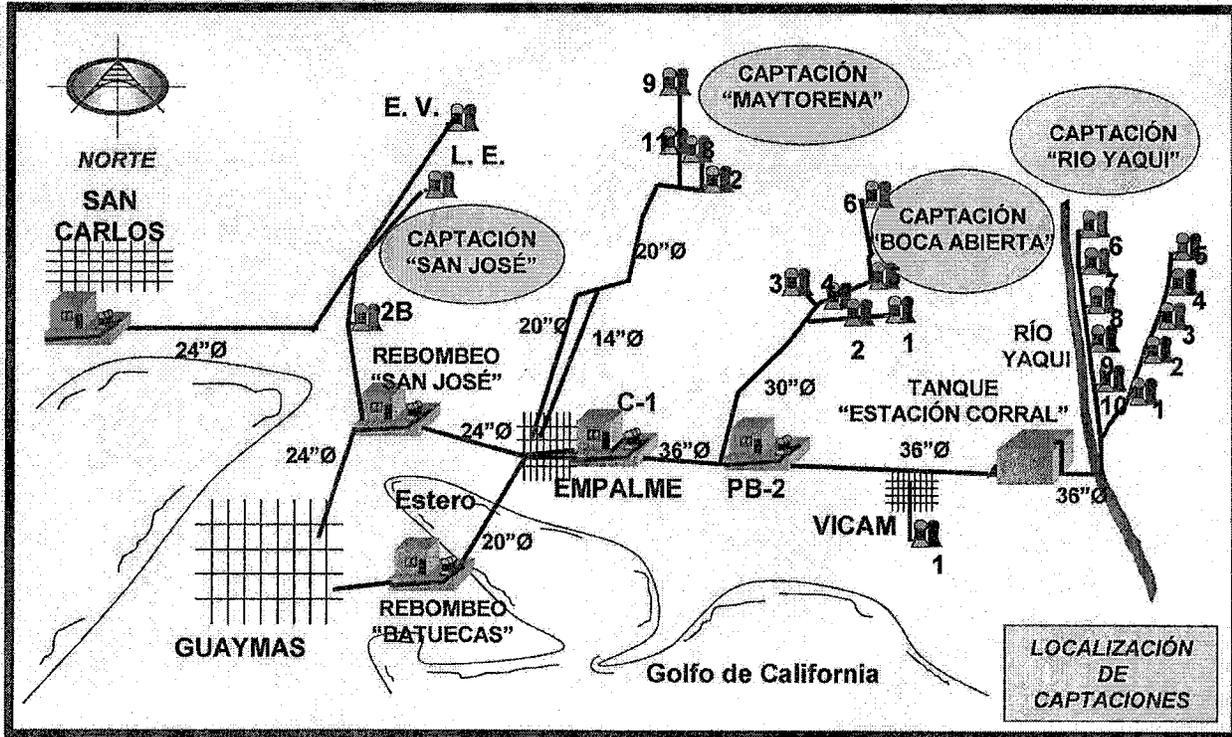
## **IV. PROPUESTA DE INVERSIÓN 2008.**

- 5.1 Propuesta de inversión 2008.

1. SUMINISTRO DE AGUA POTABLE.

1.1 Captaciones.

1.1.1 Localización



1.1.2 Fuentes.

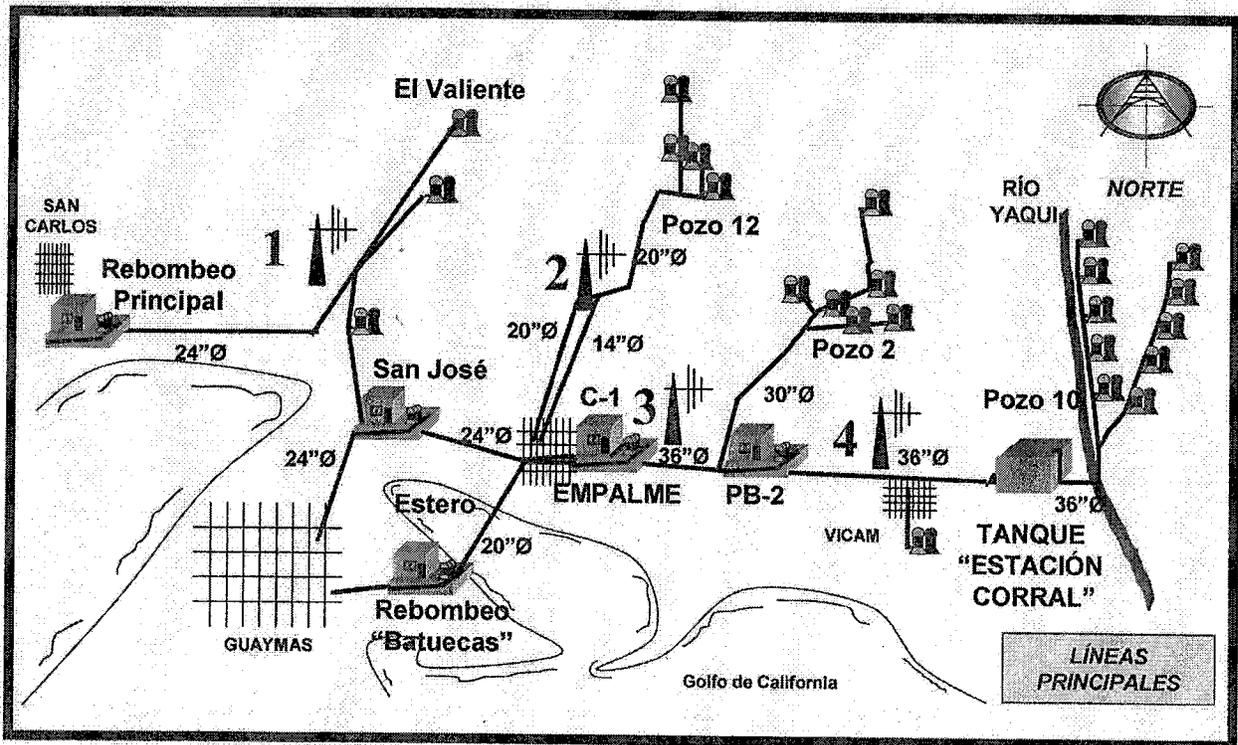
Zona de captación	Pozos										Suma	
	Clave											
1. San José	2B	L. E.	E. V.									3
2. Maytorena	8	9	11	12								4
3. Boca Abierta	1	2	3	4	5	6						6
4. Río Yaquí	1	2	3	4	5	6	7	8	9	10		10
5. Vicam	1											1
											Total	24

1.1.3 Requerimientos de automatización de pozos.

Zona de captación	Pozos										Suma	
	Clave											
1. San José	2B	L. E.	E. V.									3
2. Maytorena	8	9	11	12								4
3. Boca Abierta	1	2	3									3
4. Río Yaquí	1	2	3	4	6	9						6
5. Vicam	1											1
											Total	17

## 1.2 Conducciones.

### 1.2.1 Localización



### 1.2.2 Líneas principales de conducción.

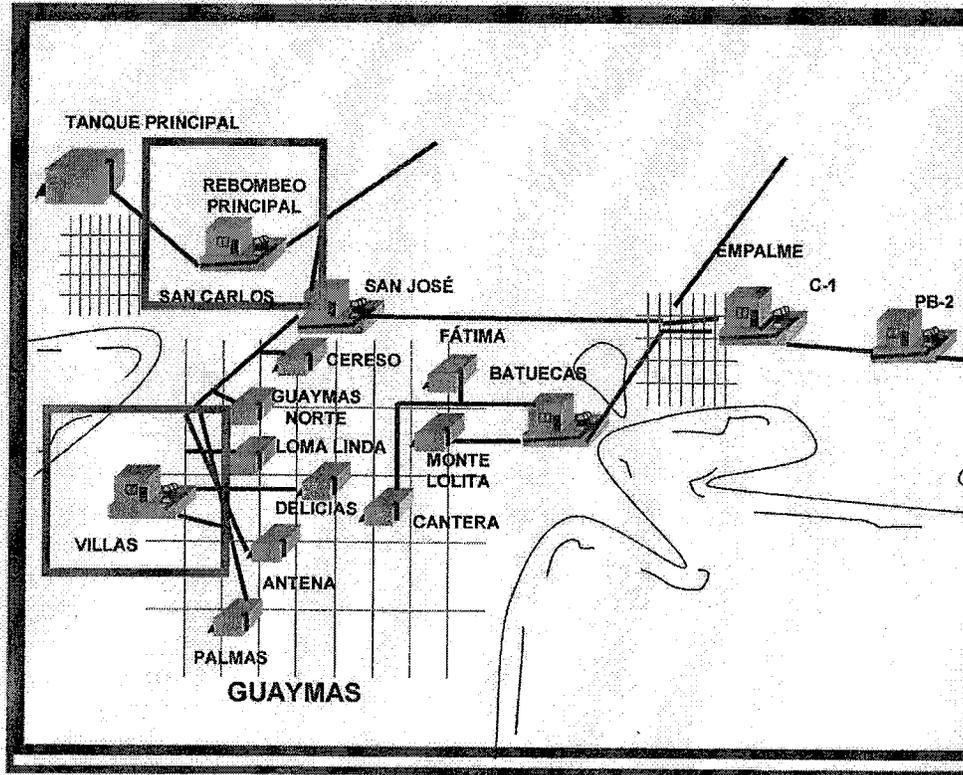
1. El Valiente al Rebombero Principal.
2. C-1 a San José.
3. C-1 a Batuecas.
4. Pozo 12 a Empalme.
5. PB2 a C-1.
6. Pozo 2 a PB 2.
7. Tanque Estación Corral a PB2.
8. Pozo 10 a tanque Estación Corral.

### 1.2.3 Requerimientos de automatización de líneas principales de conducción.

1. El Valiente al Rebombero Principal.
2. Pozo 12 a Empalme.
3. PB2 a C-1.
4. Tanque Estación Corral a PB2.

### 1.3 Rebombes de agua.

#### 1.3.1 Localización.



#### 1.3.2 Rebombes de agua potable.

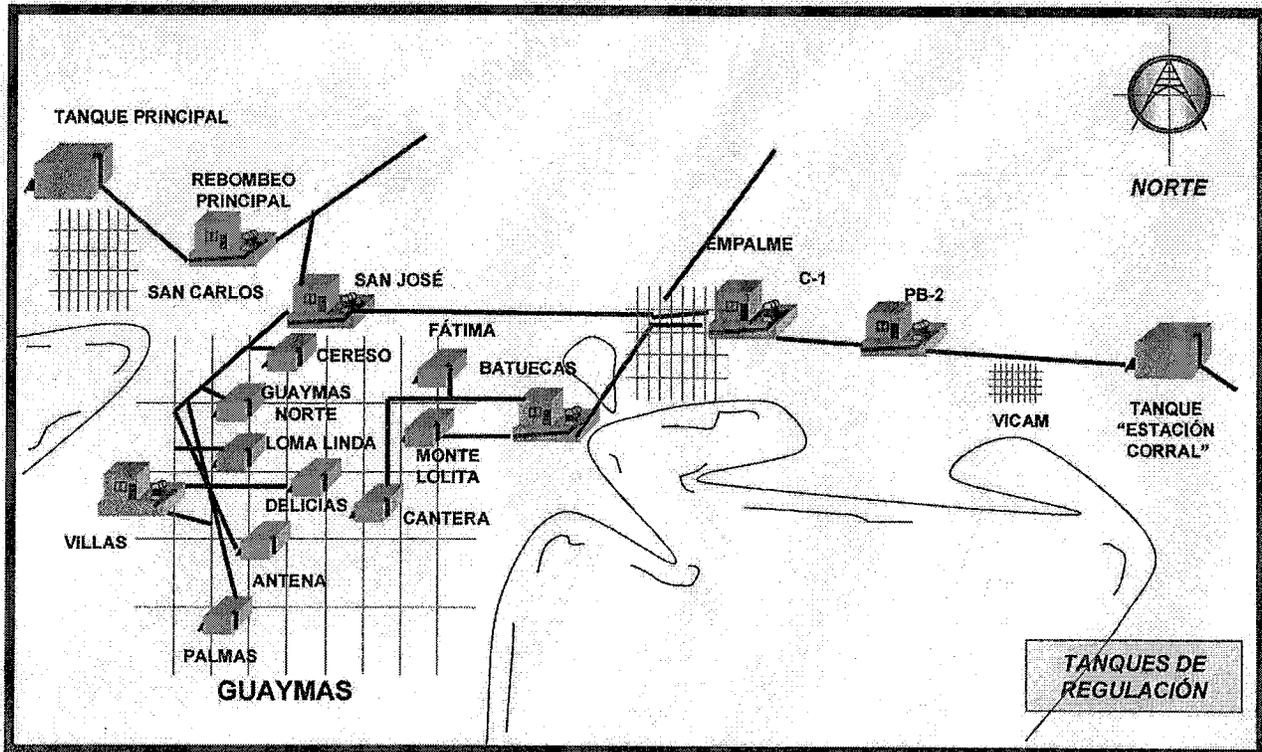
1. Planta de Bombeo 2 (PB2).
2. Rebombero C-1.
3. Rebombero Batuecas.
4. Rebombero San José.
5. Rebombero Principal San Carlos.
6. Rebombero Villas.

#### 1.3.3 Requerimientos de automatización en rebombes.

1. Rebombero Principal.
2. Rebombero Villas.

## 1.4 Tanques reguladores.

### 1.4.1 Localización.



### 1.4.2 Tanques reguladores.

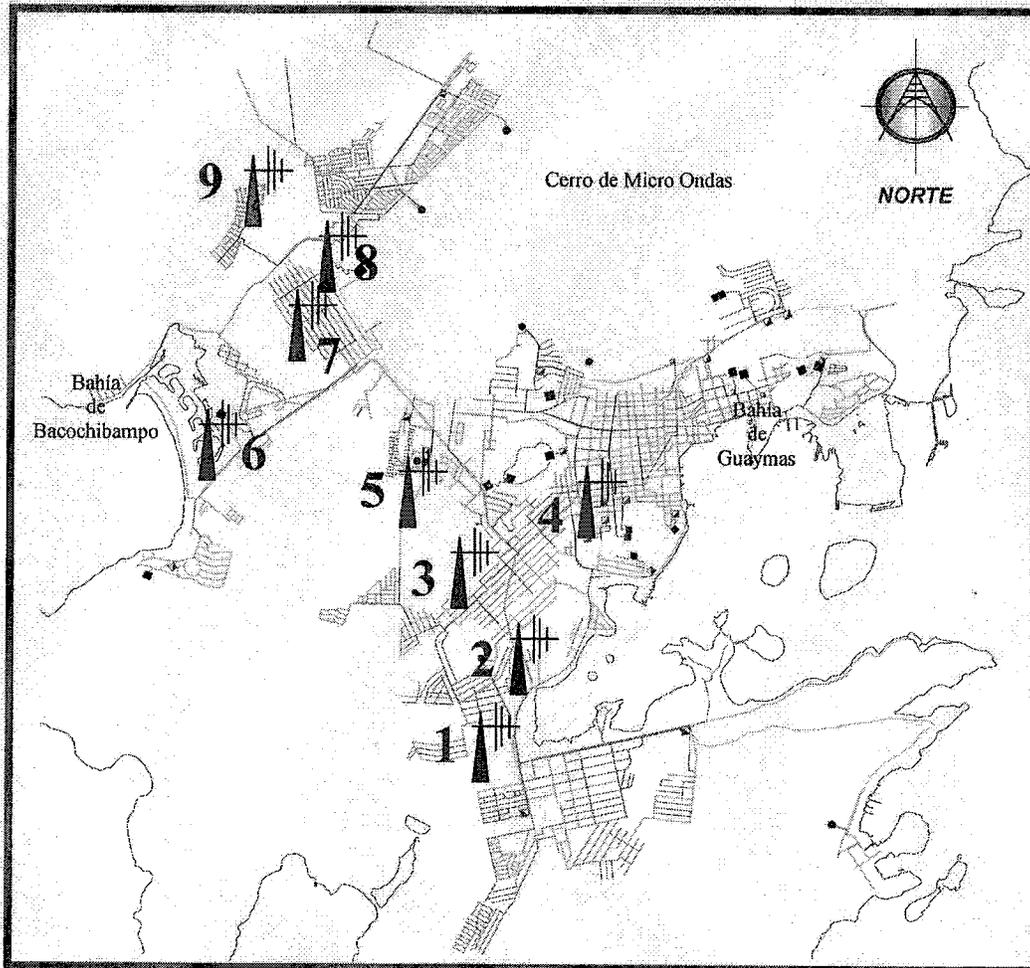
1. Estación Corral.
2. Planta de Bombeo 2 (PB2).
3. Regulador C-1.
4. Batuecas.
5. Montelolita.
6. Fátima.
7. Cantera.
8. Tanque San José.
9. Tanque Principal.
10. Cereso.
11. Guaymas Norte.
12. Loma Linda.
13. Villas.
14. Delicias.
15. Antena.
16. Palmas.

### 1.4.3 Requerimientos de automatización en tanques reguladores.

1. Estación Corral.
2. Montelolita.
3. Fátima.
4. Cantera.
5. Tanque Principal.
6. Cereso.
7. Guaymas Norte.
8. Loma Linda.
9. Villas.
10. Delicias.
11. Antena.
12. Palmas.

## 1.5 Red de distribución. Proyecto de control de sectores hidrométricos.

### 1.5.1 Localización de estaciones para control de presión y flujo en la red.



### 1.5.2 Estaciones para control de presión y flujo en la red.

1. Colonia Centinela.
2. Colonia Sahuaripa.
3. Colonia Las Palmas.
4. Colonia San Bernardo.
5. Colonia Las Colinas.
6. Colonia Lomas de Cortes.
7. Colonia Villas de Miramar.
8. Colonia Petrolera.
9. Colonia Residencial NIZA.

