CITY OF BRAWLEY
WATER TREATMENT PLANT APPLICATION
TO
BORDER ENVIRONMENT COOPERATION COMMISSION

GENERAL DESCRIPTION OF THE PROJECT

A. PROJECT ORGINATORS
B. PROJECT LOCATION
C. ENVIRONMENTAL ISSUE
D. PROJECT ALTERNATIVES
E. PROJECT JUSTIFICATION
F. PROJECT STRENGTHS **AND** WEAKNESSES
G. BINATIONAL ASPECTS

2. ENVIRONMENT
   A. DOCUMENTATION OF ENVIRONMENTAL REGULATORY COMPLIANCE
   B. CONFORMANCE WITH LOCAL AND REGIONAL CONSERVATION AND DEVELOPMENT PLANS
   C. ENVIRONMENTAL ASSESSMENT

3. TECHNICAL FEASIBILITY
   A. PROJECT SPECIFICATIONS
   B. TECHNICAL PROCESS
   C. QUALITY CONTROL PROGRAM
   D. INVESTMENT TIMETABLE

4. ECONOMIC AND FINANCIAL FEASIBILITY
   A. ANALYSIS - CASH FLOW, BALANCE SHEET, INCOME STATEMENT, AND SOURCES OF FINANCING
   B. PLAN TO RECOVER INVESTMENT AND OPERATION AND MAINTENANCE COSTS
   C. SENSITIVITY ANALYSIS
   D. FINANCIAL STATEMENTS FOR 15 YEARS

5. SOCIAL ASPECTS
   A. PROJECT IMPACTS ON LOCAL POPULATIONS
   B. PROJECT IMPACTS ON CULTURAL RESOURCES
   C. CHARACTERIZATION OF LOCAL ECONOMIC SITUATION

6. COMMUNITY PARTICIPA-NON
   A. PUBLIC EXPECTATIONS

7. OPERATION AND MAINTENANCE
   - A. START-UP OPERATION PROGRAM
   - B. CONTINGENCY PROGRAM
   - C. OPERATION AND MAINTENANCE PROGRAM
   - D. SAFETY PROGRAM

CITY OF BRAWLEY
BORDER ENVIRONMENT COOPERATION COMMISSION
FINAL APPLICATION
SUBMITTED
AUGUST 1995

I . General Description of the Project

a. Project Originators:

City of Brawley
400 Main Street - Plaza Park
Brawley, CA 92227

City Manager: Roger L. Bennett
Phone: (619) **344-9111**
Fax: (619) **344-0907**

Project Contact: Jerry Santillan, City Planner
Phone: (619) 344-8622
Fax: (619) 344-0907

b . Project Location:

The proposed WTP is located within the incorporated city limits of Brawley. Brawley is located in the heart of the agriculturally significant Imperial Valley, approximately 210 miles southeast of Los Angeles; 75 miles southeast of Palm Springs; 230 miles west of Phoenix, Arizona; and 23 miles north of Mexicali, Mexico. The area is characterized by hot summers and mild winters with annual rainfall of less than 3 inches.

The project will be located on a level, 50+ acre, city-owned parcel, near the intersection of Highway 86 and Cattle Call Road, in the southwest corner of the City. The elevation of the site is -106 below sea level. Water is supplied by the Imperial Irrigation District via the Colorado River and the All-American Canal. Please refer to **Attachment A** for project site maps.

C. **Environmental Issue:**

The environmental issue to be addressed by this proposed project is water quality. The City of Brawley's domestic water system has been cited for failure to meet State of California, Department of Health Services, Division of Drinking Water and Environmental Management requirements as follows:

Section 4033 (a) (2), Health and Safety Code, California Code of Regulations - Failure to comply with the time schedule set in Compliance Order 04-021 and its March **15,** 1993 amendment.

Section 54650 et seq., Title 22, Chapter 17, California Code of Regulations - Failure to provide multiple barrier treatment for surface water supplies, including using coagulation/flocculation, approved filtration technologies, and adequate disinfection contact times to ensure that the total treatment process provides a total of 99.9% reduction of Giardia cysts and 99.99% reduction of viruses.

Section 7584 et seq., Title 17 Chapter 5, California Code of Regulations - Failure to protect the public water supply from contamination by implementation of a cross-connection control program.