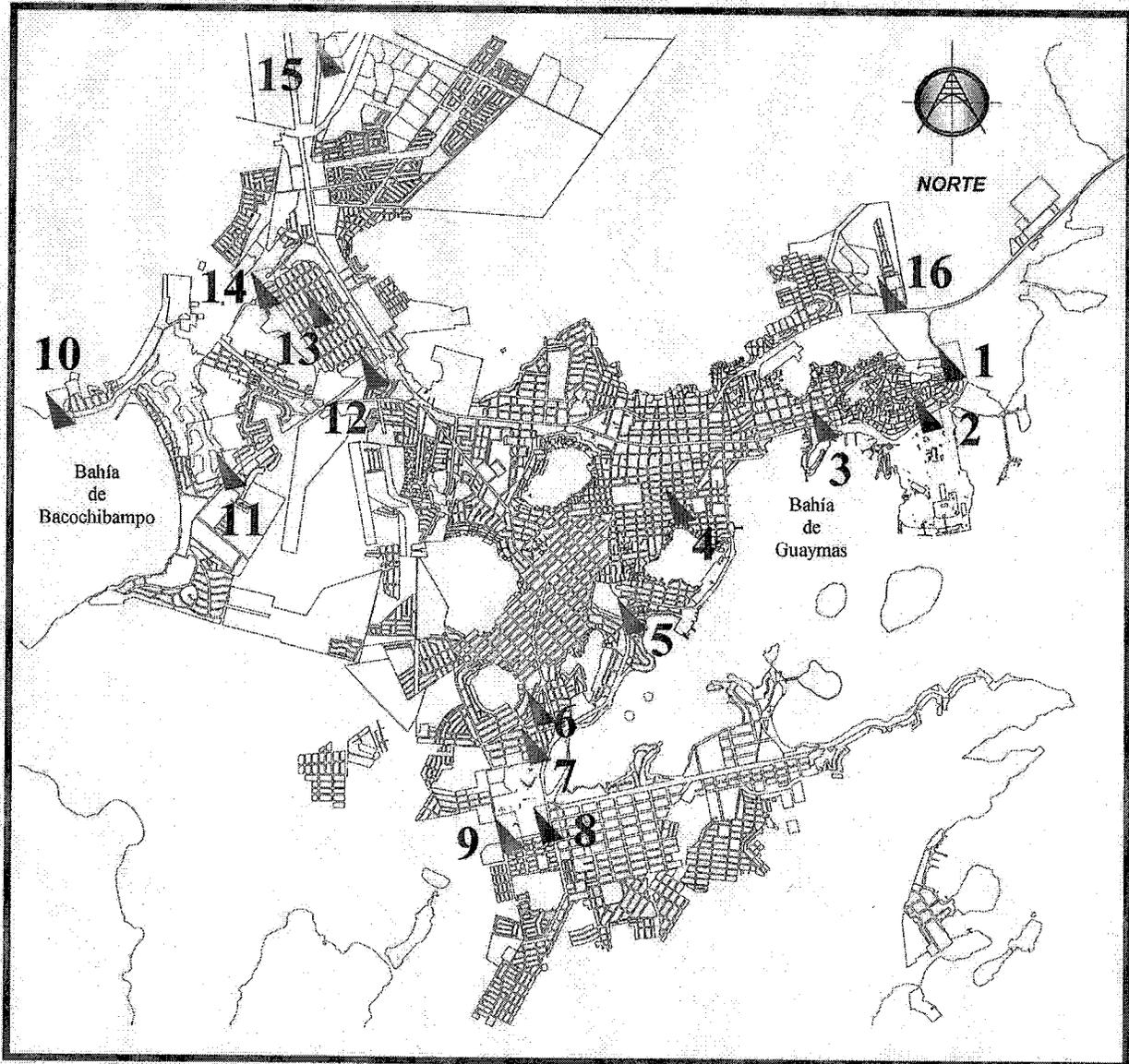
**1.5.3 Requerimientos para automatización de estaciones para control de presión y flujo en la red.**

1. Colonia Centinela.
2. Colonia Sahuaripa.
3. Colonia Las Palmas.
4. Colonia San Bernardo.
5. Colonia Las Colinas.
6. Colonia Lomas de Cortes.
7. Colonia Villas de Miramar.
8. Colonia Petrolera.
9. Colonia Residencial NIZA.

## 2. DESALOJO DE AGUAS RESIDUALES.

### 2.1 Cárcamos de bombeo.

#### 2.1.1 Localización.



### 2.1.2 Cárcamos.

1. Termoeléctrica.
2. Punta de Arena.
3. Calle 31.
4. Avenida 4.
5. Panteón.
6. 100 casas.
7. Gil Samaniego.
8. Sahuaripa.
9. Unidad Deportiva.
10. Las Tinajas.
11. Miramar.
12. Las Quintas.
13. Petrolera.
14. Los Pinos.
15. Guaymas Norte.
16. Colinas de Fátima.

### 2.1.3 Requerimientos para automatización de cárcamos.

1. Termoeléctrica.
2. Punta de Arena.
3. Calle 31.
4. Avenida 4.
5. Panteón.
6. 100 casas.
7. Gil Samaniego.
8. Sahuaripa.
9. Unidad Deportiva.
10. Las Tinajas.
11. Miramar.
12. Las Quintas.
13. Petrolera.
14. Los Pinos.
15. Guaymas Norte.
16. Colinas de Fátima.

## II. PRESUPUESTO PARA AUTOMATIZACIÓN (Mexican Pesos).

### 3.1 Pozos de agua potable

CLAVE	C O N C E P T O	UNIDAD	CANTIDAD	P. U.	IMPORTE
CSG001	UNIDAD TERMINAL REMOTA CON CONFIGURACIÓN DE ENTRADA SALIDA PARA: MEDICIÓN DE PRESIÓN ESTÁTICA 4-20 MA, ARRANQUE / PARO / RETROAVISO DE BOMBA DE POZO, DETECCIÓN DE PUERTA ABIERTA, DETECCIÓN DE INTRUSO, MEDICIÓN DE PARÁMETROS ELÉCTRICOS.	PZA	17.00	51,450.00	874,650.00
CSG002	TRANSMISOR DE PRESIÓN MANOMÉTRICA CON RANGO DE 0 - 100 PSI, SEÑAL DE SALIDA DE 4-20 MA. PRESIÓN + 0.25 %, AJUSTE, ZERO Y SPAM, ESCALABILIDAD DE RANGO, 5:1, CONEXIÓN HIDRÁULICA DE 1/2" NPT, CONEXIÓN ELÉCTRICA DE 1/2" NPT, GARANTÍA DE TRES AÑOS COMO MÍNIMO. TIPO DE SERVICIOS LÍQUIDOS.	PZA	17.00	14,175.00	240,975.00
CSG003	INSTALACIÓN DE DUCTERÍA Y CABLEADO PARA POZO QUE INCLUYE: INTALACIÓN DE ANTENA Y PARARRAYOS EN MÁSTIL, TIERRA FÍSICA, DONAS DE ARRANCADOR, CENTRO DE CARGA, DUCTERÍA Y CABLEADO. INSTALACIÓN DE EQUIPOS DE CONTROL Y TRANSMISORES, INGENIERÍA, PROGRAMACIÓN, CONFIGURACIÓN, SINTONIZACIÓN, PRUEBAS Y PUESTA EN MARCHA.	PZA	17.00	17,220.00	292,740.00
CSG004	REPETIDOR DE DATOS TIPO REGENERATIVO "ALMACENA-ENVIA" CON LAS SIGUIENTES CARACTERÍSTICAS: CPU 32 BITS, MEMORIA TIPO FLASH, 1 MB MEMORIA TIPO RAM, 256 KB, PUERTO SERIAL RS-232, PUERTO SERIAL RS-485, MODEM DPSK, BITÁCORA DE ERRORES CON ACCESO REMOTO, LENGUAJE DE PROGRAMACIÓN ESCALERA, DIAGNÓSTICOS REMÓTOS DE: CPU, CANAL DE COMUNICACIONES: ENTRADA/SALIDA, OPERACIÓN AMBIENTE DE LA UNIDAD TERMINAL REMOTA (CPU, RACK, MÓDULOS DE ENTRADA Y SALIDA, FUENTE DE PODER), DE -25 A + 60° CENTÍGRADOS, CON HUMEDAD RELATIVA < 95% @ 50° CENTÍGRADOS, DIAGNÓSTICOS LOCALES MEDIANTE LEDS DE OPERACIÓN, PRESENCIA DE AC, ERROR CPU, LEDS DE OPERACIÓN DE PUERTOS DE COMUNICACIÓN, PUERTO 1, 2, Y 3.	PZA	3.00	103,950.00	311,850.00
CSG005	INSTALACIÓN DE DUCTERÍA Y CABLEADO PARA REPETIDOR QUE INCLUYE: INTALACIÓN DE ANTENA Y PARARRAYOS, TIERRA FÍSICA, Y EQUIPOS DE COMUNICACIONES, EQUIPO DE CONTROL Y SINTONIZACIÓN Y PUESTA EN OPERACIÓN.	PZA	3.00	21,840.00	65,520.00

CSG006	MEDIDOR DE PARÁMETROS ELÉCTRICOS TRIFÁSICOS PARA LOS EQUIPO DE BOMBEO DE ACUERDO A LA LISTA SIGUIENTE: VRMS POR FASE, IRMS POR FASE, POTENCIA REAL POR FASE, VA (POTENCIA APARENTE) POR FASE, VAR (POTENCIA REACTIVA) POR FASE, FRECUENCIA, ENERGÍA (POTENCIA-HORA), FACTOR DE POTENCIA, PRESIÓN +/- 0,3%, VOLTAJE DE ENTRADA 0-690 VAC TRES FASES. INCLUYE LOS TRANSFORMADORES DE CORRIENTE, ALIMENTACIÓN 12 V DC, PUERTO RS-485 DOS HILOS CON PROTOCOLO MODBUS PARA CONEXIÓN A EQUIPO DE CONTROL O TERMINAL REMOTA.	PZA	17.00	9,345.00	158,865.00
CSG007	INSTALACIÓN DE SOFTWARE, DUCTERÍA Y CABLEADO PARA ESTACIÓN CENTRAL Y BASE DE COMUNICACIONES, INCLUYE: INSTALACIÓN DE ANTENA, PARARRAYOS, TIERRA FÍSICA, CENTRO DE CARGA, DUCTERÍA Y CABLEADOS, INSTALACIÓN DE EQUIPO DE COMPUTO, IMPRESORA, UPS, CONFIGURACIÓN, SINTONIZACIÓN, PRUEBAS Y PUESTA EN MARCHA.	PZA	1.00	12,495.00	12,495.00
EL PRESUPUESTO ES POR LA CANTIDAD DE:				SUMA \$	1,957,095.00
Dos Millones, Doscientos Cincuenta Mil, Seiscientos Cincuenta				15 % IVA	293,564.25
y Nueve Pesos, 25/100 M. N.)				\$	
				TOTAL \$	2,250,659.25

## 3.2 Líneas principales de conducción.

CLAVE	CONCEPTO	UNIDAD	CANTIDAD	P. U.	IMPORTE
CSG008	UNIDAD TERMINAL REMOTA CON CONFIGURACIÓN DE ENTRADA SALIDA PARA: MEDICIÓN DE PRESIÓN ESTÁTICA 4-20 MA, DETECCIÓN DE PUERTA ABIERTA, DETECCIÓN DE INTRUSO.	PZA	4.00	49,000.00	196,000.00
CSG002	TRANSMISOR DE PRESIÓN MANOMÉTRICA CON RANGO DE 0 - 100 PSI, SEÑAL DE SALIDA DE 4-20 MA. PRESIÓN +/- 0.25 %, AJUSTE, ZERO Y SPAM, ESCALABILIDAD DE RANGO, 5:1, CONEXIÓN HIDRÁULICA DE 1/2" NPT, CONEXIÓN ELÉCTRICA DE 1/2" NPT, GARANTÍA DE TRES AÑOS COMO MÍNIMO, TIPO DE SERVICIO LÍQUIDOS.	PZA	4.00	14,175.00	56,700.00
CSG009	INSTALACIÓN DE DUCTERÍA Y CABLEADO ELÉCTRICO QUE INCLUYE: INTALACIÓN DE ANTENA Y PARARRAYOS EN MÁSTIL, TIERRA FÍSICA, DONAS DE ARRANCADOR, CENTRO DE CARGA, DUCTERÍA Y CABLEADO. INSTALACIÓN DE EQUIPOS DE CONTROL Y TRANSMISORES, INGENIERÍA, PROGRAMACIÓN, CONFIGURACIÓN, SINTONIZACIÓN, PRUEBAS Y PUESTA EN MARCHA.	PZA	4.00	17,876.00	71,504.00
EL PRESUPUESTO ES POR LA CANTIDAD DE:				SUMA \$	324,204.00
Trescientos Setenta y Dos Mil Ochocientos Treinta y Cuatro Pesos, 60/100 M. N.				15 % IVA	48,630.60
				\$	
				TOTAL \$	372,834.60

## 3.3 Rebombes de agua.

CLAVE	CONCEPTO	UNIDAD	CANTIDAD	P. U.	IMPORTE
CSG002	TRANSMISOR DE PRESIÓN MANOMÉTRICA CON RANGO DE 0 - 100 PSI, SEÑAL DE SALIDA DE 4-20 MA, PRESIÓN +- 0.25 %, AJUSTE, ZERO Y SPAM, ESCALABILIDAD DE RANGO, 5:1, CONEXIÓN HIDRÁULICA DE 1/2" NPT, CONEXIÓN ELÉCTRICA DE 1/2" NPT, GARANTÍA DE TRES AÑOS COMO MÍNIMO, TIPO DE SERVICIO LÍQUIDOS	PZA	2.00	14,175.00	28,350.00
CSG010	UNIDAD TERMINAL REMOTA CON CONFIGURACIÓN DE ENTRADA SALIDA PARA: REBOMBEO, CON MEDICIÓN DE NIVEL DE CÁRCAMO, PRESIÓN EN LA DESCARGA DEL REBOMBEO, ARRANQUE / PARO / RETROAVISO AUTOMÁTICO, REMOTO/MANUAL/LOCAL PARA LOS EQUIPOS DE BOMBEO DE CADA INSTALACIÓN.	PZA	2.00	70,192.00	140,384.00
CSG011	TRANSMISOR DE NIVEL 4-20 MA. TIPO SUMERGIBLE, ESPECIFICACIONES: RANGO 4, 10 Y 21 M. SEÑAL DE SALIDA 4-20 MA, PRESIÓN +- 0.25%, AJUSTE FIJO, CONEXIÓN ELÉCTRICA, CABLE SUMERGIBLE, GARANTÍA 3 AÑOS COMO MÍNIMO, TIPO DE SERVICIO LÍQUIDOS, FUENTE DE ALIMENTACIÓN 24 V DC, LÍMITES DE TEMPERATURA DE OPERACIÓN 0 A 60° CENTÍGRADOS, MATERIALES DE LAS PARTES HÚMEDAS DEL PROCESO 316 ACERO INOXIDABLE, MATERIAL DEL DIAFRAGMA 316 ACERO INOXIDABLE.	PZA	2.00	13,650.00	27,300.00
CSG012	INSTALACIÓN DE DUCTERÍA Y CABLEADO PARA REBOMBEO QUE INCLUYE: INTALACIÓN DE ANTENA, PARARRAYOS, TIERRA FÍSICA, TRANSFORMADORES DE CORRIENTE (DONAS) DE ARRANCADOR, CENTRO DE CARGA, DUCTERÍA Y CABLEADOS. INSTALACIÓN DE EQUIPOS DE CONTROL Y TRANSMISORES, INGENIERÍA, PROGRAMACIÓN, CONFIGURACIÓN, SINTONIZACIÓN, PRUEBAS Y PUESTA EN MARCHA.	PZA	2.00	20,370.00	40,740.00
CSG006	MEDIDOR DE PARÁMETROS ELÉCTRICOS TRIFÁSICOS PARA LOS EQUIPO DE BOMBEO DE ACUERDO A LA LISTA SIGUIENTE: VRMS POR FASE, IRMS POR FASE, POTENCIA REAL POR FASE, VA (POTENCIA APARENTE) POR FASE, VAR (POTENCIA REACTIVA) POR FASE, FRECUENCIA, ENERGÍA (POTENCIA-HORA), FACTOR DE POTENCIA, PRESIÓN, +- 0.3%, VOLTAJE DE ENTRADA 0-690 VAC TRES FASES, INCLUYE LOS TRANSFORMADORES DE CORRIENTE, ALIMENTACIÓN 12 V DC, PUERTO RS-485 DOS HILOS CON PROTOCOLO MODBUS PARA CONEXIÓN A EQUIPO DE CONTROL O TERMINAL REMOTA.	PZA	2.00	9,345.00	18,690.00
EL PRESUPUESTO ES POR LA CANTIDAD DE:				SUMA \$	255,464.00
Doscientos Noventa y Tres Mil Setecientos Ochenta y Tres Pesos, 60/100 M. N.				15 % IVA	38,319.60
				\$	
				TOTAL \$	293,783.60

## 3.4 Tanques reguladores.

CLAVE	CONCEPTO	UNIDAD	CANTIDAD	P. U.	IMPORTE
CSG013	UNIDAD TERMINAL REMOTA CON CONFIGURACIÓN DE ENTRADA SALIDA PARA: MEDICIÓN DE NIVEL DE TANQUE.	PZA	16.00	66,000.00	1,056,000.00
CSG011	TRANSMISOR DE NIVEL 4-20 MA. TIPO SUMERGIBLE, ESPECIFICACIONES: RANGO 4, 10 Y 21 M. SEÑAL DE SALIDA 4-20 MA, PRECISIÓN +- 0.25%, AJUSTE FIJO, CONEXIÓN ELÉCTRICA, CABLE SUMERGIBLE, GARANTÍA 3 AÑOS COMO MÍNIMO, TIPO DE SERVICIO LÍQUIDOS, FUENTE DE ALIMENTACIÓN 24 V DC, LÍMITES DE TEMPERATURA DE OPERACIÓN 0 A 60° CENTÍGRADOS, MATERIAL DE LAS PARTES HÚMEDAS DEL PROCESO 316 ACERO INOXIDABLE, MATERIAL DEL DIAFRAGMA 316 ACERO INOXIDABLE.	PZA	16.00	13,650.00	218,400.00
CSG009	INSTALACIÓN DE DUCTERÍA Y CABLEADO ELÉCTRICO QUE INCLUYE: INTALACIÓN DE ANTENA Y PARARRAYOS EN MÁSTIL, TIERRA FÍSICA, DONAS DE ARRANCADOR, CENTRO DE CARGA, DUCTERÍA Y CABLEADO. INSTALACIÓN DE EQUIPOS DE CONTROL Y TRANSMISORES, INGENIERÍA, PROGRAMACIÓN, CONFIGURACIÓN, SINTONIZACIÓN, PRUEBAS Y PUESTA EN MARCHA.	PZA	16.00	17,876.00	286,016.00
EL PRESUPUESTO ES POR LA CANTIDAD DE:				SUMA \$	1,560,416.00
Un Millón Setecientos Noventa y Cuatro Mil Cuatrocientos Setenta y Ocho Pesos, 40/100 M. N.				15 % IVA	234,062.40
				\$	
				TOTAL \$	1,794,478.40

## 3.5 Estaciones para control y flujo en la red.

CLAVE	C O N C E P T O	UNIDAD	CANTIDAD	P. U.	IMPORTE
CSG008	UNIDAD TERMINAL REMOTA CON CONFIGURACIÓN DE ENTRADA SALIDA PARA: MEDICIÓN DE PRESIÓN ESTÁTICA 4-20 MA, DETECCIÓN DE PUERTA ABIERTA, DETECCIÓN DE INTRUSO.	PZA	9.00	49,000.00	441,000.00
CSG002	TRANSMISOR DE PRESIÓN MANOMÉTRICA CON RANGO DE 0 - 100 PSI, SEÑAL DE SALIDA DE 4-20 MA. PRESIÓN +- 0.25 %, AJUSTE, ZERO Y SPAM, ESCALABILIDAD DE RANGO, 5:1, CONEXIÓN HIDRÁULICA DE 1/2" NPT, CONEXIÓN ELÉCTRICA DE 1/2" NPT, GARANTÍA DE TRES AÑOS COMO MÍNIMO, TIPO DE SERVICIO LÍQUIDOS.	PZA	9.00	14,175.00	127,575.00
CSG009	INSTALACIÓN DE DUCTERÍA Y CABLEADO ELÉCTRICO QUE INCLUYE: INTALACIÓN DE ANTENA Y PARARRAYOS EN MÁSTIL, TIERRA FÍSICA, DONAS DE ARRANCADOR, CENTRO DE CARGA, DUCTERÍA Y CABLEADO. INSTALACIÓN DE EQUIPOS DE CONTROL Y TRANSMISORES, INGENIERÍA, PROGRAMACIÓN, CONFIGURACIÓN, SINTONIZACIÓN, PRUEBAS Y PUESTA EN MARCHA.	PZA	9.00	17,876.00	160,884.00
EL PRESUPUESTO ES POR LA CANTIDAD DE:				SUMA \$	729,459.00
Ochocientos Treinta y Ocho Mil Ochocientos Setenta y Siete Pesos, 85/100 M. N.				15 % IVA	109,418.85
				\$	
				TOTAL \$	838,877.85