Acquisition of financing through the Border Environment Cooperation Commission will provide the financing necessary to address all environmental issues faced by the City in regard to water quality.

d Project Alternatives:

The recommended design of the Water Treatment Plant (WTP) was based on an evaluation of existing water quality data on file at the City Department of Public Works. Raw water is conveyed to Brawley from the Colorado River via the All American Canal, through the Mansfield Canal and then into the Central Main Canal, all part of the Colorado River canal system operated by the Imperial Irrigation District (IID). The proposed water treatment plant will consist of raw water storage ponds, a raw water intake structure, a chemical handling facility, treatment process structures, a finished water reservoir and pump station, and an operations building. Two of the existing raw water storage ponds at the site will be modified to serve as washwater recovery ponds and for overflow containment. The new water treatment process elements include chemical addition, flash and rapid mix chambers, flocculation and sedimentation basins, ozone contact basins (future), dual media filters, and backwash facilities.

1) Water Ouality Design Criteria

Inorganic Dissolved Solids

Inorganic raw water quality data was collected at the existing Brawley WTP in July 1993. The most significant impact on new plant operations is expected to result from seasonal changes in raw water pH and total alkalinity. This will require carefully monitoring of pH and coagulant dosages so that adjustments can be made to compensate for the seasonal changes.

Organic Compounds

Organic water quality measurements of raw water in IID's canal system during July 1993 showed no detectable organic compounds in the water. However, both storm water runoff and irrigation runoff enters the canal system and could account for periodic high concentrations of organic compounds. The source water from the canals is unprotected and is susceptible to these runoff events.

Organic chemicals detected by Metropolitan Water District (MWD) at sites outside of Imperial Valley for Colorado River Water (CRW) showed only small concentrations of trihalomethane (THM). This condition should continue to be monitored by MWD, but it is not a problem at the present time. The only other organic compounds observed by MWD from CRW were toluene on one occasion and Xylene on another occasion, also at sites outside of Imperial Valley. The concentrations observed for both of these compounds did not approach current permitted Maximum Contaminant Levels (MCLs), but their presence serves to illustrate that large portions of the watershed for the Colorado River are not controlled and are vulnerable to accidental contamination.

Treatment processes selected for use in the new plant should be designed to be upgraded to achieve organics removal, if needed in the future. The classes of compounds most likely to necessitate this type of upgrade are pesticides and agricultural chemicals used in the Imperial Valley. Although the levels observed are below current MCLS, the numbers of contaminants being detected at other CRW reservoirs and the frequency with which many of them are being observed suggest the potential need to incorporate organics removal sometime in the future.

Biological Quality

MWD has had ongoing programs for monitoring the biological quality of raw and finished waters of CRW treatment plants. Most Probable Number (MPN) measurements for Total Coliform in the raw water indicate that water obtained from the Colorado River has very good biological quality. The Surface Water Treatment Rule (SWTR) requires treatment plants to achieve specified total removal or inactivation levels for Giardia, which is a parasitic protozoan, and for viruses. However, pending regulations for Cryptosporidium removal/inactivation may require more stringent disinfection criteria in the future to provide protection from this parasitic organism.

Disinfection

The use of chlorine as the primary disinfectant will require close monitoring of Disinfection By Products (DBPS) observed in the effluent from the plant. The major DBPs formed when treating

CRW are chloroform, bromodichloromethane, and dibromochloromethane. The U. S . Environmental Protection Agency (EPA) is required under the Safe Drinking Water Act (SDWA) to set DBP levels as "close as is feasible" to EPA Goals, with "feasible" being defined to include analytical capabilities, best available technology (BAT), treatment performance, and costs. This definition of "feasible" presents problems when applied to the DBPs because of the tradeoff between lowering allowable DBP concentrations by reducing the use of chlorine, and the concern that this may increase risks for the outbreak of waterborne diseases due to inadequate chlorination of drinking water.

The EPA is still involved in negotiating the rules for DBPS. The current schedule is for adoption of a final rule in June 1995. However, previous schedules for developing this rule have been significantly delayed. The best approach for the City is to proceed with design of a disinfection system which minimizes by-product formation and is flexible enough to be economically modified if required in the future.