## 3.6 Carcamos para bombeo de aguas residuales.

CLAVE	CONCEPTO	UNIDAD	CANTIDAD	P. U.	IMPORTE
CSG002	TRANSMISOR DE PRESIÓN MANOMÉTRICA CON RANGO DE 0 - 100 PSI, SEÑAL DE SALIDA DE 4-20 MA. PRESIÓN +- 0.25 %, AJUSTE, ZERO Y SPAM, ESCALABILIDAD DE RANGO, 5:1, CONEXIÓN HIDRÁULICA DE 1/2" NPT, CONEXIÓN ELÉCTRICA DE 1/2" NPT, GARANTÍA DE TRES AÑOS COMO MÍNIMO, TIPO DE SERVICIO LÍQUIDOS	PZA	16.00	14,175.00	226,800.00
CSG010	UNIDAD TERMINAL REMOTA CON CONFIGURACIÓN DE ENTRADA SALIDA PARA: REBOMBEO, CON MEDICIÓN DE NIVEL DE CÁRCAMO, PRESIÓN EN LA DESCARGA DEL REBOMBEO, ARRANQUE / PARO / RETROAVISO AUTOMÁTICO, REMOTO/MANUAL/LOCAL PARA LOS EQUIPOS DE BOMBEO DE CADA INSTALACIÓN.	PZA	16.00	70,192.00	1,123,072.00
CSG011	TRANSMISOR DE NIVEL 4-20 MA. TIPO SUMERGIBLE, ESPECIFICACIONES: RANGO 4, 10 Y 21 M. SEÑAL DE SALIDA 4-20 MA, PRESIÓN +- 0.25%, AJUSTE FIJO, CONEXIÓN ELÉCTRICA, CABLE SUMERGIBLE, GARANTÍA 3 AÑOS COMO MÍNIMO, TIPO DE SERVICIO LÍQUIDOS, FUENTE DE ALIMENTACIÓN 24 V DC, LÍMITES DE TEMPERATURA DE OPERACIÓN 0 A 60° CENTÍGRADOS, MATERIALES DE LAS PARTES HÚMEDAS DEL PROCESO 316 ACERO INOXIDABLE, MATERIAL DEL DIAFRAGMA 316 ACERO INOXIDABLE.	PZA	16.00	13,650.00	218,400.00
CSG012	INSTALACIÓN DE DUCTERÍA Y CABLEADO PARA REBOMBEO QUE INCLUYE: INTALACIÓN DE ANTENA, PARARRAYOS, TIERRA FÍSICA, TRANSFORMADORES DE CORRIENTE (DONAS) DE ARRANCADOR, CENTRO DE CARGA, DUCTERÍA Y CABLEADOS. INSTALACIÓN DE EQUIPOS DE CONTROL Y TRANSMISORES, INGENIERÍA, PROGRAMACIÓN, CONFIGURACIÓN, SINTONIZACIÓN, PRUEBAS Y PUESTA EN MARCHA.	PZA	16.00	20,370.00	325,920.00
CSG006	MEDIDOR DE PARÁMETROS ELÉCTRICOS TRIFÁSICOS PARA LOS EQUIPO DE BOMBEO DE ACUERDO A LA LISTA SIGUIENTE: VRMS POR FASE, IRMS POR FASE, POTENCIA REAL POR FASE, VA (POTENCIA APARENTE) POR FASE, VAR (POTENCIA REACTIVA) POR FASE, FRECUENCIA, ENERGÍA (POTENCIA-HORA), FACTOR DE POTENCIA, PRESIÓN, +- 0.3%, VOLTAJE DE ENTRADA 0-690 VAC TRES FASES, INCLUYE LOS TRANSFORMADORES DE CORRIENTE, ALIMENTACIÓN 12 V DC, PUERTO RS-485 DOS HILOS CON PROTOCOLO MODBUS PARA CONEXIÓN A EQUIPO DE CONTROL O TERMINAL REMOTA.	PZA	16.00	9,345.00	149,520.00
EL PRESUPUESTO ES POR LA CANTIDAD DE:				SUMA \$	2,043,712.00
Dos Millones, Trescientos Cincuenta Mil Doscientos Sesenta Y Ocho Pesos, 80/100 M. N.				15 % IVA	306,556.80
				\$	
				TOTAL \$	2,350,268.80

## 3.7 Resumen de presupuestos.

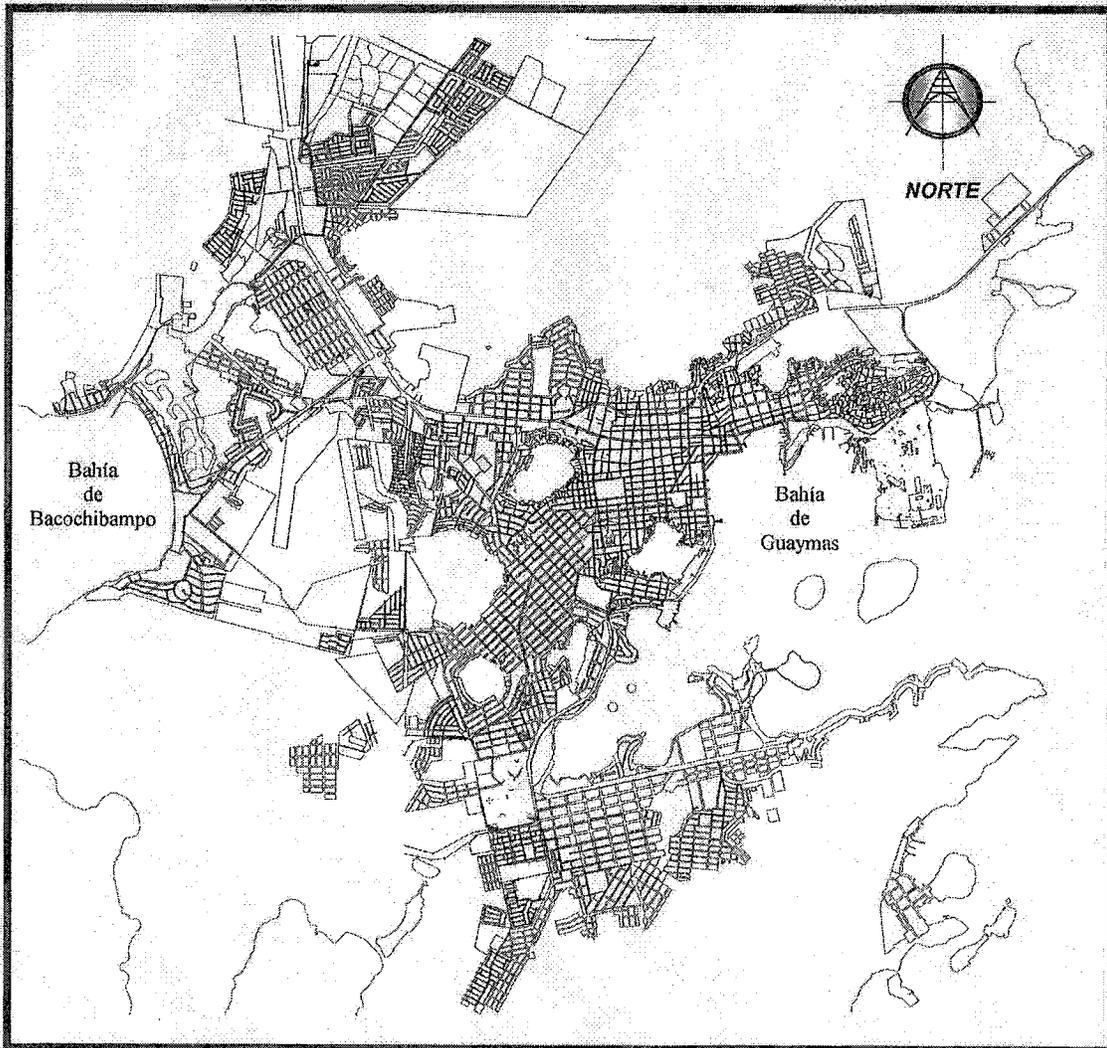
## PRESUPUESTO PARA AUTOMATIZACIÓN

3.1 Pozos de agua potable	2'250,659.25
3.2 Líneas principales de conducción.	372,834.60
3.3 Rebombes de agua.	293,783.60
3.4 Tanques reguladores.	1'794,478.40
3.5 Estaciones para control y flujo en la red.	838,877.85
3.6 Carcamos para bombeo de aguas residuales.	2'350,268.80
<b>Total in Mexican Pesos \$</b>	<b>7'900,902.50</b>

### III. ANEXOS.

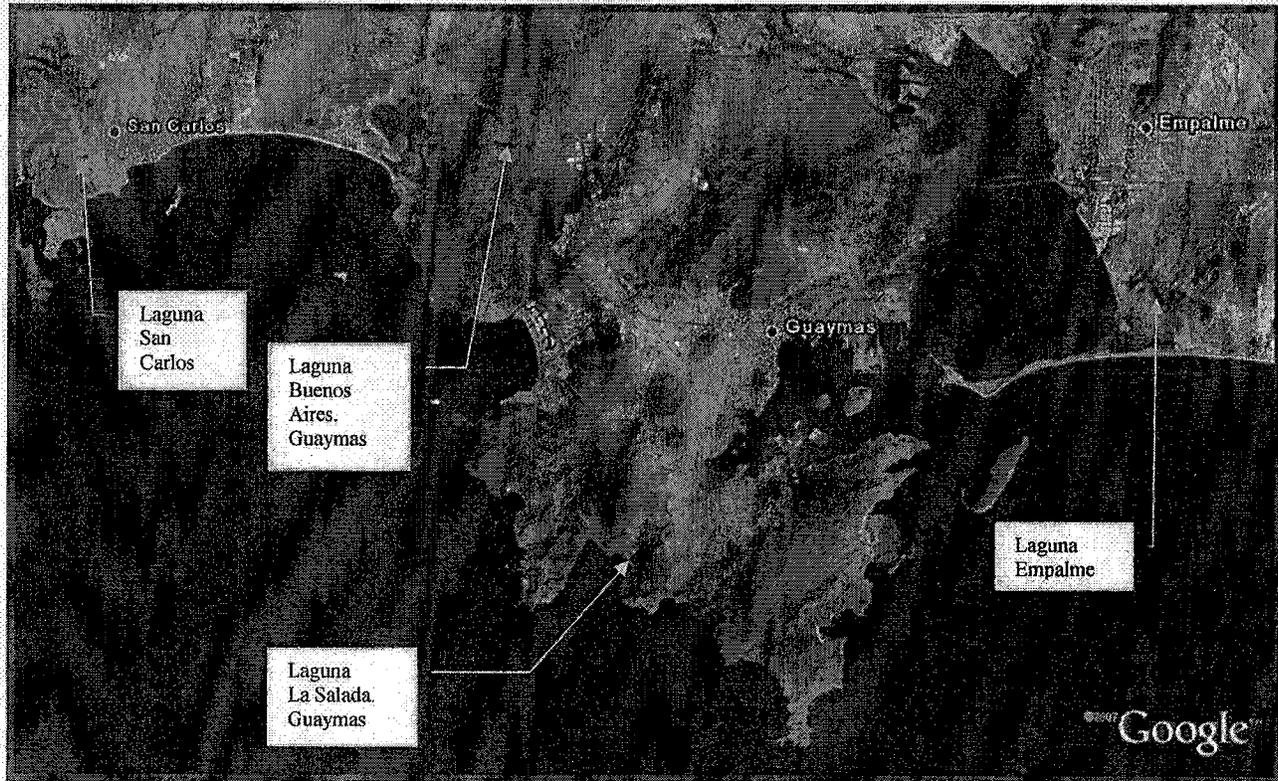
#### 4.1 Red de drenaje.

##### 4.1.1 Localización.

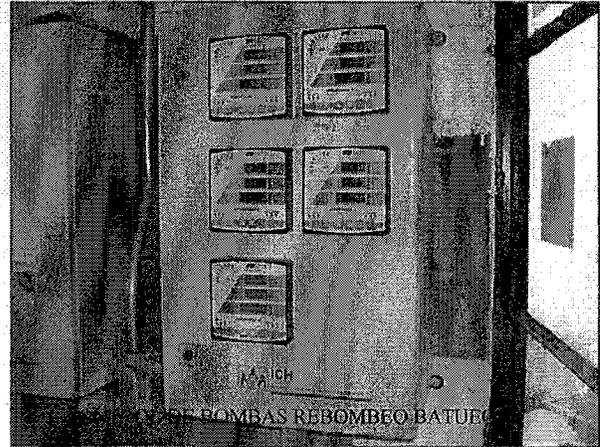


## 4.2 Lagunas de oxidación.

### 4.2.1 Localización.



4.3 Fotos del sistema actual.



**IV. PROPUESTA DE INVERSIÓN 2008.**

## 5.1 Propuesta de inversión 2008.

Concepto	Inversión
1. Reposición de 10 pozos en la zona de captación del Río Yaqui.	\$ 12'000,000.00
2. Reequipamiento de 10 pozos en la zona de captación del Río Yaqui.	\$ 2'500,000.00
3. Instalación de 10 plantas generadoras para emergencias en la zona de captación del Río Yaqui.	\$ 4'500,000.00
4. Sectorización de la red en la zona de captación del Río Yaqui.	\$ 500,000.00
5. Impermeabilización y limpieza del tanque de estación Corral.	\$ 500,000.00
6. Control y medición de gastos de extracción en las válvulas de admisión y expulsión de aire de los acueductos.	\$ 7'500,000.00
7. Instalación de medidores electromagnéticos en Boca Abierta.	\$ 6'000,000.00
8. Mejoramiento de las instalaciones de operación del rebombeo C-1.	\$ 2'000,000.00
9. Macromedición y automatización en líneas de distribución principales del sistema San José.	\$ 20'000,000.00
10. Macromedición y automatización en líneas de distribución principales del sistema San Batuecas.	\$ 10'000,000.00
11. Rehabilitación de tomas domiciliarias.	\$ 45'000,000.00
12. Rehabilitación del emisor, sistemas de cárcamos y lagunas de oxidación.	\$ 20'000,000.00
<b>Inversión Total in Mexican Pesos</b>	<b>\$130'500,000.00</b>

Guaymas Sonora, a 7 de Diciembre del 2007.

**Appendix 6 Puerto Peñasco Planning Level RO Seawater Desalination Capital Cost**

Project Name	Date	Stage
Puerto Penasco	11/18/07	A1

**RO & NF OUTPUT**

Estimating Construction Costs for NF90 Membrane Treatment Plant			
Item	Quantity	Unit	Rate
Membranes	\$ 2,414,244	@	\$ 1,402 \$/module
RO Skids	\$ 1,756,522	@	\$ 5,000 \$/vessel
Building	\$ 2,294,473	Housing	\$ 1,076 \$/m <sup>2</sup>
Electrical	\$ 1,466,291	Manf & El	Base of \$ 977 \$/m <sup>3</sup>
Instrumentation & Controls	\$ 773,309	Manf & El	Lead \$300,000 \$ 65,000 base cost
High Pressure Pumps	\$ 3,511,002	Piping	61,138,699 kWhr
Energy Recovery for Seawater	\$ -	Manf & Elect	
Transfer Pumps	\$ 148,902	Piping	3,021,390 kWhr
Product Water Pumps	\$ 93,682	Piping	1,963,903 kWhr
Odor Control	\$ -	Piping	\$ 50,000 base cost
Process Piping	\$ 1,147,573	Piping	\$ 55,000 base cost
Yard Piping	\$ 509,651	Piping	\$ 50,000 base cost
Cartridge Filters	\$ 203,629	Maint Materials	\$ 15,000 base cost
Membrane Cleaning Equip	\$ 97,574	Manf & Elect	\$ 67,000 From Reference
Contractor Engineering & Trail	\$ 91,266	Labor	\$ 100,000 base cost
Concentrate Treatment & Pipil	\$ 237,353	Piping	\$ 13 \$/m <sup>3</sup> Concentrate
Generators	\$ 73,271	Electrical	0.7 MW RO & Building
Stework	\$ 815,399	Electrical	\$ 14.53 \$/m <sup>3</sup>
<b>Total Direct Capital Costs</b>	<b>\$ 15,634,154</b>		

<b>Indirect Capital Costs</b>	
Interest During Construction	\$ 781,708
Contingencies	\$ 934,285
A&E Fees, Proj. Management	\$ 1,868,281
Working Capital	\$ 625,366
<b>Total Indirect Capital Cost</b>	<b>\$ 4,209,640</b>
	27

<b>Total Construction Cos</b>	<b>\$ 19,843,794</b>
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<b>Cost per m<sup>3</sup>/day capaci</b>	<b>\$ 459</b>
<b>Cost per gpd capacity</b>	<b>\$ 1.74</b>

<b>Estimating O&amp;M Costs</b>	
Electricity	\$ 5,620,539
Labor	\$ 2,544,780
Membrane Replacement	\$ 956,357
Cleaning Chemicals	\$ 22,349
Cartridge Filters	\$ 251,499
Repairs and Replacement	\$ 92,898
Insurance	\$ 37,159
Lab fees	\$ 57,043
<b>Total O&amp;M Cost</b>	<b>\$ 9,582,624</b>

<b>Total Costs</b>	
Capital Recovery O&M	\$ 1,664,635
	\$ 9,582,624
<b>Annual cost</b>	<b>\$ 11,247,258</b>
\$/m <sup>3</sup> Product	\$ 0.75
\$/1000 gal Product	\$ 2.84
\$/acre foot Product	\$ 926.08

**References**  
 Based on "Estimating the Cost of Membrane (RO or NF) Water Treatment Plants" By William B. Sharratt, P.E. Camp Dresser & McKee Inc. Vero Beach Florida  
 Presented at the AWWA Membrane Technology Conference, Reno, NV, 1995; also published as "Estimating the cost of membrane water treatment plants."

**APPENDIX 7**  
**PROPOSED TERMS OF REFERENCE**  
**FOR THE PUERTO PEÑASCO DESALINATION PLANT PROJECT**

**1. PURPOSE AND OBJECTIVE OF THE STUDY**

The purpose of this U.S. Trade and Development Agency (USTDA) grant assistance is to provide technical support to the Municipality of Puerto Peñasco, (Project Sponsor, Grantee) for the feasibility study (FS) of a water desalination project (project or facility) at Puerto Peñasco (study area) in the State of Sonora, Mexico.