Odor and Color

It is desirable to minimize color to the maximum extent possible because it is readily perceived by the public. In the past, CRW has usually been below the Secondary Maximum Contaminant Level (SMCL) for color in finished water, and the City should not expect any problems with color removal.

Current tested levels for tastes and odors in finished water exceeds SMCL for CRW, with the predominant odor detected being described as fishy/musty. If increased biological activity occurs, the odor problem will intensity. Therefore, the treatment process selected for the future plant should include enhanced capabilities for odor removal.

Selected Method of Treatment

Based on the review of existing raw water quality and the review of other facilities treating CRW, **conventional treatment** is the recommended process. Conventional treatment consists of chemical coagulation, flocculation, sedimentation, and filtration. This process will remove the majority of the suspended solids present in the raw water supply and/or formed through coagulation and flocculation, by gravity settling prior to filtration. Sedimentation also reduces the potential for accumulation of nuisance organisms, such as algae, within the filters. The residence time within a conventional treatment process (typically 4 to 5 hours at the design flow rate) allows for oxidation/adsorption of THM precursors, color, odors, and other contaminants prior to filtration and disinfection. The plant is also recommended to be designed with adequate space for the future addition of ozone. As detectable amounts of organics and total coliform increase, the addition of ozone offers several benefits to the overall treatment: (1) Maximum disinfection effectiveness and capabilities with minimized production of by-products (DBPs); (2) ability to oxidize iron, manganese, and taste and odor-causing compounds; (3) the capability to oxidize synthetic organic chemicals if detected in the future; and (4) the capability, through carbon or anthracite filtering, of reducing the dissolved organic carbon content of the water.

"No Project" Alternative

The 'no project" alternative is not an alternative for consideration by the City of Brawley. If the Water Treatment Facility is not brought into compliance with State Law, the outcome would include tremendous fines against the City and a potential health hazard for the residents of the City of Brawley.

e. Project Justification:

The City of Brawley proposes to construct a new water treatment plant (WTP) to replace its existing plant which has been issued a Citation for Nonconformance by the State Department of Health Services. Failure to construct the new WTP within the near future will leave the City 'out of compliance" with State water standards leading to continued and increased fines, the issuance of hazard and health warnings, and the possible interruption of supply. The results of these events will only hasten the City's economic distress and lead to declining property values, continued out migration, and closing of businesses (restaurants, clinics, offices, etc.). With few, yet expensive and cost prohibitive alternatives, it is difficult to perceive the adverse impacts and social costs upon schools, hospitals, the poor, and the elderly.

The City has no other alternative but to replace the outdated, inadequate,and failing Water Treatment Plant.

f. Project Strengths and Weaknesses:

Strengths

Providing the City's residential, commercial, and industrial users with an adequate supply of safe, affordable, and dependable water will serve as a valuable and effective incentive to retain and expand existing businesses and reduce the "out migration" of the City's residents to the southern Imperial Valley or out of the State.

The existing V,/TP was designed for a 7.5 mgd capacity and is currently operating at its physical capacity of 12.5 mgd. The facility has also been cited for non-compliance with treatment standards. The City cannot realistically attract high-valued and job-creating industrial, manufacturing, or retail enterprises with a WTP that is operating at its capacity and out of compliance. Landowners and developers cannot effectively plan for new developments without an adequate or dependable water supply. The new, modern, and well designed VVTP that is

being proposed will greatly improve the City's potential for economic growth, by allowing the City to offer competitive alternatives for new development.

The new WTP has been designed to serve two other communities: the City of Westmorland, and the **Poe Subdivision - a federally recognized "Colonoa' CommuniW.** If the City of Brawley is unable to complete the new WTP it is unlikely that the City of Westmorland and the Poe Colonia will be financially able to develop water treatment facilities to deal with Safe Drinking water compliance issues.

The City of Brawley recently participated in a multi-jurisdictional application for Federal Enterprise Community (EC) designation. The Imperial County Enterprise Community was designated by the U.S. Department of Agriculture. One Census Tract within the City, tract number 104, is a component of the EC. Communities receiving designation must have developed comprehensive strategic plans to address the excessive rates of unemployment, poverty, low-incomes, over-crowded and deteriorated housing, as well as other cultural and institutional barriers to economic and community development. Competition to receive EC designation was very intense. Only two rural EC designations were made in the entire state. The minimum requirement of an EC is at least 50% of the Census Tracts must have poverty rates exceeding 35%. The proposed WTP will supply water to this area. Of note is the fact that the City of Westmorland experiences a poverty rate of 71 % and the Poe "Colonia" a low-income rate of approximately 75%.