The objective of the study is to assess the technical, economic, financial, environmental and regulatory feasibilities and the developmental impacts associated with seawater and/or brackish water desalination and conditioning for potable water use in the study area. In addition, the study will also provide the documentation for a PERFORMANCE DRIVEN competitive procurement process for the selection of a Design-Build-Operate (DBO) Contractor. The Municipality of Puerto Peñasco will require that the Contractor operate the facility for a duration that allows the local technical personnel of the "Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento (OOMAPAS)" to acquire the technical competence and proficiency to operate the facility without any detrimental effect to the quality and quantity of the water supply, the cost of the operation and the operational capability of the facility.

**2. BACKGROUND**

The Municipality of Puerto Peñasco has a contract with the Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (CICESE) for the study of the saline water intake, concentrate disposal, environmental impact assessment and permitting of a desalination facility for Puerto Peñasco. Specifically, the CICESE scope of work entails the following:

- Study and selection of the location of the saline water intake.
- Water quality analysis of the saline water at the location of the proposed intake.
- Study and selection of a suitable terrain for the desalination facility. The Project Sponsor will provide the legal clearance necessary for the siting of the desalination facility.
- Study and selection of the location of the concentrate disposal area.
- All environmental impact studies and approvals associated with the intake and concentrate disposal.

The Project Sponsor submitted a request for a feasibility study (FS) on a water desalination project for Puerto Peñasco to USTDA. The technical assistance entails reviewing the results of the CICESE study and engineering work and the FS of the saline water treatment facility including the preparation of the documentation for the selection of DBO Contractor. The proposed desalination facility will be designed to produce 500 lps (liters per second, 11.41 MGD) with a modular design that allows for increasing potable water production to 2,000 lps (45.64 MGD) by 2020. The proposed action is necessary to support population growth and current and planned tourist resorts and related business expansion in the study area. The FS Contractor (also referred to as the Contractor) will lend expertise for the assessment of the technical and commercial value of the project. The Contractor shall prepare the procurement documents needed to carry out the project under a Fee-For-Service Contract via a DBO Contractor or the OOMAPAS. The proposed scope of work is documented below.

### **3. SCOPE OF WORK**

#### **Task 1 DETAILED BACKGROUND REVIEW**

The FS Contractor (Contractor) shall commence work by becoming familiar with the project area environmental setting and reviewing all existing and available background information on the Puerto Peñasco water supply system and the Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (CICESE) study. As part of this task, the Contractor shall meet with Project Sponsors officials including the "Coordinador del Proyecto de Desalinizacion de Puerto Peñasco", CICESE, OOMAPAS and other relevant stakeholders.

The FS Contractor will review the CICESE study reports, data and technical conclusions pertaining seawater and/or brackish water intake, water quality requirement and environmental discharge of desalination plant reject. In the event water quality standards for the study are not specified in the regulations of the Government of Mexico, the FS Consultant, in agreement with accepted professional practice, will propose the adoption of international standards such as those promulgated by the World Health Organization guidelines. The Contractor shall identify the water system sampling and analysis required as a condition of a regulatory permit and for the facility design and operation. If the FS Contractor considers it necessary to request additional analytical data, the Municipality (through CICESE) shall be responsible for obtaining this data as scheduled by the FS Contractor. Funds and personnel for water quality laboratory work, intake location and concentrate disposal system installation and any geotechnical analysis required for this project will be furnished by the Project Sponsor through CICESE.

As a result of this task the FS Contractor shall become fully acquainted with the service area, facility location and its environs and the scope of the work required to satisfy the requirements of the assignment. This will include the quantity of saline water to be treated at the desalination facility to meet the average, peak and seasonal variations of the water supply demand.

Duration of Task 1: Ten (10) workdays

#### **Task 2 PROJECT MANAGEMENT PLAN**

As part of this task, the Contractor will coordinate project activities with all project team members including the Contractor staff, the project sponsor personnel and CICESE. This task involves a workshop at the start of the project to exchange ideas and develop an integrated workplan for all components of the project. The result of this task is a detailed project management plan outlining the responsibility of each entity and professional participating in the project.

Duration of Task 2: Two (2) workdays

#### **Task 3 DESALINATION AND WATER TREATMENT TECHNOLOGIES EVALUATION**

The work under this task involves the assessment of saline water treatment technologies to meet potable water quality requirements.

##### **Subtask 3.1 Establishing Design Criteria**

The FS Contractor will work closely with the Project Sponsor to establish the power source and cost of the electric power supply for the project. In concert with the Project Sponsor and CICESE, the FS Contractor will establish the appropriate design criteria for the various components of the water management system (i.e. hydraulic design criteria for the saline water intake and its conveyance to the facility and discharge of desalination plant reject to the environment in accordance with regulatory requirements). The design criteria shall include saline water pretreatment, pump units and desalination

system, potable water storage and related appurtenances such as pump stations. As indicated in Task 1, in establishing appropriate design parameters, the Contractor shall take into account local and international regulations on saline water treatment for potable use. At the completion of this Task, the Contractor will prepare a technical memorandum to document the proposed design criteria for the project.

Duration of Subtask 3.1: Twenty (20) workdays

### **Subtask 3.2 Evaluation of Saline Water Treatment Alternatives**

This task involves the identification, description and evaluation of viable saline water treatment alternatives. Alternatives will be identified based on actual saline water characteristics (quantity and quality), potable water quality requirements, saline water treatment facility footprint (which depends on the assessment of land availability in the project area), implementation costs and operation and maintenance (O&M) factors.

The Contractor will identify all components of the saline water management systems, including but not limited to saline water intake and conveyance, power source, pumps, Ultra Filtration, Reverse Osmosis and UV or chlorination units, saline and desalinated water storage and desalination plant reject. A conceptual design will be prepared for each water management alternative. The technical details of each alternative shall include pipeline sizes and alignment, pump stations, process flow diagrams, site layouts, hydraulic profiles and equipment list. In addition, alternative pipeline materials should be evaluated.

Potential viable alternatives will be subject to a detailed evaluation. The criteria to be used in the evaluation shall include but will not be limited to:

- Expected effectiveness and reliability,
- Health risks and environmental concerns,
- Implementability and constructability,
- Expandability,
- Operational considerations,
- Ability to be phased to meet long-term potable water demand in Puerto Peñasco and its environs.

As part of the evaluation, the Contractor shall prepare and articulate a comprehensive cost analysis of the alternatives that shall include life cycle costs, present cost analysis and cost/benefits. The evaluation will lead to the selection of a preferred alternative. The Contractor shall recommend a preferred alternative and make a presentation on its specifics technical details to the Project Sponsor.

Duration of Subtask 3.2: Twenty (20) workdays

### **Subtask 3.3 Preliminary Design**

This subtask will involve the preliminary design of all required components of the water desalination system under the preferred alternative selected in subtask 3.2. In agreement with professional standard practice, the work will include but is not to be limited to the following:

- Power source, pump stations, electrical and mechanical equipment,
- Units processes including pretreatment system, membrane system, desalinated water conditioning (posttreatment),
- Influent, RO process piping, chemical process piping and discharge pipelines,
- Desalination plant reject,
- Preliminary design of potable water storage,
- Instrumentation and control system (SCADA).

Any required topographic and water quality and geotechnical surveys will be conducted by the Project Sponsor.

The overall preliminary design for the project will be presented in a descriptive and schematic form. The preliminary design will be discussed with the Project Sponsor prior to its completion.

Duration of Subtask 3.3: Twenty (20) workdays

#### **Task 4 FEASIBILITY ANALYSIS OF THE WATER DESALINATION PROJECT**

The Contractor shall conduct and articulate a detailed feasibility analysis of the project developed above.

##### **Subtask 4.1 Technical Assessment**

In agreement with standard professional practice the technical assessment will include, but is not to be limited to, the analysis of the following factors:

- Engineering and design parameters, complexity, and limitations;
- Constructability and identification of major problem areas;
- Operability including operating costs and personnel needs to operate;
- Maintenance requirements, personnel needs and costs;
- Long-term adaptability and effects on the existing water supply system; and
- Life cycle costs.

##### **Subtask 4.2 Economic Analysis**

The Contractor will assess the project based on a set of socioeconomic indicators including, but not limited to, the cost of the desalinated potable water system on the Puerto Peñasco water users. The Contractor shall examine the economic benefits of using desalinated potable water in the service area as compared to using the limited existing fresh water system. To this end, the analysis shall take into account all avoidable water management costs associated with the saline water treatment plant, water quality monitoring and environmental externalities related to saline water intake and the disposal of the reject.

The Contractor shall estimate the economic and financial impacts of the investment by means of a comparison of current (without the project) socioeconomic conditions to future (with the project) potential socioeconomic scenarios.

##### **Subtask 4.3 Financial Analysis**

The Contractor shall prepare, as part of the feasibility study, a financial plan for the implementation of the project. The financial plan shall satisfy the requirements of the Project Sponsor who is responsible for seeking and obtaining project financing. In addition, the financial plan shall also satisfy the requirements of all prospective funding institutions, which shall be identified by the project sponsor at the onset of the assignment. In concert with the Project Sponsor, the Contractor will assess the potential interest of the Inter-American Development Bank and Banco Nacional de Obras y Servicios Públicos (BANOBRAS) and other local and international financial institutions interested in lending support to the project. The financial analysis shall include, but will not be limited to, a detailed analysis of the proposed debt-equity structure and a full description of the cost-recovery program required for the self-sustainability of the project.

The cost-recovery program should take into account the costs associated with the operation and maintenance of the project plus the debt service and the cost of replacement. As future significant capital expenditures are to be required to replace project facilities and equipment, it will be appropriate to include depreciation components in the water charges. All sources of revenue must be identified.

As part of this task, the Contractor shall meet with the Project Sponsor to discuss the financial plan and the water rates needed to support the project implementation.

#### **Subtask 4.4 Human Health, Environmental Analysis**

The feasibility analysis shall include the identification, discussion and analysis of the impacts on human health and environment that may result from implementation of the project. The environmental impact analysis shall be carried out based on the information and data provided by CICESE and in accordance with the Government of Mexico (Comision Nacional del Agua, SEMARNAT, Secretaria de Marina, Gobierno del Estado de Sonora) procedures. Environmental control and mitigation measures shall be assessed and specified as necessary. All data and information required for the environmental analysis will be provided by the Project Sponsor through CICESE.

#### **Subtask 4.5 Water Quality Impacts**

Short-term and long-term impacts on seawater and/or groundwater quality that may result from the implementation of the project shall be identified based on baseline water quality analytical data. The analysis shall include the identification and discussion of mitigation measures available to reduce water quality impacts to the greatest extent possible. All data and information required for the analysis of the water quality impacts will be provided by the Project Sponsor through CICESE.

#### **Subtask 4.6 Ecological Impacts**

The feasibility study shall analyze any short-term and long-term impacts on sensitive life forms and ecological systems derived from the implementation of the project. It shall include the identification and discussion of mitigation measures available to reduce negative impacts to the greatest extent possible. All data and information required for the analysis of the ecological impacts will be provided by the Project Sponsor through CICESE.

#### **Subtask 4.7 Socioeconomic Impacts**

Identify, discuss and analyze short-term and long-term impacts on human health and wellbeing, employment, income, education, business growth, economic production, and commercial and industrial activity that may result from the implementation of the project.

#### **Subtask 4.8 Developmental Impact**

The socioeconomic analysis discussed in Task 4.7 will provide the basis for assessing the potential developmental impact of the project on the study area and, broadly speaking on the state of Sonora and Mexico. For the benefit of those interested in the Project, the Contractor shall assess the Project's development benefits and the methodology for measuring those benefits. The assessment shall include examples of what is to be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall focus specifically on examples from the categories listed below and shall develop a methodology for assessing these impacts over time. The Contractor shall select examples that USTDA can obtain information on in the future and shall identify where to obtain this information (e.g. the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project. The categories to be considered are as follows:

- **Infrastructure:** Estimate the expected scale of infrastructure construction and comment on the capabilities of any recommended infrastructure improvements.
- **Human capacity building:** Estimate the number and type of jobs that would be created during the construction or installation phases if the Contractor's recommendations are implemented. Distinguish between temporary construction jobs and the number of jobs that would be created or sustained once construction is complete. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- **Technology transfer and productivity improvements:** Discuss recommended commercial contracts for licensing new technologies, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains stemming from these recommendations such as improved systems or processes that enhance productivity or result in the more efficient use of resources.
- **Market-oriented reform:** Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that effectuate liberalization of prices, privatization of previously state-owned assets, or increased competition in a given sector.
- **Other:** Discuss prospective, indirect developmental impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

Duration of Task 4 (including all its Subtasks): Thirty (30) workdays

#### **Task 5 ANALYSIS OF U. S. MANUFACTURERS OF DESALINATION AND WATER TREATMENT TECHNOLOGY**

The Contractor shall assess the availability of U.S. manufactured equipment and products for all components of the saline water desalination system and shall provide detailed technical specifications for each of them including business name, website, point of contact, address, telephone and fax numbers, and email address.

Duration of Task 8: Five (5) Workdays

#### **Task 6 PROJECT IMPLEMENTATION PLAN**

This task involves the preparation of an overall plan for the implementation of each of the project's components. This will include the procurement plan for the acquisition of the DBO service needed for the project's implementation. The Contractor will provide the PERFORMANCE DRIVEN bidding documents and procurement schedule. The Contractor will specify that the DBO Contractor is expected to perform all contract services as set forth in the Puerto Peñasco Seawater Desalination Project DBO Contract, including compliance with the requirements of a Fee-For-Services Contract. Specific obligations of the DBO Contractor will include:

- Completing the construction (including acceptance testing) and placing the Project into commercial operation no later than January 02, 2010. Delays will be allowed only if they are outside the control of the DBO Contractor and accepted by the Municipality of Puerto Peñasco as a valid extension.

- Treating up to 11.41 MGD of the saline water to meet the potable water requirements specified in the DBO Contract.
- Paying penalties for failure to complete the Project on time or failure to meet the treatment standards in the DBO Contract and in applicable Mexican standards and permit requirement.
- Accepting and treating saline water in the volumes specified in the Fee-For-Services Contract.
- Providing capacity to treat saline water that exceeds the flow or water quality parameters as specified in the Fee-For-Services Contract.
- Accepting and making reasonable effort to treat water that exceeds the allowable flow or water quality limits, unless the saline water threatens to damage the treatment facilities.
- Providing customary financial guarantees of payment and performance, acceptable to the Municipality of Puerto Peñasco, including a \$5 million performance bond for the life of the DBO Contract.
- Paying all payroll, federal, state, and local taxes associated with its operations in Mexico.
- Collecting influent and effluent quality and quantity data and process monitoring data.
- Preparing routine operating reports required by CEA-Sonora and CAN and other pertinent regulatory agencies identified by the FS Consultant.
- Maintaining operating permits for the Project current during the operating period.
- Maintaining the Project facilities in good and reliable operating condition throughout the operating period.
- Providing training to OOMAPAS personnel.
- During the design and construction of the project, the DBO Contractor will be entitled to monthly payments according to an agreed-upon schedule for the design, procurement of materials and/or equipment, and placement of construction. During the operating period, the DBO Contractor will be paid monthly for treating and delivering the saline water and maintaining the facilities.

Duration of Task 9: Twenty (20) Workdays

#### **Task 7 FINAL REPORT**

The Contractor shall prepare a substantive and comprehensive Final Report of all the work performed in accordance with these Terms of Reference, including all deliverables to be turned in to the Project Sponsor and USTDA. The Final Report shall document the projected host country development impact that results from the implementation of the project based on the requirements identified in Subtask 4.8. The Final Report will be prepared in accordance with Clause I of Annex II of the Grant Agreement. The Contractor shall deliver the Grantee and USTDA with six (6) copies (each) of the final report on CD-ROM. The CD-ROM version of the final report will include:

Adobe Acrobat readable copies of all documents;  
Source files for all drawings in AutoCad or Visio format; and

Source files for all documents in MS Office 2000 or later formats.

Duration of Task 10: Fifteen (15) Workdays

**APPENDIX 8  
PROPOSED BUDGET FOR THE FEASIBILITY STUDY OF THE PUERTO PEÑASCO PROJECT**

**Budget Narrative****Project Manager (PM)**

The direction of the USTDA technical assistance will be a responsibility of the U.S. Contractor's Project Manager. The proposed individual for the PM position should be a licensed engineer (PE) with no less than twenty (20) years of proven professional experience with emphasis on water desalination and tertiary treatment design. The participation of the PM is estimated at 23 days. The fully loaded daily rate assessed for the PM is \$1,500, which is consistent with standard remuneration for senior level engineers in the U.S.

**Project Engineer (PEN)**

This professional will perform the role of the Project Engineer and as such should be responsible for the day-to-day progress of the project. The proposed individual should be a professional engineer (PE) with over ten (10) years of professional experience in water treatment FS and design. The participation of this professional is estimated at 70 days. The fully loaded daily rate assessed for this professional is \$1,300.

**Project Mechanical Engineer (PME)**

This is a professional mechanical engineer with at least 10 years of experience in seawater desalination facilities design with emphasis on the selection of UV and RO systems for water desalination. The participation of this professional is estimated at 46 days. The fully loaded daily rate assessed for this professional is \$1,300.

**Project Electrical Engineer (PEL)**

This is a professional electrical engineer with at least 10 years of experience in power systems design for seawater desalination facilities with emphasis on UV and RO systems. The participation of this professional is estimated at 28 days. The fully loaded daily rate assessed for this professional is \$1,300.

**Project Economist / Financial Analyst (PEC)**

The economist / financial analyst selected for the project will have at least ten (10) years of professional experience conducting FS related to water supply projects. The participation of this individual is estimated at 30 days. The fully loaded daily rate assessed for this professional is \$1,300.

**Scientists/AutoCad**

The Social and Environmental Scientists selected for the project will have at least ten (10) years of professional experience conducting FS related to water supply projects. AutoCad Experts will have ten (10) years of experience. The participation of these individuals is estimated at 47 days. The fully loaded daily rate assessed for this professional is \$1,100.

**Sponsor Technical Support / Liaison**

The Municipality of Puerto Peñasco has confirmed that it will provide an Engineer who will serve as the liaison between the Municipality and the Contractor. In addition, the Municipality will provide the U.S. Contractor with all the necessary support such as transportation, office space in the project area, office supplies and materials, telephone, internet connection and local support personnel. Through CICESE, the

Municipality is also responsible for the cost of the water quality sampling and analytical work, land surveying and geotechnical survey.



**APPENDIX 9**  
**PROPOSED TERMS OF REFERENCE**  
**FOR THE GUAYMAS TELEMETRY AND SUPERVISORY CONTROL AND DATA ACQUISITION**  
**(SCADA) PROJECT**

**1. PURPOSE AND OBJECTIVE OF THE STUDY**

The purpose of this U.S. Trade and Development Agency (USTDA) grant assistance is to provide technical support to the Guaymas Office of the Comision Estatal de Agua del Estado de Sonora (CEA-Sonora, Project Sponsor, Grantee) for the Guaymas SCADA upgrade and expansion project feasibility study. Guaymas is located in the State of Sonora, Mexico.