Construction of the WTP involves removal of a substantial amount of dirt from the project site. As a part of the project design, this dirt will be utilized to landscape and enhance an existing park nearby the location of the new WTP.

Completion of a new WTP will eliminate a potential threat to the health of water users. In addition, the new WTP will eliminate the threat of increased costs to the City from penalties.

Weaknesses

One weakness occurring from this proposed mandatory project is the need to increase rates on a population that is 55% low-income (below 80% of the Area Median Income). Some Census blocks have low-income concentrations of 75% to 100%. The unemployment rate for Imperial County is presently 24%. The City of Brawley unemployment rate is consistent with the County's. The unemployment rate for the last four (4) years has averaged over 25%. No quick

fix or reversal of the unemployment rate is expected. Much of the high rate is institutional and not associated with National or State economic performance. The City has an overall poverty rate exceeding 24% (1990 Census). The poverty rate in 1980 was 15%.

The City has taken steps to overcome this weakness by designing a financing strategy which includes the seeking out of grant funding. This will minimize the overall debt, and lower the monthly rate increases necessary for debt payments. The City has initiated an ambitious effort to acquire grant funding from: the U.S. Department of Commerce, Economic Development Administration, $1,500,000 pending; the U.S. Department of Agriculture, Rural Economic and Community Development Services (formally the Farmers Home Administration) $1,610,000 obligated; State Water Resources, $400,000; and the State Department of Housing and Community Development, Community Development Block Grant program, $30,000 obligated.

g. Binational Aspects

With the construction of a new WTP, the City of Brawley will be able to continue with plans to construct a 1 00 acre industrial park. The City of Brawley's industrial base will increase, and the City of Brawley will continue to be a hub for workers from Mexicali. This is because the City of Brawley is directly accessible to the Mexican Border from Mexicali via Highway 1 1 1, approximately 23 miles away. In addition, the City of Brawley is part of a larger, economically interconnected region, which includes the eight cities of Imperial County, and the City of Mexicali, in Mexico.

2 . Environment

a. Documentation of Environmental Regulatory Compliance

i. The State Department of Health Services (DOHS) has found the City's 12.5 million gallons per day (MGD) water treatment plant, located at the intersection of Western Avenue and G Street, to be in violation of the requirements contained in the California Surface Water Filtration and disinfection Treatment Regulations. On February 23, 1994, DOHS issued a Citation for Noncompliance which ordered the City to correct the violation. The City of Brawley is proposing the subject project in order to correct the violation and fully comply with State regulations.

An Environmental Impact Report (EIR) was prepared for the proposed water treatment plant, and was submitted to the State of California, Governor's Off ice of Planning and Research, for review by State agencies. This review was conducted during the public review period from June 9, 1995, through July 24, 1995, and was completed in accordance with the California Environmental Quality Act (CEQA). State of California Agencies and Departments which reviewed the EIR were the following: Resources Agency; Department of Fish & Game; Department of Water Resources; Department of Transportation (Caltrans);
Department of Housing and Community Development; Department of Health & Welfare; Air Resources Board; Water Resources Control Board; Regional Water Quality Control Board; and State Lands Commission.

Environmental issues which were evaluated in detail for the proposed Project were: Land Use; Visual Quality; Traffic Circulation; and Growth Inducement. Changes or alterations have been required or incorporated into the project that adequately mitigate the project's significant environmental effects. In addition, site specific evaluation was also done for the additional environmental issues of Noise, Biological Resources, and Cultural Resources. No potentially significant environmental effects related to these issues were found to result from the project as proposed.

ii. On August 2, 1995, the Brawley Planning Commission recommended to the City Council that the EIR be certified and the project be approved. The Brawley City Council has set two hearing dates to receive additional public input on the project, August 21, 1995 and September 5, 1995. At the September 5th hearing it is expected that action will be taken on the water treatment plant. Following the expected City Council approval, the project will be submitted to the State DOHS for approval. Patrick Murphy, Brawley Economic and Community Development Department (619/344-8622) and Behrooz Nikjoo, Brawley Public Works Director
(619/344-5800) are the contact persons for the project's compliance with
the City's regulatory permit and environmental compliance processes.

iii. The regulation of potable water systems with respect to water quality and operations is controlled principally by the California Department of Health Services (DOHS), Office of Drinking Water, under the authority of the California Safe Drinking Water Act (SDWA). DOHS is authorized to issue operating permits for all public water systems.

Contact: Ms. Toby Roy
District Engineer
California Department of Health Services 1350 Front Street, Room 2050
San Diego, CA 921 01

(619) 525-4108

The South Coast Air Quality Management District (SCAQMD) has established limits on chlorine gas release which must be considered in the design of the scrubber system. A generic permit for the chlorine scrubber system with a specific application for the technology use and design features, must be submitted for review and approval by SCAQMD.

Contact: Mr. Michael Laybourn
Air Quality Specialist
South Coast Air Quality Management District Diamond Bar, CA
(909) 396-3066

b. Compliance with Local and Regional Conservation and Development Plans

i. The proposed location for the new water treatment plant presently contains raw water storage reservoirs, and is designated for "Public Facility" use by the Brawley General Plan. In addition, the County of Imperial General Plan designates the site as part of the Brawley Urban Area. No local or regional agency has designated the site for open space or conservation purposes. Jerry Santillan, Brawley Planning Director (610/344-8622) and Jurg Heuberger, County of Imperial Planning Director (619/339-4236 ext. 310) are the contact persons for the project's compliance with local and regional conservation and development plans.

ii. As indicated above, the project complies with the City General Plan because it is a Public Facility in a area zoned as Public Facility, and the project is in compliance with the County General Plan because the site on which the project is to be constructed is designated as an Urban Area.

c **Environmental Assessment**

The project EIR concludes that during construction of the facility, there will be short term traffic impacts and temporary disruption to normal activities of existing land uses in the area. Because the site is within an urban area and is presently used by the City Public Works Department, there are no issues relative to biological diversity or impacts to sensitive environmental habitats; nor were any significant medium or long-term impacts identified by the EIR. A potentially significant human health concern relates to the State DOHS requirement that the City "provide multiple barrier treatment for surface water supplies, including

using coagulation/flocculation, approved filtration technologies, and adequate disinfection contact times to ensure that the total treatment process provides a total of 99.9% reduction of Giardia cysts and 99.99% reduction of viruses." Because of physical and operational limitations at the existing water treatment plant, it is not feasible to construct the necessary facilities at the existing treatment plant site without significant additional expense and disruption to the City's water supply. Due to these considerations, the proposed project site was determined to be the most feasible and environmentally preferred location of the three alternative sites evaluated for the new facility.

A discussion of environmental risk, negative and positive impacts, mitigation of negative impacts, environmental standards and objectives of the affected area, and project alternatives are contained in the project EIR submitted earlier under separate cover.

3 . Technical Feasibility

a. Project Specifications:

Please refer to the Preliminary Design Report titled, "New Water Treatment Plant", prepared by Black and Veatch for the City of Brawley and submitted to the Border Environment Cooperation Commission on or about July 27, 1995, under separate cover.

b . Technical Process

Extensive review of raw water quality and existing water treatment plants treating similar raw waters was conducted prior to making process selections. Data including information on inorganic dissolved solids, organic compounds, turbidity, biological quality, disinfection, and odor and color was provided from the City of Brawley and the Metropolitan Water District of Southern California. This data, which defines the raw water quality that has existed at the plant during the past several years of operation, was studied to develop the most efficient and well-suited treatment methods. The study of the performance of existing water treatment plants treating similar raw Colorado River water provided for the transfer of proven technology to the new Brawley WTP.

Based on the review of raw water quality and the review of existing treatment facilities, conventional treatment was determined to be the optimum treatment strategy. Conventional treatment consists of chemical coagulation, flocculation, sedimentation, and filtration. As the majority of the suspended solids present in the raw water supply and/or formed through coagulation and flocculation are removed by gravity settling prior to filtration, filter run times between backwashes are maximized. Sedimentation also reduces the potential for accumulation of nuisance organisms, such as algae, within the filters. The residence time within a conventional treatment process (typically 4 to 5 hours at the design flow rate) allows for oxidation/absorption of trihalomethane precursors, odors, and other contaminants prior to filtration and disinfection.