The objective of the study is to assess the technical, economic, financial, environmental and regulatory feasibility and the developmental impacts associated with the upgrade and expansion of the municipal water supply and wastewater management telemetry/SCADA system (SCADA or project).

The feasibility study will document a functional telemetry/SCADA operating structure that meets Project Sponsor requirements and provides Master Terminal Unit operations with flexible and unambiguous management responsibility of the remote control system. The feasibility study will provide the implementation plan and cost estimate for the telemetry/SCADA framework selected. The USTDA technical assistance will generate the terms of reference for the acquisition of the Guaymas telemetry/SCADA system. The terms of reference will contain the software specifications, hardware specifications, communication technology, performance standards, training, testing and technical support required for the implementation of the telemetry/SCADA system.

**2. BACKGROUND**

The Guaymas potable water supply system originates from water wells located near the Yaqui River delta some 130 km (81 miles) to the south of the Guaymas City center. The water distribution network is 300 km (187 miles) in length. The Guaymas office of CEA-Sonora (CEA-Guaymas) operates the water supply and wastewater management systems. CEA-Guaymas currently operates a telemetry/SCADA system that includes 7 of its 24 water wells, half of its potable water conveyance system, four of its six main pump stations, 4 of its 16 holding tanks. The entire wastewater management system is manually operated. Accordingly, there is an imminent need for upgrading and expanding its telemetry coverage to incorporate new water stations and add remote wastewater system management control. In addition, an important upgrade expected from this project involves improving the data management capability at the operator's central control facilities to optimize its real time operation.

The evaluation of the technical capability of the current telemetry/SCADA system will be conducted in concert with CEA-Guaymas. All feasibility study activities related to upgrade and expansion of the telemetry/SCADA system will be coordinated with CEA-Guaymas. Understanding of the functional features of the current telemetry/SCADA framework will be the principal consideration for devising the upgrade and expansion needed for the remote control and management of the water and wastewater management systems. The project encompasses upgrading the Master Terminal Unit in order to enhance operators' monitoring and control capability. As a result, the feasibility study will investigate and select a SCADA system that being compatible with the electronic system and telemetry network; thus allowing for enhanced capability for the process and storage of water and wastewater systems data.

The feasibility study Contractor (Contractor) will provide expertise to carry out a feasibility study for the selection of an appropriate telemetry/SCADA system that will meet current water supply and wastewater upgrade and expansion plans. The system will be designed to provide years of cost-effective remote operation and control for both water and wastewater systems using a technological setting that

accommodates future needs. The consulting service will investigate all components of the system: Master Terminal Unit, Remote Terminal Unit, Communication Equipment, SCADA Software and peripheral and ancillary equipment as well as power supply sources.

The evaluation of any potential technologies will take into account compatibility, flexibility and capability factors and would allow for cost-effective remote monitoring of both water and wastewater systems and enhanced controls at the operator's central facility. In addition, the system will involve a technological setting that would adapt to expansion and future remote monitoring needs without requiring substantial changes to its telemetry/SCADA framework.

The feasibility study will generate terms reference for a system that includes software specifications, hardware specifications, communication technology, performance standards, training, testing and technical support and will allow bids to be evaluated on the basis of their capability and functionality in meeting these requirements. The feasibility study will provide the implementation plan and cost estimate for the telemetry/SCADA framework selected for the remote monitoring and control of the Guaymas water and wastewater systems. The feasibility study Contractor will provide a seminar with regard to the implementation of the selected telemetry/SCADA technology. The duration of the feasibility study is three months at the end of which all services including the final report and seminar shall be completed.

### **3. SCOPE OF WORK**

#### **Task 1 DETAILED BACKGROUND REVIEW**

##### **Subtask 1.1 Data Gathering and Kickoff Meeting**

Upon award of the contract, one of the initial activities will be to request copies of all relevant background information. It is anticipated that such information will be available within ten (10) business days of the contract award. Following the review of the background information, Contractor's personnel assigned to the project will travel to Guaymas to meet representatives of CEA-Sonora and CEA-Guaymas. The initial priority of the kickoff meeting is twofold; one is to learn from CEA-Guaymas about the existing telemetry/SCADA system and the other is to become thoroughly familiar with the key technical, environmental, regulatory and socioeconomic aspects of the project area.

In addition, the purpose of the kickoff meeting will be to discuss the scope of work and obtain additional background information regarding the current telemetry/SCADA system. Feasibility study Contractor personnel will visit each of the facilities involved in the project to assess the current telemetry/SCADA system capability. The fieldwork will also involve the research of pertinent regulatory information. Feasibility study personnel will work with CEA-Guaymas to develop a work plan for the implementation of the study including additional data collection procedures. The review and evaluation of the background information and fieldwork will be the basis for identifying the system operating requirements and telemetry/SCADA technologies that will be evaluated for the project.

##### **Subtask 1.2 Identification of System Operating Requirements**

The Contractor will work with CEA-Guaymas to identify the current and future operational requirements of both the potable water supply and wastewater management systems (systems). The Contractor will prepare a report documenting these requirements and defining the specific technical details for the remote operation of each component of the systems.

Duration of Task 1: Fifteen (15) Workdays

**Task 2 SCADA AND COMMUNICATION SYSTEM IDENTIFICATION AND EVALUATION**

The Contractor will work with CEA-Guaymas to identify and determine the requirements of the overall SCADA and telemetry communication system. Specific issues to be evaluated will include but will not be limited to the following:

1. Review Mexican telemetry regulatory framework;
2. Review of existing telemetry system and required expansion and upgrade;
3. Coordinate the planning aspects of the scope of the telemetry system with CEA-Guaymas;
4. Evaluate current CEA-Guaymas telemetry system and SCADA workstation system;
5. Review current telemetry system topology, transmission modes and link media;
6. Identify and design a telemetry/SCADA system to enable the proper monitoring and control of the processes involved in water conveyance and distribution and wastewater collection, transport and treatment.
7. Develop telemetry/SCADA system to meet intended expansion and upgrade requirements;
8. Estimate cost of the required system;
9. Develop information and data for the feasibility study report; and
10. Develop information and data for the seminars on the telemetry network and SCADA system required to meet CEA-Guaymas expansion and upgrade plans.

Duration of Task 2: Fifteen (15) Workdays

**Task 3 TELEMETRY/SCADA FEASIBILITY STUDY**

The Contractor shall conduct and articulate a detailed feasibility analysis of the project developed above.

**Subtask 3.1 Technical Assessment**

In agreement with standard professional practice the technical assessment will include, but is not to be limited to, the analysis of the following factors:

- Engineering and design parameters, complexity, and limitations;
- Constructability, implementability and identification of major problem areas;
- Operability including operating costs and personnel needs to operate;
- Maintenance requirements, personnel needs and costs;
- Long-term adaptability and effects on the existing water supply and wastewater management systems; and
- Life cycle costs.

**Subtask 3.2 Economic Analysis**

The Contractor will assess the project based on a set of socioeconomic indicators including, but not limited to, the cost of the telemetry/SCADA system on the Guaymas water and wastewater systems users. The Contractor shall examine the economic benefits of using the upgraded and expanded telemetry/SCADA system in the potable water wastewater service area as compared to using the limited existing telemetry/SCADA system. To this end, the analysis shall take into account all avoidable water management costs associated with potable water spills, wastewater water quality non-compliance issues, water quality monitoring and environmental externalities related to improved potable water system operation and wastewater treatment higher efficiency.

The Contractor shall estimate the economic and financial impacts of the investment by means of a comparison of current (without the project) socioeconomic conditions to future (with the project) potential socioeconomic scenarios.

### **Subtask 3.3 Financial Analysis**

As part of the feasibility study, The Contractor shall prepare a financial plan for the implementation of the project. The financial plan shall satisfy Project Sponsor's requirements who is responsible for seeking and obtaining project financing. In addition, the financial plan shall also satisfy the requirements of all prospective funding institutions, which shall be identified by the project sponsor at the onset of the assignment. In concert with the Project Sponsor, the Contractor will assess the potential interest of the Inter-American Development Bank and Banco Nacional de Obras y Servicios Publicos (BANOBRAS) and other local and international financial institutions interested in lending support to the project. The financial analysis shall include, but will not be limited to, a detailed analysis of the proposed debt-equity structure and a full description of the cost-recovery program required for the self-sustainability of the project.

The cost-recovery program should take into account the costs associated with the operation and maintenance of the project plus the debt service and the cost of replacement. As future significant capital expenditures are to be required to replace project facilities and equipment, it will be appropriate to include depreciation components in the water/wastewater charges. All sources of revenue must be identified.

As part of this task, the Contractor shall meet with the Project Sponsor to discuss the financial plan and the water rates needed to support the project implementation.

### **Subtask 3.4 Human Health, Environmental Analysis**

The feasibility analysis shall include the identification, discussion and analysis of the impacts on human health and environment that may result from implementation of the project. The environmental impact analysis shall be carried in accordance with the Government of Mexico (Comision Nacional del Agua, SEMARNAT, Gobierno del Estado de Sonora) procedures. Environmental control and mitigation measures shall be assessed and specified as necessary.

### **Subtask 3.5 Water Quality Impacts**

Short-term and long-term impacts on seawater and/or groundwater quality that may result from the implementation of the project shall be identified. The analysis shall include the identification and discussion of mitigation measures available to reduce any potential water quality impacts.

### **Subtask 3.6 Ecological Impacts**

The feasibility study shall analyze any short-term and long-term impacts on sensitive life forms and ecological systems derived from the implementation of the project. It shall include the identification and discussion of mitigation measures available to reduce negative impacts to the greatest extent possible.

### **Subtask 3.7 Socioeconomic Impacts**

Identify, discuss and analyze short-term and long-term impacts on human health and wellbeing, employment, income, education, business growth, economic production, and commercial and industrial activity that may result from the implementation of the project.

**Subtask 3.8 Developmental Impact**

The socioeconomic analysis discussed in Task 3.7 will provide the basis for assessing the potential developmental impact of the project on the study area and, on a broader scale, on the State of Sonora and Mexico. For the benefit of those interested in the Project, the Contractor shall assess the Project's development benefits and the methodology for measuring those benefits. The assessment shall include examples of what is to be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall focus specifically on examples from the categories listed below and shall develop a methodology for assessing these impacts over time. The Contractor shall select examples that USTDA can obtain information on in the future and shall identify where to obtain this information (e.g. the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project. The categories to be considered are as follows:

- **Infrastructure:** Estimate the expected scale of infrastructure construction and comment on the capabilities of any recommended infrastructure improvements.
- **Human capacity building:** Estimate the number and type of jobs that would be created during the construction or installation phases if the Contractor's recommendations are implemented. Distinguish between temporary construction jobs and the number of jobs that would be created or sustained once construction is complete. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- **Technology transfer and productivity improvements:** Discuss recommended commercial contracts for licensing new technologies, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains stemming from these recommendations such as improved systems or processes that enhance productivity or result in the more efficient use of resources.
- **Market-oriented reform:** Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that effectuate liberalization of prices, privatization of previously state-owned assets, or increased competition in a given sector.
- **Other:** Discuss prospective, indirect developmental impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

Duration of Task 3 (including all its Subtasks): Fifteen (15) workdays

**Task 4 ANALYSIS OF U. S. MANUFACTURERS OF TELEMETRY/SCADA TECHNOLOGY**

The Contractor shall assess the availability of U.S. manufactured equipment and products for all components of the telemetry/SCADA system and shall provide detailed technical specifications for each of them including business name, website, point of contact, address, telephone and fax numbers, and email address.

Duration of Task 8: Five (5) Workdays

**Task 5 PROJECT IMPLEMENTATION PLAN**

This task involves the preparation of an overall plan for the implementation of each of the project's components. This will include the procurement plan for the acquisition of each component of the telemetry/SCADA system. The Contractor will provide the technical specifications and terms of reference for each component of the project.

The feasibility study will generate a project and terms of reference specific enough to allow for bids to be evaluated on the basis of their capability in meeting software specifications, hardware specifications, communication technology, performance standards, training, testing and technical support.

Duration of Task 5: Five (5) Workdays

**Task 7 FINAL REPORT**

The Contractor will prepare a feasibility study report with the technical details of the telemetry/SCADA technology selected for Guaymas. It will provide information on the O&M requirements of the system. The Contractor will also provide a list of companies in the United States that are capable of providing the technologies required for the successful implementation of the project.

The Final Report shall be substantive and comprehensive of all the work performed in accordance with these Terms of Reference, including all deliverables to be turned in to the Project Sponsor and USTDA. The Final Report shall document the projected host country developmental impacts that results from the implementation of the project based on the requirements identified in Subtask 3.8. The Final Report will be prepared in accordance with Clause I of Annex II of the Grant Agreement. The Contractor shall deliver the Grantee and USTDA with six (6) copies (each) of the final report on CD-ROM. The CD-ROM version of the final report will include:

- Adobe Acrobat readable copies of all documents;
- Source files for all drawings in AutoCad or Visio format; and
- Source files for all documents in MS Office 2000 or later formats.

Duration of Task 10: Five (5) Workdays

**APPENDIX 10  
PROPOSED BUDGET  
FOR THE FEASIBILITY STUDY OF THE GUAYMAS PROJECT**

**Budget Narrative****Project Manager (PM)**

The direction of the USTDA technical assistance will be a responsibility of the U.S. Contractor's Project Manager. The proposed individual for the PM position should be a licensed engineer (PE) with no less than twenty (20) years of proven professional experience with emphasis on water desalination and tertiary treatment design. The participation of the PM is estimated at 6 days. The fully loaded daily rate assessed for the PM is \$1,500, which is consistent with standard remuneration for senior level engineers in the U.S.

**Project Engineer (PEN)**

This professional will perform the role of the Project Engineer and as such should be responsible for the day-to-day progress of the project. The proposed individual should be a professional engineer (PE) with over ten (10) years of professional experience in water/wastewater projects FS and design. The participation of this professional is estimated at 25 days. The fully loaded daily rate assessed for this professional is \$1,300.

**Project Communication Engineer (PCE)**

This is a professional electrical or related science engineer with at least 10 years of experience in telemetry and SCADA systems design with emphasis on the selection of SCADA systems for water/wastewater facilities. The participation of this professional is estimated at 26 days. The fully loaded daily rate assessed for this professional is \$1,800.

**Project Electrical Engineer (PEL)**

This is a professional electrical engineer with at least 10 years of experience in power systems design for water/wastewater systems including telemetry and SCADA projects. The participation of this professional is estimated at 12 days. The fully loaded daily rate assessed for this professional is \$1,300.

**Project Economist / Financial Analyst (PEN)**

The economist / Financial Analyst selected for the project will have at least ten (10) years of professional experience conducting FS related to water/wastewater projects. The participation of this individual is estimated at 19 days. The fully loaded daily rate assessed for this professional is \$1,300.

**Scientists/AutoCad**

The Social and Environmental Scientists selected for the project will have at least ten (10) years of professional experience conducting FS related to water supply and wastewater management projects. The AutoCad Expert selected for the projects will have ten (10) years of experience. The participation of these individuals is estimated at 16 days. The fully loaded daily rate assessed for this professional is \$1,100.

**Sponsor Technical Support / Liaison**

The Project Sponsor has confirmed that it will provide an Engineer who will serve as the liaison between the CEA-Guaymas and the Contractor. In addition, CEA-Guaymas will provide the U.S. Contractor with all the necessary support such as transportation, office space in the project area, office supplies and materials, telephone, internet connection and local support personnel.

Appendix 10  
 Definitional Mission: Municipal Water Supply and Wastewater Treatment Projects in Mexico  
 USTDA-CO2007510005  
 Guaymas Telemetry/SCADA  
 TECHNICAL ASSISTANCE PROPOSED BUDGET

TASK NAME	LABOR IN PERSON DAYS							LABOR RECAP BY TASK			TRIP RECAP BY TASK		
	Project Manager	Project Engineer	Communic ation Eng.	Electrical Eng.	Economist	Scientist/ AutoCad	Sponsor Liaison	TOTAL DAYS	LABOR COST	TRIPS	TRIP DAYS	TRIP COST	
Task 1 DETAILED BACKGROUND REVIEW	1	10	5	2	2	2	15	37	\$30,900	2	10	\$4,450	
Task 2 SCADA AND COMMUNICATION SYSTEM IDENTIFICATION AND EVALUATION	1	2	15	5	1	3	15	42	\$42,200	2	10	\$4,450	
Task 3 TELEMETRY/SCADA FEASIBILITY ANALYSIS	1	2	3	2	15	10	15	48	\$42,600	2	10	\$4,450	
Task 5 ANALYSIS OF U.S. MANUFACTURERS OF TELEMETRY/SCADA TECHNOLOGIES	1	3	1	1	1	5	5	11	\$8,500	1	2	\$0	
Task 6 PROJECT IMPLEMENTATION PLAN	1	3	1	1	1	1	5	11	\$8,500	1	2	\$0	
Task 7 FINAL REPORT	1	5	1	1	1	1	5	15	\$13,500	1	2	\$120	
LABOR IN PERSON DAYS	6	25	26	12	19	16	60	164	\$146,200	7	32	\$13,470	

LABOR INCLUDING OVERHEAD & GENERAL ADMINISTRATIVE

Daily Rate*	\$1,500	\$1,300	\$1,500	\$1,500	\$1,300	\$1,300	\$1,100	TOTAL LABOR COST
	\$9,000	\$32,500	\$46,800	\$15,600	\$24,700	\$17,600	\$0	\$146,200

Labor Categories:	Average Fully Loaded Daily Rate	Person Days	Cost Extension	Totals	
				Subtotal Labor	Subtotal Labor
US Nationals**					\$0
Outside Consultants					\$0
Other Direct Costs for Outside Consultants**					\$0

Ground Travel	Number	Unit	Cost/Unit	Totals
Per Diem	7	RT	\$1,200	\$8,400
Misc Costs inc. Tel. Fax, Courier	32	Per-Days	\$205	\$6,560
	7	RT	\$120	\$840
<b>TOTAL OUTSIDE CONSULTANTS (Consultant Labor + Other Costs):</b>				<b>\$30,000</b>

Other Direct Costs	Number	Unit	Cost/Unit	Totals
Total Outside Consultants	7	RT	\$1,200	\$8,400
Air Fare	32	Per-Days	\$205	\$6,560
Per Diem Location	7	RT	\$120	\$840
Local Travel, Interpreter & Local Technical Assistance				\$3,000
Travel To & From Airport				\$2,000
Communication				\$3,000
Other Field expenses including DBA & Mecevac insurance, office space				\$3,000
Other Administrative Costs, including internet, telephone & fax				\$30,200
<b>TOTAL ODC's</b>				<b>\$30,200</b>
<b>TOTAL USTDA Grant</b>				<b>\$176,400</b>

LABOR RECAP BY TASK	TRIP RECAP BY TASK
TOTAL LABOR COST	TOTAL PROJECT COST
\$146,200	\$176,400

**ANNEX 3**

**USTDA NATIONALITY REQUIREMENTS**



**U.S. TRADE AND DEVELOPMENT AGENCY  
Arlington, VA 22209-2131**

**NATIONALITY, SOURCE, AND ORIGIN REQUIREMENTS**

The purpose of USTDA's nationality, source, and origin requirements is to assure the maximum practicable participation of American contractors, technology, equipment and materials in the prefeasibility, feasibility, and implementation stages of a project.

**USTDA STANDARD RULE (GRANT AGREEMENT STANDARD LANGUAGE):**

Except as USTDA may otherwise agree, each of the following provisions shall apply to the delivery of goods and services funded by USTDA under this Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from host country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for implementation of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in host country are not subject to the above restrictions. USTDA will make available further details concerning these standards of eligibility upon request.

**NATIONALITY:**

1) Rule

Except as USTDA may otherwise agree, the Contractor for USTDA funded activities must be either a U.S. firm or a U.S. individual. Prime contractors may utilize U.S. subcontractors without limitation, but the use of host country subcontractors is limited to 20% of the USTDA grant amount.

## 2) Application

Accordingly, only a U.S. firm or U.S. individual may submit proposals on USTDA funded activities. Although those proposals may include subcontracting arrangements with host country firms or individuals for up to 20% of the USTDA grant amount, they may not include subcontracts with third country entities. U.S. firms submitting proposals must ensure that the professional services funded by the USTDA grant, to the extent not subcontracted to host country entities, are supplied by employees of the firm or employees of U.S. subcontractor firms who are U.S. individuals.

Interested U.S. firms and consultants who submit proposals must meet USTDA nationality requirements as of the due date for the submission of proposals and, if selected, must continue to meet such requirements throughout the duration of the USTDA-financed activity. These nationality provisions apply to whatever portion of the Terms of Reference is funded with the USTDA grant.

## 3) Definitions

A "U.S. individual" is (a) a U.S. citizen, or (b) a non-U.S. citizen lawfully admitted for permanent residence in the U.S. (a green card holder).

A "U.S. firm" is a privately owned firm which is incorporated in the U.S., with its principal place of business in the U.S., and which is either (a) more than 50% owned by U.S. individuals, or (b) has been incorporated in the U.S. for more than three (3) years prior to the issuance date of the request for proposals; has performed similar services in the U.S. for that three (3) year period; employs U.S. citizens in more than half of its permanent full-time positions in the U.S.; and has the existing capability in the U.S. to perform the work in question.

A partnership, organized in the U.S. with its principal place of business in the U.S., may also qualify as a "U.S. firm" as would a joint venture organized or incorporated in the United States consisting entirely of U.S. firms and/or U.S. individuals.

A nonprofit organization, such as an educational institution, foundation, or association may also qualify as a "U.S. firm" if it is incorporated in the United States and managed by a governing body, a majority of whose members are U.S. individuals.

## **SOURCE AND ORIGIN:**

### 1) Rule

In addition to the nationality requirement stated above, any goods (e.g., equipment and materials) and services related to their shipment (e.g., international transportation and insurance) funded under the USTDA Grant Agreement must have their source and origin in the United States, unless USTDA otherwise agrees. However, necessary purchases of goods and project support services which are unavailable from a U.S. source (e.g., local food, housing and transportation) are eligible without specific USTDA approval.

### 2) Application

Accordingly, the prime contractor must be able to demonstrate that all goods and services purchased in the host country to carry out the Terms of Reference for a USTDA Grant Agreement that were not of U.S. source and origin were unavailable in the United States.

### 3) Definitions

"Source" means the country from which shipment is made.

"Origin" means the place of production, through manufacturing, assembly or otherwise.

*Questions regarding these nationality, source, and origin requirements may be addressed to the USTDA Office of General Counsel.*

**ANNEX 4**

**USTDA GRANT AGREEMENT,  
INCLUDING MANDATORY CONTRACT CLAUSES**

USTDA # 07-51022B

## GRANT AGREEMENT

DEPARTMENT OF COMMERCE U.S. TRADE AND DEVELOPMENT AGENCY	MAR - 3 2008
K. J. O'NEIL	

This Grant Agreement is entered into between the Government of the United States of America, acting through the U.S. Trade and Development Agency ("USTDA") and the Municipalidad de Puerto Peñasco ("Grantee"). USTDA agrees to provide the Grantee under the terms of this Agreement US\$369,325 ("USTDA Grant") to fund the cost of goods and services required for a feasibility study ("Study") on the proposed Puerto Peñasco Water Desalination Facility ("Project") in Mexico ("Host Country").

*1. English + Spanish*

### 1. USTDA Funding

The funding to be provided under this Grant Agreement shall be used to fund the costs of a contract between the Grantee and the U.S. firm selected by the Grantee ("Contractor") under which the Contractor will perform the Study ("Contract"). Payment to the Contractor will be made directly by USTDA on behalf of the Grantee with the USTDA Grant funds provided under this Grant Agreement.

### 2. Terms of Reference

The Terms of Reference for the Study ("Terms of Reference") are attached as Annex I and are hereby made a part of this Grant Agreement. The Study will examine the technical, financial, environmental, and other critical aspects of the proposed Project. The Terms of Reference for the Study shall also be included in the Contract.

### 3. Standards of Conduct

USTDA and the Grantee recognize the existence of standards of conduct for public officials, and commercial entities, in their respective countries. The parties to this Grant Agreement and the Contractor shall observe these standards, which include not accepting payment of money or anything of value, directly or indirectly, from any person for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the Study.

### 4. Grantee Responsibilities

The Grantee shall undertake its best efforts to provide reasonable support for the Contractor, such as local transportation, office space, and secretarial support.

## **5. USTDA as Financier**

### **(A) USTDA Approval of Competitive Selection Procedures**

Selection of the U.S. Contractor shall be carried out by the Grantee according to its established procedures for the competitive selection of contractors with advance notice of the procurement published online through *Federal Business Opportunities* ([www.fedbizopps.gov](http://www.fedbizopps.gov)). Upon request, the Grantee will submit these contracting procedures and related documents to USTDA for information and/or approval.

### **(B) USTDA Approval of Contractor Selection**

The Grantee shall notify USTDA at the address of record set forth in Article 17 below upon selection of the Contractor to perform the Study. Upon approval of this selection by USTDA, the Grantee and the Contractor shall then enter into a contract for performance of the Study. The Grantee shall notify in writing the U.S. firms that submitted unsuccessful proposals to perform the Study that they were not selected.

### **(C) USTDA Approval of Contract Between Grantee and Contractor**

The Grantee and the Contractor shall enter into a contract for performance of the Study. This contract, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing. To expedite this approval, the Grantee (or the Contractor on the Grantee's behalf) shall transmit to USTDA, at the address set forth in Article 17 below, a photocopy of an English language version of the signed contract or a final negotiated draft version of the contract.

### **(D) USTDA Not a Party to the Contract**

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of the contract and any amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of funding the Study and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility or liability to such parties. Any approval or failure to approve by USTDA shall not bar the Grantee or USTDA from asserting any right they might have against the

Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Grantee or USTDA.

**(E) Grant Agreement Controlling**

Regardless of USTDA approval, the rights and obligations of any party to the contract or subcontract thereunder must be consistent with this Grant Agreement. In the event of any inconsistency between the Grant Agreement and any contract or subcontract funded by the Grant Agreement, the Grant Agreement shall be controlling.

**6. Disbursement Procedures**

**(A) USTDA Approval of Contract Required**

USTDA will make disbursements of Grant funds directly to the Contractor only after USTDA approves the Grantee's contract with the Contractor.

**(B) Contractor Invoice Requirements**

The Grantee should request disbursement of funds by USTDA to the Contractor for performance of the Study by submitting invoices in accordance with the procedures set forth in the USTDA Mandatory Clauses in Annex II.

**7. Effective Date**

The effective date of this Grant Agreement ("Effective Date") shall be the date of signature by both parties or, if the parties sign on different dates, the date of the last signature.

**8. Study Schedule**

**(A) Study Completion Date**

The completion date for the Study, which is December 31, 2008, is the date by which the parties estimate that the Study will have been completed.

**(B) Time Limitation on Disbursement of USTDA Grant Funds**

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this Grant Agreement for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

## **9. USTDA Mandatory Clauses**

All contracts funded under this Grant Agreement shall include the USTDA mandatory clauses set forth in Annex II to this Grant Agreement. All subcontracts funded or partially funded with USTDA Grant funds shall include the USTDA mandatory clauses, except for clauses B(1), G, H, I, and J.

## **10. Use of U.S. Carriers**

### **(A) Air**

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

### **(B) Marine**

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

## **11. Nationality, Source and Origin**

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

## **12. Taxes**

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country. Neither the Grantee nor the Contractor will seek reimbursement from USTDA for such taxes, tariffs, duties, fees or other levies.

### **13. Cooperation Between Parties and Follow-Up**

The parties will cooperate to assure that the purposes of the Grant Agreement are accomplished. For five (5) years following receipt by USTDA of the Final Report (as defined in Clause I of Annex II), the Grantee agrees to respond to any reasonable inquiries from USTDA about the status of the Project.

### **14. Implementation Letters**

To assist the Grantee in the implementation of the Study, USTDA may, from time to time, issue implementation letters that will provide additional information about matters covered by the Grant Agreement. The parties may also use jointly agreed upon implementation letters to confirm and record their mutual understanding of matters covered by the Grant Agreement.

### **15. Recordkeeping and Audit**

The Grantee agrees to maintain books, records, and other documents relating to the Study and the Grant Agreement adequate to demonstrate implementation of its responsibilities under the Grant Agreement, including the selection of contractors, receipt and approval of contract deliverables, and approval or disapproval of contractor invoices for payment by USTDA. Such books, records, and other documents shall be separately maintained for three (3) years after the date of the final disbursement by USTDA. The Grantee shall afford USTDA or its authorized representatives the opportunity at reasonable times to review books, records, and other documents relating to the Study and the Grant Agreement.

### **16. Representation of Parties**

For all purposes relevant to the Grant Agreement, the Government of the United States of America will be represented by the U. S. Ambassador to Host Country or USTDA and Grantee will be represented by the Presidente Municipal of the Municipalidad de Puerto Peñasco. The parties hereto may, by written notice, designate additional representatives for all purposes under the Grant Agreement.

### **17. Addresses of Record for Parties**

Any notice, request, document, or other communication submitted by either party to the other under the Grant Agreement shall be in writing or through a wire or electronic medium which produces a tangible record of the transmission, such as a telegram, cable or facsimile, and will be deemed duly given or sent when delivered to such party at the following:

To: Presidencia Municipal.  
Municipio de Puerto Peñasco  
Boulevard Benito Juarez y  
Boulevard Freemont s/n  
CP 83550  
RFC: MPP 510916 KN7  
Puerto Peñasco, Sonora  
México.  
Phone: 011-52-638-383-2060 Ext. 1  
Fax: 011-52-638-383-2060

To: U.S. Trade and Development Agency  
1000 Wilson Boulevard, Suite 1600  
Arlington, Virginia 22209-3901  
USA

Phone: (703) 875-4357  
Fax: (703) 875-4009

All such communications shall be in English, unless the parties otherwise agree in writing. In addition, the Grantee shall provide the Commercial Section of the U.S. Embassy in Host Country with a copy of each communication sent to USTDA.

Any communication relating to this Grant Agreement shall include the following fiscal data:

Appropriation No.: 118/91001  
Activity No.: 2007-51022B  
Reservation No.: 2008510014  
Grant No.: GH2008510006

## **18. Termination Clause**

Either party may terminate the Grant Agreement by giving the other party thirty (30) days advance written notice. The termination of the Grant Agreement will end any obligations of the parties to provide financial or other resources for the Study, except for payments which they are committed to make pursuant to noncancellable commitments entered into with third parties prior to the written notice of termination.

**19. Non-waiver of Rights and Remedies**

No delay in exercising any right or remedy accruing to either party in connection with the Grant Agreement shall be construed as a waiver of such right or remedy.

**20. U.S. Technology and Equipment**

By funding this Study, USTDA seeks to promote the project objectives of the Host Country through the use of U.S. technology, goods, and services. In recognition of this purpose, the Grantee agrees that it will allow U.S. suppliers to compete in the procurement of technology, goods and services needed for Project implementation.

**[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]**

**IN WITNESS WHEREOF, the Government of the United States of America and the Municipalidad de Puerto Peñasco, each acting through its duly authorized representative, have caused this Agreement to be signed in the English language in their names and delivered as of the day and year written below. In the event that this Grant Agreement is signed in more than one language, the English language version shall govern.**

**For the Government of the  
United States of America**

By: 

Leocadia I. Zak  
Acting Director

Date: February 27, 2008

**For the Municipalidad de  
Puerto Peñasco**

By: 

C. Heriberto Rentería Sánchez  
Municipal President

Date: February 27, 2008

**Annex I -- Terms of Reference**

**Annex II -- USTDA Mandatory Clauses**

## Annex I

### **TERMS OF REFERENCE FOR THE PUERTO PEÑASCO WATER DESALINATION FACILITY FEASIBILITY STUDY**

#### **1. PURPOSE AND OBJECTIVE OF THE STUDY**

The purpose of this U.S. Trade and Development Agency (“USTDA”) grant assistance is to provide technical support to the Municipality of Puerto Peñasco (“Grantee”) for a feasibility study (“Study”) on a water desalination project at Puerto Peñasco (“Project Area”) in the State of Sonora, Mexico.

The objective of the Study is to assess the technical, economic, financial, environmental and regulatory feasibilities and the developmental impacts associated with seawater and/or brackish water desalination and conditioning for potable water use in the Project Area. In addition, the Study will also provide the documentation for a performance-driven competitive procurement process for the selection of a project contractor (“Project Contractor”). Although it is anticipated that the Project will be implemented using a Design-Build-Operate (“DBO”) structure, other structures may be considered. Under a DBO structure, the Municipality of Puerto Peñasco will require that the Project Contractor operate the facility for a duration that allows the local technical personnel of the Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento (“OOMAPAS”) to acquire the technical proficiency to operate the facility without any detrimental effect to the quality and quantity of the water supply, the cost of the operation and the operational capability of the facility.

#### **2. BACKGROUND**

The Municipality of Puerto Peñasco has a contract with the Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (“CICESE”) for the study of the saline water intake, concentrate disposal, environmental impact assessment and permitting of a desalination facility for Puerto Peñasco. Specifically, the CICESE scope of work entails the following:

- Study and selection of the location of the saline water intake.
- Water quality analysis of the saline water at the location of the proposed intake.
- Study and selection of a suitable terrain for the desalination facility.
- The Grantee will provide the legal clearance necessary for the siting of the desalination facility.
- Study and selection of the location of the concentrate disposal area.
- All environmental impact studies and approvals associated with the intake and concentrate disposal.

The Grantee submitted a request for a study on a water desalination project for Puerto Peñasco to USTDA. The Study entails reviewing the results of the CICESE study and

engineering work, the analysis of the feasibility of the proposed saline water treatment facility, and the preparation of the documentation for the selection of Project Contractor. The proposed desalination facility will be designed to produce 500 lps (liters per second, 11.41 MGD) with a modular design that allows for increasing potable water production to 2,000 lps (45.64 MGD) by 2020. The proposed action is necessary to support population growth and current and planned tourist resorts and related business expansion in the Project Area. The Contractor shall also assess the technical and commercial value of the Project.

### **3. SCOPE OF WORK**

#### **Task 1 DETAILED BACKGROUND REVIEW**

The Contractor shall commence work by becoming familiar with the Project Area environmental setting and reviewing all existing and available background information on the Puerto Peñasco water supply system and the CICESE study. As part of this task, the Contractor shall meet with Grantee officials including the “Coordinador del Proyecto de Desalinización de Puerto Peñasco”, CICESE, OOMAPAS and other relevant stakeholders.

The Contractor shall review the CICESE study reports, data and technical conclusions pertaining seawater and/or brackish water intake, water quality requirement and environmental discharge of desalination plant reject. In the event water quality standards for the Study are not specified in the regulations of the Government of Mexico, the Contractor, in agreement with accepted professional practice, shall propose the adoption of international standards such as those promulgated by the World Health Organization guidelines. The Contractor shall identify the water system sampling and analysis required as a condition of a regulatory permit and for the facility design and operation. If the Contractor considers it necessary to request additional analytical data, the Grantee (through CICESE) shall be responsible for obtaining this data as scheduled by the Contractor. Funds and personnel for water quality laboratory work, intake location and concentrate disposal system installation and any geotechnical analysis required for this project shall be furnished by the Grantee.

As a result of this task the Contractor shall become fully acquainted with the Project Area, facility location and its environs and the scope of the work required to satisfy the requirements of the Study. The Contractor shall also assess the quantity of saline water to be treated at the desalination facility to meet the average, peak and seasonal variations of the water supply demand.

Estimated duration of Task 1: Ten (10) workdays

## **Task 2           STUDY MANAGEMENT PLAN**

As part of this task, the Contractor shall coordinate Study activities with all Study team members including the Contractor staff, Grantee personnel and CICESE. The Contractor shall organize a workshop at the start of the Study to exchange ideas and develop an integrated study plan for all components of the Study. The Contractor shall prepare a detailed project management plan outlining the responsibility of each entity and professionals participating in the Study.

Estimated duration of Task 2: Two (2) workdays

## **Task 3           DESALINATION AND WATER TREATMENT TECHNOLOGIES EVALUATION**

The Contractor shall assess saline water treatment technologies to meet potable water quality requirements.

### **Subtask 3.1   Establishing Design Criteria**

The Contractor shall work closely with the Grantee to establish the power source and cost of the electric power supply for the Project. In concert with the Grantee and CICESE, the Contractor shall establish the appropriate design criteria for the various components of the water management system (i.e., hydraulic design criteria for the saline water intake and its conveyance to the facility and discharge of desalination plant reject to the environment in accordance with regulatory requirements). The design criteria shall include saline water pretreatment, pump units and desalination system, potable water storage and related appurtenances such as pump stations. As indicated in Task 1, in establishing appropriate design parameters, the Contractor shall take into account local, national, and international regulations on saline water treatment for potable use. At the completion of this task, the Contractor shall prepare a technical memorandum to document the proposed design criteria for the Project.

Estimated duration of Subtask 3.1: Twenty (20) workdays

### **Subtask 3.2   Evaluation of Saline Water Treatment Alternatives**

The Contractor shall identify, describe and evaluate viable saline water treatment alternatives. Alternatives shall be identified based on actual saline water characteristics (quantity and quality), potable water quality requirements, saline water treatment facility footprint (which depends on the assessment of land availability in the Project Area), implementation costs and operation and maintenance (O&M) factors.

The Contractor shall identify all components of the saline water management systems, including but not limited to saline water intake and conveyance, power source, pumps, Ultra Filtration, Reverse Osmosis and UV or chlorination units, saline and desalinated

water storage and desalination plant reject. The Contractor shall prepare a conceptual design for each water management alternative. The technical details of each alternative shall include pipeline sizes and alignment, pump stations, process flow diagrams, site layouts, hydraulic profiles and equipment list. In addition, alternative pipeline materials shall be evaluated.

The Contractor shall provide a detailed evaluation for the each potential viable alternative. The criteria to be used in the evaluation shall include but will not be limited to:

- Expected effectiveness and reliability,
- Health risks and environmental concerns,
- Implementability and constructability,
- Expandability,
- Operational considerations,
- Ability to be phased to meet long-term potable water demand in Puerto Peñasco and its environs.

As part of the evaluation, the Contractor shall prepare and articulate a comprehensive cost analysis of the alternatives that shall include life cycle costs, present cost analysis and cost/benefits. The Contractor shall recommend and present the preferred alternative to the Grantee for review and approval.

Estimated duration of Subtask 3.2: Twenty (20) workdays

### **Subtask 3.3 Preliminary Design**

The Contractor shall prepare a preliminary design of all required components of the water desalination system under the preferred alternative approved by the Grantee in subtask 3.2. In agreement with professional standard practice, the design shall include but is not to be limited to the following:

- Power source, pump stations, electrical and mechanical equipment,
- Unit processes including pretreatment system, membrane system, desalinated water conditioning (post-treatment),
- Influent, reverse osmosis process piping, chemical process piping and discharge pipelines,
- Desalination plant reject,
- Preliminary design of potable water storage,
- Instrumentation and control system (SCADA).

Any required topographic, water quality, and/or geotechnical surveys shall be conducted by the Grantee.

The preliminary design for the Project shall be presented in a descriptive and schematic form. The preliminary design shall be discussed with the Grantee prior to its completion.

Estimated duration of Subtask 3.3: Twenty (20) workdays

#### **Task 4 FEASIBILITY ANALYSIS OF THE WATER DESALINATION PROJECT**

The Contractor shall conduct and articulate a detailed feasibility analysis of the Project developed above.

##### **Subtask 4.1 Technical Assessment**

In agreement with standard professional practice, the Contractor shall prepare a technical assessment which shall include, but is not to be limited to, the analysis of the following factors:

- Engineering and design parameters, complexity, and limitations;
- Constructability and identification of major problem areas;
- Operability including operating costs and personnel needs to operate;
- Maintenance requirements, personnel needs and costs;
- Long-term adaptability and effects on the existing water supply system; and
- Life cycle costs.

##### **Subtask 4.2 Economic Analysis**

The Contractor shall prepare an economic analysis to assess the Project based on a set of socioeconomic indicators including, but not limited to, the cost of the desalinated potable water system on the Puerto Peñasco water users. The Contractor shall examine the economic benefits of using desalinated potable water in the Project Area as compared to using the limited existing fresh water system. To this end, the analysis shall take into account all avoidable water management costs associated with the saline water treatment plant, water quality monitoring and environmental externalities related to saline water intake and the disposal of the reject.

The Contractor shall estimate the economic and financial impacts of the investment by means of a comparison of current (without the Project) socioeconomic conditions to future (with the Project) potential socioeconomic scenarios.

##### **Subtask 4.3 Financial Analysis**

The Contractor shall prepare, as part of the Study, a financial analysis for the implementation of the Project. The financial analysis shall satisfy the requirements of the Grantee who is responsible for seeking and obtaining project financing. In addition, the financial analysis shall also satisfy the requirements of all prospective funding institutions, which shall be identified by the Grantee at the onset of the Study. In concert with the Grantee, the Contractor shall assess the potential interest of the Inter-American Development Bank and Banco Nacional de Obras y Servicios Públicos (“BANOBRAS”)

and other local and international financial institutions interested in lending support to the Project. The financial analysis shall include, but will not be limited to, a detailed analysis of the proposed debt-equity structure and a full description of the cost-recovery program required for the self-sustainability of the Project.

The cost-recovery program shall take into account the costs associated with the operation and maintenance of the Project plus the debt service and the cost of replacement. As future significant capital expenditures are to be required to replace Project facilities and equipment, the Contractor shall include depreciation components in the water charges. All potential sources of revenue shall be identified.

As part of this task, the Contractor shall meet with the Grantee to discuss the financial analysis and the water rates needed to support the Project implementation.

#### **Subtask 4.4 Human Health and Environmental Impact Analysis**

The Contractor shall identify, discuss, and analyze the impacts on human health and environment that may result from implementation of the Project. The environmental impact analysis shall be carried out based on the information and data provided by CICESE and in accordance with the Government of Mexico (Comision Nacional del Agua, SEMARNAT, Secretaria de Marina and Gobierno del Estado de Sonora) procedures. Environmental control and mitigation measures shall be assessed and specified as necessary. All data and information required for the environmental impact analysis shall be provided by the Grantee.

#### **Subtask 4.5 Water Quality Impact Analysis**

The Contractor shall identify the short-term and long-term impacts on seawater and/or groundwater quality that may result from the implementation of the Project based on baseline water quality analytical data. The analysis shall include the identification and discussion of mitigation measures available to reduce water quality impacts to the greatest extent possible. All data and information required for the analysis of the water quality impacts shall be provided by the Grantee.

#### **Subtask 4.6 Ecological Impact Analysis**

The Contractor shall analyze any short-term and long-term impacts on sensitive life forms and ecological systems derived from the implementation of the Project. The analysis shall include the identification and discussion of mitigation measures available to reduce negative impacts to the greatest extent possible. All data and information required for the analysis of the ecological impacts shall be provided by the Grantee.

#### **Subtask 4.7 Socioeconomic Impact Analysis**

The Contractor shall identify, discuss and analyze short-term and long-term impacts on human health and well-being, employment, income, education, business growth,

economic production, and commercial and industrial activity that may result from the implementation of the Project.

#### **Subtask 4.8 Developmental Impact Assessment**

The socioeconomic analysis discussed in Task 4.7 will provide the basis for assessing the potential developmental impact of the Project on the Project Area and, broadly speaking on the state of Sonora and Mexico. For the benefit of those interested in the Project, the Contractor shall assess the Project's development benefits and the methodology for measuring those benefits. The assessment shall include examples of what is to be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall focus specifically on examples from the categories listed below, shall develop a methodology for assessing these impacts over time, and shall identify where to obtain this information in the future (e.g., the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project. The categories to be considered are as follows:

- Infrastructure: Estimate the expected scale of infrastructure construction and comment on the capabilities of any recommended infrastructure improvements.
- Human capacity building: Estimate the number and type of jobs that would be created during the construction or installation phases if the Contractor's recommendations are implemented. Distinguish between temporary construction jobs and the number of jobs that would be created or sustained once construction is complete. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- Technology transfer and productivity improvements: Discuss recommended commercial contracts for licensing new technologies, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains stemming from these recommendations such as improved systems or processes that enhance productivity or result in the more efficient use of resources.
- Market-oriented reform: Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that effectuate liberalization of prices, privatization of previously state-owned assets, or increased competition in a given sector.
- Other: Discuss prospective, indirect developmental impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

Estimated duration of Task 4 (including all its Subtasks): Thirty (30) workdays

**Task 5 ANALYSIS OF U. S. MANUFACTURERS OF DESALINATION AND WATER TREATMENT TECHNOLOGY**

The Contractor shall assess the availability of U.S. manufactured equipment and products for all components of the saline water desalination system and shall provide detailed technical specifications for each of them including business name, website, point of contact, address, telephone and fax numbers, and email address.

Estimated duration of Task 5: Five (5) Workdays

**Task 6 PROJECT IMPLEMENTATION PLAN**

The Contractor shall prepare an overall plan for the implementation of each of the Project's components. The implementation plan shall include the procurement plan for the acquisition of services needed by the Project Contractor for the Project's implementation. The Contractor shall provide performance-driven bidding documents and a procurement schedule. Under this Terms of Reference, the Contractor shall not be responsible for the evaluation of proposals under any procurement related to this Project.

The Contractor, in consultation with the Grantee, shall set forth the obligations of the Project Contractor in the bidding documents. The obligations of the Project Contractor may include the following:

- Performing all contract services as set forth in the Puerto Peñasco Seawater Desalination Project Contract, including compliance with the requirements of a Fee-For-Services Contract.
- Completing the construction (including acceptance testing) and placing the Project into commercial operation on a date to be determined by the Grantee and Contractor. Delays will be allowed only if they are outside the control of the Project Contractor and accepted by the Municipality of Puerto Peñasco as a valid extension.
- Treating up to 11.41 MGD of the saline water to meet the potable water requirements specified in the Project Contract.
- Paying penalties for failure to complete the Project on time or failure to meet the treatment standards in the Project Contract and in applicable Mexican standards and permit requirements.
- Accepting and treating saline water in the volumes specified in the Fee-For-Services Contract.

- Providing capacity to treat saline water that exceeds the flow or water quality parameters as specified in the Fee-For-Services Contract.
- Accepting and making reasonable effort to treat water that exceeds the allowable flow or water quality limits, unless the saline water threatens to damage the treatment facilities.
- Providing customary financial guarantees of payment and performance, acceptable to the Municipality of Puerto Peñasco, including a \$5 million performance bond for the life of the Project Contract.
- Paying all payroll, federal, state, and local taxes associated with its operations in Mexico.
- Collecting influent and effluent quality and quantity data and process monitoring data.
- Preparing routine operating reports required by the Comisión Estatal de Agua - Sonora, the Comisión Nacional de Agua and other pertinent regulatory agencies identified by the Contractor.
- Maintaining operating permits for the Project current during the operating period.
- Maintaining the Project facilities in good and reliable operating condition throughout the operating period.
- Providing training to OOMAPAS personnel.
- During the design and construction of the Project, the Project Contractor shall be entitled to monthly payments according to an agreed-upon schedule for the design, procurement of materials and/or equipment, and placement of construction. During the operating period, the Project Contractor shall be paid monthly for treating and delivering the saline water and maintaining the facilities.

Duration of Task 6: Twenty (20) Workdays

#### **Task 7 FINAL REPORT**

The Contractor shall prepare a substantive and comprehensive Final Report of all the work performed in accordance with these Terms of Reference, including all deliverables to be turned in to the Grantee and USTDA. The Final Report shall include all findings, recommendations and work product provided to the Grantee under Tasks 1 through 6. The Final Report shall be submitted to USTDA and the Grantee in accordance with Clause I of Annex II of the Grant Agreement. The Contractor shall deliver to the Grantee and USTDA with two (2) copies (each) of the Public Version of the Final Report on CD-ROM. The CD-ROM version of the Final Report shall include:

- Adobe Acrobat readable copies of all documents;
- Source files for all drawings in AutoCad or Visio format; and
- Source files for all documents in MS Office 2000 or later formats.

Duration of Task 7: Fifteen (15) Workdays

Notes:

- (1) The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.
- (2) The Contractor and the Grantee shall be careful to ensure that the public version of the Final Report contains no security or confidential information.
- (3) The Grantee and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work product that is developed under these Terms of Reference.
- (4) The Grantee shall be responsible for all procurement-related final decisions.

## Annex II

### USTDA Mandatory Contract Clauses

#### A. USTDA Mandatory Clauses Controlling

The parties to this contract acknowledge that this contract is funded in whole or in part by the U.S. Trade and Development Agency ("USTDA") under the Grant Agreement between the Government of the United States of America acting through USTDA and the Municipalidad de Puerto Peñasco ("Client"), dated \_\_\_\_\_ ("Grant Agreement"). The Client has selected \_\_\_\_\_ ("Contractor") to perform the feasibility study ("Study") for the Puerto Peñasco Water Desalination Facility project ("Project") in Mexico ("Host Country"). Notwithstanding any other provisions of this contract, the following USTDA mandatory contract clauses shall govern. All subcontracts entered into by Contractor funded or partially funded with USTDA Grant funds shall include these USTDA mandatory contract clauses, except for clauses B(1), G, H, I, and J. In addition, in the event of any inconsistency between the Grant Agreement and any contract or subcontract thereunder, the Grant Agreement shall be controlling.

#### B. USTDA as Financier

##### (1) USTDA Approval of Contract

All contracts funded under the Grant Agreement, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing in order to be effective with respect to the expenditure of USTDA Grant funds. USTDA will not authorize the disbursement of USTDA Grant funds until the contract has been formally approved by USTDA or until the contract conforms to modifications required by USTDA during the contract review process.

##### (2) USTDA Not a Party to the Contract

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of this contract and amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of financing the Study and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility or liability to such parties. Any approval or failure to approve by USTDA shall not

bar the Client or USTDA from asserting any right they might have against the Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Client or USTDA.

### **C. Nationality, Source and Origin**

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

### **D. Recordkeeping and Audit**

The Contractor and subcontractors funded under the Grant Agreement shall maintain, in accordance with generally accepted accounting procedures, books, records, and other documents, sufficient to reflect properly all transactions under or in connection with the contract. These books, records, and other documents shall clearly identify and track the use and expenditure of USTDA funds, separately from other funding sources. Such books, records, and documents shall be maintained during the contract term and for a period of three (3) years after final disbursement by USTDA. The Contractor and subcontractors shall afford USTDA, or its authorized representatives, the opportunity at reasonable times for inspection and audit of such books, records, and other documentation.

### **E. U.S. Carriers**

#### **(1) Air**

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

## **(2) Marine**

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

## **F. Workman's Compensation Insurance**

The Contractor shall provide adequate Workman's Compensation Insurance coverage for work performed under this Contract.

## **G. Reporting Requirements**

The Contractor shall advise USTDA by letter as to the status of the Project on March 1st annually for a period of two (2) years after completion of the Study. In addition, if at any time the Contractor receives follow-on work from the Client, the Contractor shall so notify USTDA and designate the Contractor's contact point including name, telephone, and fax number. Since this information may be made publicly available by USTDA, any information which is confidential shall be designated as such by the Contractor and provided separately to USTDA. USTDA will maintain the confidentiality of such information in accordance with applicable law.

## **H. Disbursement Procedures**

### **(1) USTDA Approval of Contract**

Disbursement of Grant funds will be made only after USTDA approval of this contract. To make this review in a timely fashion, USTDA must receive from either the Client or the Contractor a photocopy of an English language version of a signed contract or a final negotiated draft version to the attention of the General Counsel's office at USTDA's address listed in Clause M below.

### **(2) Payment Schedule Requirements**

A payment schedule for disbursement of Grant funds to the Contractor shall be included in this Contract. Such payment schedule must conform to the following USTDA requirements: (1) up to twenty percent (20%) of the total USTDA Grant amount may be used as an advance payment; (2) all other payments, with the exception of the final payment, shall be based upon contract performance milestones; and (3) the final payment may be no less than fifteen percent (15%) of the total USTDA Grant amount, payable upon receipt by USTDA of an approved Final Report in accordance with the specifications and quantities set forth in Clause I below. Invoicing procedures for all payments are described below.

### **(3) Contractor Invoice Requirements**

USTDA will make all disbursements of USTDA Grant funds directly to the Contractor. The Contractor must provide USTDA with an ACH Vendor Enrollment Form (available from USTDA) with the first invoice. The Client shall request disbursement of funds by USTDA to the Contractor for performance of the contract by submitting the following to USTDA:

#### **(a) Contractor's Invoice**

The Contractor's invoice shall include reference to an item listed in the Contract payment schedule, the requested payment amount, and an appropriate certification by the Contractor, as follows:

##### **(i) For an advance payment (if any):**

"As a condition for this advance payment, which is an advance against future Study costs, the Contractor certifies that it will perform all work in accordance with the terms of its Contract with the Client. To the extent that the Contractor does not comply with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA. "

##### **(ii) For contract performance milestone payments:**

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

##### **(iii) For final payment:**

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. Specifically, the Contractor has submitted the Final Report to the Client, as required by the Contract, and received the Client's approval of the Final Report. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

#### **(b) Client's Approval of the Contractor's Invoice**

**(i)** The invoice for an advance payment must be approved in writing by the Client.

(ii) For contract performance milestone payments, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and the terms and conditions of the USTDA Grant Agreement."

(iii) For final payment, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and terms and conditions of the USTDA Grant Agreement. The Final Report submitted by the Contractor has been reviewed and approved by the Client. "

**(c) USTDA Address for Disbursement Requests**

Requests for disbursement shall be submitted by courier or mail to the attention of the Finance Department at USTDA's address listed in Clause M below.

**(4) Termination**

In the event that the Contract is terminated prior to completion, the Contractor will be eligible, subject to USTDA approval, for reasonable and documented costs which have been incurred in performing the Terms of Reference prior to termination, as well as reasonable wind down expenses. Reimbursement for such costs shall not exceed the total amount of undisbursed Grant funds. Likewise, in the event of such termination, USTDA is entitled to receive from the Contractor all USTDA Grant funds previously disbursed to the Contractor (including but not limited to advance payments) which exceed the reasonable and documented costs incurred in performing the Terms of Reference prior to termination.

**I. USTDA Final Report**

**(1) Definition**

"Final Report" shall mean the Final Report described in the attached Annex I Terms of Reference or, if no such "Final Report" is described therein, "Final Report" shall mean a substantive and comprehensive report of work performed in accordance with the attached Annex I Terms of Reference, including any documents delivered to the Client.

**(2) Final Report Submission Requirements**

The Contractor shall provide the following to USTDA:

(a) One (1) complete version of the Final Report for USTDA's records. This version shall have been approved by the Client in writing and must be in the English language. It is the responsibility of the Contractor to ensure that confidential information, if any, contained in this version be clearly marked. USTDA will maintain the confidentiality of such information in accordance with applicable law.

and

(b) One (1) copy of the Final Report suitable for public distribution ("Public Version"). The Public Version shall have been approved by the Client in writing and must be in the English language. As this version will be available for public distribution, it must not contain any confidential information. If the report in (a) above contains no confidential information, it may be used as the Public Version. In any event, the Public Version must be informative and contain sufficient Project detail to be useful to prospective equipment and service providers.

and

(c) Two (2) CD-ROMs, each containing a complete copy of the Public Version of the Final Report. The electronic files on the CD-ROMs shall be submitted in a commonly accessible read-only format. As these CD-ROMs will be available for public distribution, they must not contain any confidential information. It is the responsibility of the Contractor to ensure that no confidential information is contained on the CD-ROMs.

The Contractor shall also provide one (1) copy of the Public Version of the Final Report to the Foreign Commercial Service Officer or the Economic Section of the U.S. Embassy in Host Country for informational purposes.

### **(3) Final Report Presentation**

All Final Reports submitted to USTDA must be paginated and include the following:

(a) The front cover of every Final Report shall contain the name of the Client, the name of the Contractor who prepared the report, a report title, USTDA's logo, USTDA's mailing and delivery addresses. If the complete version of the Final Report contains confidential information, the Contractor shall be responsible for labeling the front cover of that version of the Final Report with the term "Confidential Version." The Contractor shall be responsible for labeling the front cover of the Public Version of the Final Report with the term "Public Version." The front cover of every Final Report shall also contain the following disclaimer:

"This report was funded by the U.S. Trade and Development Agency (USTDA), an agency of the U. S. Government. The opinions, findings, conclusions or recommendations expressed in this document are those of the author(s) and do not necessarily represent the official position or policies of

USTDA. USTDA makes no representation about, nor does it accept responsibility for, the accuracy or completeness of the information contained in this report."

(b) The inside front cover of every Final Report shall contain USTDA's logo, USTDA's mailing and delivery addresses, and USTDA's mission statement. Camera-ready copy of USTDA Final Report specifications will be available from USTDA upon request.

(c) The Contractor shall affix to the front of the CD-ROM a label identifying the Host Country, USTDA Activity Number, the name of the Client, the name of the Contractor who prepared the report, a report title, and the following language:

"The Contractor certifies that this CD-ROM contains the Public Version of the Final Report and that all contents are suitable for public distribution."

(d) The Contractor and any subcontractors that perform work pursuant to the Grant Agreement must be clearly identified in the Final Report. Business name, point of contact, address, telephone and fax numbers shall be included for Contractor and each subcontractor.

(e) The Final Report, while aiming at optimum specifications and characteristics for the Project, shall identify the availability of prospective U.S. sources of supply. Business name, point of contact, address, telephone and fax numbers shall be included for each commercial source.

(f) The Final Report shall be accompanied by a letter or other notation by the Client which states that the Client approves the Final Report. A certification by the Client to this effect provided on or with the invoice for final payment will meet this requirement.

## **J. Modifications**

All changes, modifications, assignments or amendments to this contract, including the appendices, shall be made only by written agreement by the parties hereto, subject to written USTDA approval.

## **K. Study Schedule**

### **(1) Study Completion Date**

The completion date for the Study, which is December 31, 2008, is the date by which the parties estimate that the Study will have been completed.

## **(2) Time Limitation on Disbursement of USTDA Grant Funds**

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this contract for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

## **L. Business Practices**

The Contractor agrees not to pay, promise to pay, or authorize the payment of any money or anything of value, directly or indirectly, to any person (whether a governmental official or private individual) for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the Study. The Client agrees not to receive any such payment. The Contractor and the Client agree that each will require that any agent or representative hired to represent them in connection with the Study will comply with this paragraph and all laws which apply to activities and obligations of each party under this Contract, including but not limited to those laws and obligations dealing with improper payments as described above.

## **M. USTDA Address and Fiscal Data**

Any communication with USTDA regarding this Contract shall be sent to the following address and include the fiscal data listed below:

U.S. Trade and Development Agency  
1000 Wilson Boulevard, Suite 1600  
Arlington, Virginia 22209-3901  
USA

Phone: (703) 875-4357  
Fax: (703) 875-4009

### Fiscal Data:

Appropriation No.: 118/91001  
Activity No.: 2007-51022B  
Reservation No.: 2008510014  
Grant No.: GH2008510006

## **N. Definitions**

All capitalized terms not otherwise defined herein shall have the meaning set forth in the Grant Agreement.

## **O. Taxes**

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country. Neither the Client nor the Contractor will seek reimbursement from USTDA for such taxes, tariffs, duties, fees or other levies.

**ANNEX 5**

**TERMS OF REFERENCE  
(FROM USTDA GRANT AGREEMENT)**

## Annex I

### **TERMS OF REFERENCE FOR THE PUERTO PEÑASCO WATER DESALINATION FACILITY FEASIBILITY STUDY**

#### **1. PURPOSE AND OBJECTIVE OF THE STUDY**

The purpose of this U.S. Trade and Development Agency (“USTDA”) grant assistance is to provide technical support to the Municipality of Puerto Peñasco (“Grantee”) for a feasibility study (“Study”) on a water desalination project at Puerto Peñasco (“Project Area”) in the State of Sonora, Mexico.

The objective of the Study is to assess the technical, economic, financial, environmental and regulatory feasibilities and the developmental impacts associated with seawater and/or brackish water desalination and conditioning for potable water use in the Project Area. In addition, the Study will also provide the documentation for a performance-driven competitive procurement process for the selection of a project contractor (“Project Contractor”). Although it is anticipated that the Project will be implemented using a Design-Build-Operate (“DBO”) structure, other structures may be considered. Under a DBO structure, the Municipality of Puerto Peñasco will require that the Project Contractor operate the facility for a duration that allows the local technical personnel of the Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento (“OOMAPAS”) to acquire the technical proficiency to operate the facility without any detrimental effect to the quality and quantity of the water supply, the cost of the operation and the operational capability of the facility.

#### **2. BACKGROUND**

The Municipality of Puerto Peñasco has a contract with the Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (“CICESE”) for the study of the saline water intake, concentrate disposal, environmental impact assessment and permitting of a desalination facility for Puerto Peñasco. Specifically, the CICESE scope of work entails the following:

- Study and selection of the location of the saline water intake.
- Water quality analysis of the saline water at the location of the proposed intake.
- Study and selection of a suitable terrain for the desalination facility.
- The Grantee will provide the legal clearance necessary for the siting of the desalination facility.
- Study and selection of the location of the concentrate disposal area.
- All environmental impact studies and approvals associated with the intake and concentrate disposal.

The Grantee submitted a request for a study on a water desalination project for Puerto Peñasco to USTDA. The Study entails reviewing the results of the CICESE study and

engineering work, the analysis of the feasibility of the proposed saline water treatment facility, and the preparation of the documentation for the selection of Project Contractor. The proposed desalination facility will be designed to produce 500 lps (liters per second, 11.41 MGD) with a modular design that allows for increasing potable water production to 2,000 lps (45.64 MGD) by 2020. The proposed action is necessary to support population growth and current and planned tourist resorts and related business expansion in the Project Area. The Contractor shall also assess the technical and commercial value of the Project.

### **3. SCOPE OF WORK**

#### **Task 1 DETAILED BACKGROUND REVIEW**

The Contractor shall commence work by becoming familiar with the Project Area environmental setting and reviewing all existing and available background information on the Puerto Peñasco water supply system and the CICESE study. As part of this task, the Contractor shall meet with Grantee officials including the “Coordinador del Proyecto de Desalinizacion de Puerto Peñasco”, CICESE, OOMAPAS and other relevant stakeholders.

The Contractor shall review the CICESE study reports, data and technical conclusions pertaining seawater and/or brackish water intake, water quality requirement and environmental discharge of desalination plant reject. In the event water quality standards for the Study are not specified in the regulations of the Government of Mexico, the Contractor, in agreement with accepted professional practice, shall propose the adoption of international standards such as those promulgated by the World Health Organization guidelines. The Contractor shall identify the water system sampling and analysis required as a condition of a regulatory permit and for the facility design and operation. If the Contractor considers it necessary to request additional analytical data, the Grantee (through CICESE) shall be responsible for obtaining this data as scheduled by the Contractor. Funds and personnel for water quality laboratory work, intake location and concentrate disposal system installation and any geotechnical analysis required for this project shall be furnished by the Grantee.

As a result of this task the Contractor shall become fully acquainted with the Project Area, facility location and its environs and the scope of the work required to satisfy the requirements of the Study. The Contractor shall also assess the quantity of saline water to be treated at the desalination facility to meet the average, peak and seasonal variations of the water supply demand.

Estimated duration of Task 1: Ten (10) workdays

## **Task 2           STUDY MANAGEMENT PLAN**

As part of this task, the Contractor shall coordinate Study activities with all Study team members including the Contractor staff, Grantee personnel and CICESE. The Contractor shall organize a workshop at the start of the Study to exchange ideas and develop an integrated study plan for all components of the Study. The Contractor shall prepare a detailed project management plan outlining the responsibility of each entity and professionals participating in the Study.

Estimated duration of Task 2: Two (2) workdays

## **Task 3           DESALINATION AND WATER TREATMENT TECHNOLOGIES EVALUATION**

The Contractor shall assess saline water treatment technologies to meet potable water quality requirements.

### **Subtask 3.1   Establishing Design Criteria**

The Contractor shall work closely with the Grantee to establish the power source and cost of the electric power supply for the Project. In concert with the Grantee and CICESE, the Contractor shall establish the appropriate design criteria for the various components of the water management system (i.e., hydraulic design criteria for the saline water intake and its conveyance to the facility and discharge of desalination plant reject to the environment in accordance with regulatory requirements). The design criteria shall include saline water pretreatment, pump units and desalination system, potable water storage and related appurtenances such as pump stations. As indicated in Task 1, in establishing appropriate design parameters, the Contractor shall take into account local, national, and international regulations on saline water treatment for potable use. At the completion of this task, the Contractor shall prepare a technical memorandum to document the proposed design criteria for the Project.

Estimated duration of Subtask 3.1: Twenty (20) workdays

### **Subtask 3.2   Evaluation of Saline Water Treatment Alternatives**

The Contractor shall identify, describe and evaluate viable saline water treatment alternatives. Alternatives shall be identified based on actual saline water characteristics (quantity and quality), potable water quality requirements, saline water treatment facility footprint (which depends on the assessment of land availability in the Project Area), implementation costs and operation and maintenance (O&M) factors.

The Contractor shall identify all components of the saline water management systems, including but not limited to saline water intake and conveyance, power source, pumps, Ultra Filtration, Reverse Osmosis and UV or chlorination units, saline and desalinated

water storage and desalination plant reject. The Contractor shall prepare a conceptual design for each water management alternative. The technical details of each alternative shall include pipeline sizes and alignment, pump stations, process flow diagrams, site layouts, hydraulic profiles and equipment list. In addition, alternative pipeline materials shall be evaluated.

The Contractor shall provide a detailed evaluation for the each potential viable alternative. The criteria to be used in the evaluation shall include but will not be limited to:

- Expected effectiveness and reliability,
- Health risks and environmental concerns,
- Implementability and constructability,
- Expandability,
- Operational considerations,
- Ability to be phased to meet long-term potable water demand in Puerto Peñasco and its environs.

As part of the evaluation, the Contractor shall prepare and articulate a comprehensive cost analysis of the alternatives that shall include life cycle costs, present cost analysis and cost/benefits. The Contractor shall recommend and present the preferred alternative to the Grantee for review and approval.

Estimated duration of Subtask 3.2: Twenty (20) workdays

### **Subtask 3.3 Preliminary Design**

The Contractor shall prepare a preliminary design of all required components of the water desalination system under the preferred alternative approved by the Grantee in subtask 3.2. In agreement with professional standard practice, the design shall include but is not to be limited to the following:

- Power source, pump stations, electrical and mechanical equipment,
- Unit processes including pretreatment system, membrane system, desalinated water conditioning (post-treatment),
- Influent, reverse osmosis process piping, chemical process piping and discharge pipelines,
- Desalination plant reject,
- Preliminary design of potable water storage,
- Instrumentation and control system (SCADA).

Any required topographic, water quality, and/or geotechnical surveys shall be conducted by the Grantee.

The preliminary design for the Project shall be presented in a descriptive and schematic form. The preliminary design shall be discussed with the Grantee prior to its completion.

Estimated duration of Subtask 3.3: Twenty (20) workdays

**Task 4            FEASIBILITY ANALYSIS OF THE WATER DESALINATION PROJECT**

The Contractor shall conduct and articulate a detailed feasibility analysis of the Project developed above.

**Subtask 4.1    Technical Assessment**

In agreement with standard professional practice, the Contractor shall prepare a technical assessment which shall include, but is not to be limited to, the analysis of the following factors:

- Engineering and design parameters, complexity, and limitations;
- Constructability and identification of major problem areas;
- Operability including operating costs and personnel needs to operate;
- Maintenance requirements, personnel needs and costs;
- Long-term adaptability and effects on the existing water supply system; and
- Life cycle costs.

**Subtask 4.2    Economic Analysis**

The Contractor shall prepare an economic analysis to assess the Project based on a set of socioeconomic indicators including, but not limited to, the cost of the desalinated potable water system on the Puerto Peñasco water users. The Contractor shall examine the economic benefits of using desalinated potable water in the Project Area as compared to using the limited existing fresh water system. To this end, the analysis shall take into account all avoidable water management costs associated with the saline water treatment plant, water quality monitoring and environmental externalities related to saline water intake and the disposal of the reject.

The Contractor shall estimate the economic and financial impacts of the investment by means of a comparison of current (without the Project) socioeconomic conditions to future (with the Project) potential socioeconomic scenarios.

**Subtask 4.3    Financial Analysis**

The Contractor shall prepare, as part of the Study, a financial analysis for the implementation of the Project. The financial analysis shall satisfy the requirements of the Grantee who is responsible for seeking and obtaining project financing. In addition, the financial analysis shall also satisfy the requirements of all prospective funding institutions, which shall be identified by the Grantee at the onset of the Study. In concert with the Grantee, the Contractor shall assess the potential interest of the Inter-American Development Bank and Banco Nacional de Obras y Servicios Publicos (“BANOBRAS”)

and other local and international financial institutions interested in lending support to the Project. The financial analysis shall include, but will not be limited to, a detailed analysis of the proposed debt-equity structure and a full description of the cost-recovery program required for the self-sustainability of the Project.

The cost-recovery program shall take into account the costs associated with the operation and maintenance of the Project plus the debt service and the cost of replacement. As future significant capital expenditures are to be required to replace Project facilities and equipment, the Contractor shall include depreciation components in the water charges. All potential sources of revenue shall be identified.

As part of this task, the Contractor shall meet with the Grantee to discuss the financial analysis and the water rates needed to support the Project implementation.

#### **Subtask 4.4 Human Health and Environmental Impact Analysis**

The Contractor shall identify, discuss, and analyze the impacts on human health and environment that may result from implementation of the Project. The environmental impact analysis shall be carried out based on the information and data provided by CICESE and in accordance with the Government of Mexico (Comision Nacional del Agua, SEMARNAT, Secretaria de Marina and Gobierno del Estado de Sonora) procedures. Environmental control and mitigation measures shall be assessed and specified as necessary. All data and information required for the environmental impact analysis shall be provided by the Grantee.

#### **Subtask 4.5 Water Quality Impact Analysis**

The Contractor shall identify the short-term and long-term impacts on seawater and/or groundwater quality that may result from the implementation of the Project based on baseline water quality analytical data. The analysis shall include the identification and discussion of mitigation measures available to reduce water quality impacts to the greatest extent possible. All data and information required for the analysis of the water quality impacts shall be provided by the Grantee.

#### **Subtask 4.6 Ecological Impact Analysis**

The Contractor shall analyze any short-term and long-term impacts on sensitive life forms and ecological systems derived from the implementation of the Project. The analysis shall include the identification and discussion of mitigation measures available to reduce negative impacts to the greatest extent possible. All data and information required for the analysis of the ecological impacts shall be provided by the Grantee.

#### **Subtask 4.7 Socioeconomic Impact Analysis**

The Contractor shall identify, discuss and analyze short-term and long-term impacts on human health and well-being, employment, income, education, business growth,

economic production, and commercial and industrial activity that may result from the implementation of the Project.

#### **Subtask 4.8 Developmental Impact Assessment**

The socioeconomic analysis discussed in Task 4.7 will provide the basis for assessing the potential developmental impact of the Project on the Project Area and, broadly speaking on the state of Sonora and Mexico. For the benefit of those interested in the Project, the Contractor shall assess the Project's development benefits and the methodology for measuring those benefits. The assessment shall include examples of what is to be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall focus specifically on examples from the categories listed below, shall develop a methodology for assessing these impacts over time, and shall identify where to obtain this information in the future (e.g., the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project. The categories to be considered are as follows:

- **Infrastructure:** Estimate the expected scale of infrastructure construction and comment on the capabilities of any recommended infrastructure improvements.
- **Human capacity building:** Estimate the number and type of jobs that would be created during the construction or installation phases if the Contractor's recommendations are implemented. Distinguish between temporary construction jobs and the number of jobs that would be created or sustained once construction is complete. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- **Technology transfer and productivity improvements:** Discuss recommended commercial contracts for licensing new technologies, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains stemming from these recommendations such as improved systems or processes that enhance productivity or result in the more efficient use of resources.
- **Market-oriented reform:** Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that effectuate liberalization of prices, privatization of previously state-owned assets, or increased competition in a given sector.
- **Other:** Discuss prospective, indirect developmental impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

Estimated duration of Task 4 (including all its Subtasks): Thirty (30) workdays

**Task 5 ANALYSIS OF U. S. MANUFACTURERS OF DESALINATION AND WATER TREATMENT TECHNOLOGY**

The Contractor shall assess the availability of U.S. manufactured equipment and products for all components of the saline water desalination system and shall provide detailed technical specifications for each of them including business name, website, point of contact, address, telephone and fax numbers, and email address.

Estimated duration of Task 5: Five (5) Workdays

**Task 6 PROJECT IMPLEMENTATION PLAN**

The Contractor shall prepare an overall plan for the implementation of each of the Project's components. The implementation plan shall include the procurement plan for the acquisition of services needed by the Project Contractor for the Project's implementation. The Contractor shall provide performance-driven bidding documents and a procurement schedule. Under this Terms of Reference, the Contractor shall not be responsible for the evaluation of proposals under any procurement related to this Project.

The Contractor, in consultation with the Grantee, shall set forth the obligations of the Project Contractor in the bidding documents. The obligations of the Project Contractor may include the following:

- Performing all contract services as set forth in the Puerto Peñasco Seawater Desalination Project Contract, including compliance with the requirements of a Fee-For-Services Contract.
- Completing the construction (including acceptance testing) and placing the Project into commercial operation on a date to be determined by the Grantee and Contractor. Delays will be allowed only if they are outside the control of the Project Contractor and accepted by the Municipality of Puerto Peñasco as a valid extension.
- Treating up to 11.41 MGD of the saline water to meet the potable water requirements specified in the Project Contract.
- Paying penalties for failure to complete the Project on time or failure to meet the treatment standards in the Project Contract and in applicable Mexican standards and permit requirements.
- Accepting and treating saline water in the volumes specified in the Fee-For-Services Contract.

- Providing capacity to treat saline water that exceeds the flow or water quality parameters as specified in the Fee-For-Services Contract.
- Accepting and making reasonable effort to treat water that exceeds the allowable flow or water quality limits, unless the saline water threatens to damage the treatment facilities.
- Providing customary financial guarantees of payment and performance, acceptable to the Municipality of Puerto Peñasco, including a \$5 million performance bond for the life of the Project Contract.
- Paying all payroll, federal, state, and local taxes associated with its operations in Mexico.
- Collecting influent and effluent quality and quantity data and process monitoring data.
- Preparing routine operating reports required by the Comisión Estatal de Agua - Sonora, the Comisión Nacional de Agua and other pertinent regulatory agencies identified by the Contractor.
- Maintaining operating permits for the Project current during the operating period.
- Maintaining the Project facilities in good and reliable operating condition throughout the operating period.
- Providing training to OOMAPAS personnel.
- During the design and construction of the Project, the Project Contractor shall be entitled to monthly payments according to an agreed-upon schedule for the design, procurement of materials and/or equipment, and placement of construction. During the operating period, the Project Contractor shall be paid monthly for treating and delivering the saline water and maintaining the facilities.

Duration of Task 6: Twenty (20) Workdays

#### **Task 7            FINAL REPORT**

The Contractor shall prepare a substantive and comprehensive Final Report of all the work performed in accordance with these Terms of Reference, including all deliverables to be turned in to the Grantee and USTDA. The Final Report shall include all findings, recommendations and work product provided to the Grantee under Tasks 1 through 6. The Final Report shall be submitted to USTDA and the Grantee in accordance with Clause I of Annex II of the Grant Agreement. The Contractor shall deliver to the Grantee and USTDA with two (2) copies (each) of the Public Version of the Final Report on CD-ROM. The CD-ROM version of the Final Report shall include:

- Adobe Acrobat readable copies of all documents;
- Source files for all drawings in AutoCad or Visio format; and
- Source files for all documents in MS Office 2000 or later formats.

Duration of Task 7: Fifteen (15) Workdays

Notes:

- (1) The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.
- (2) The Contractor and the Grantee shall be careful to ensure that the public version of the Final Report contains no security or confidential information.
- (3) The Grantee and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work product that is developed under these Terms of Reference.
- (4) The Grantee shall be responsible for all procurement-related final decisions.