The conventional treatment process provides multiple barriers for removal of particulate material through the treatment process and consequently minimizes disinfection requirements. Further, conventional treatment allows optimizing coagulation conditions for disinfection byproducts (DBP) precursor removal, with minimal impact on filter run length and productivity. In addition, it represents 'Best Available Technologyn, thereby minimizing the likelihood that more treatment process steps will be required in the future.

A conventional treatment plant designed for the future addition of ozone represents a viable intermediate-range solution. **As** detectable amounts of organics and total colfform increase, the addition of ozone offers several benefits to the overall treatment. These benefits include:

(1) maximum disinfection effectiveness and capabilities (including inactivation of Clytosporidium) with minimized production of halogenated DBPs
(2) ability to oxidize iron, manganese, and taste and odor-causing compounds
(3) the capability, especially with hydrogen peroxide supplementation, when ozone is combined with 3 to 4 feet of granular activated carbon or anthracite filter media, the capability of effecting quantifiable reduction in the dissolved organic carbon content of the water.

c . **Quality Control Program**

Quality control tests will be performed by an independent commercial testing firm acceptable to the engineer. The testing firm's laboratory shall be staffed with experienced technicians, properly equipped and fully qualified to perform the tests. The testing firm will furnish a written report of each test.

At a minimum, the following quality control tests shall be performed:

Concrete material and mix design
Asphaltic concrete material and mix designs
Graduation tests, moisture density tests, relative density tests, and in-place density tests for embedment, fill, and backfill materials.

Special Inspection

A Special Inspector authorized by the Building Official will perform the type of special inspection required. Inspection reports will be furnished by the Special Inspector to the Building Official, the Owner, the Engineer, and the Contractor. All defects in the work observed by the Special

Inspector will be brought to the immediate attention of the Contractor for correction. If the work is not corrected, the Building Official, Owner, and the Engineer will be notified. All defects and corrections in the work will be reported to the Owner and the Engineer and repaired in a manner acceptable to the Engineer.

At the completion of the work, a final signed report will confirm that the work conforms with the appropriate plans and specifications and applicable workmanship provisions of the Uniform Building Code. An experienced, competent, and authorized representative of the manufacturer of each item of equipment listed below will visit the site of the work and inspect, check, adjust d necessary, and approve the equipment installation.

Each manufacturers representative shall fumish to Owner, through the Engineer, a written report certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, and has been operated under full load conditions and that it operated satisfactorily.

Manufacturer's field services shall be provided on the following equipment:

Vertical Diffusion Vane Pumps
Submersible Pumps
Straight line Sludge Collecting Equipment
Flash and Rapid Mix Equipment
Vertical Turbine Flocculators
Centrifugal Blowers
Gas Chemical Feed Systems
Liquid Chemical Feed System
Engine Generator
Gas Scrubber System
Filter Underdrain System
Filter Media
Process Control System
Computer System Hardware
Computer System Software
Programmable Logic Controllers
Instrumentation
Butterfly Valves
Eccentric Plug Valves
Butterfly Gates
Heating System Equipment
Refrigeration

Dehumidification
Air Distribution Systems
Building System Controls
Adjustable Frequency Drives
Uninterruptible Power Supply System
Secondary Integral Unit Substations - Liquid Filled
Medium-Voltage Metal-Clad Switchgear
Medium-Voltage Motor Control Equipment
Automatic Transfer Switch
CCTV Surveillance System
Fire Detection System

Personnel Training

As described in Section 7 (a), operations and maintenance personnel shall undergo extensive training **by** specialists recommended by the individual equipment manufacturers. **All** personnel will be instructed in the operation, disassembly and assembly of major equipment items,

Table 9

City of Brawley
Water Treatment Plant
March 22, *1995*

Opinion of Probable Construction Cost		Payment Schedule		
General Requirements	680,000	October 95	1	323.400
Site Work 1,250,000		November	2	323,400
Operations Building and Superstructure	2,250,000	December	3	323,400
Flocculation Basin	800,000	January 96	4	485,100
Sedimentation Basins	1,590,000	February	*5*	646,800
Filter Complex	2,050.000	March	6	646,800
Finished Water Reservoir and P.S.	1,950,000	April	7	646,800
Wash Water Recovery	600,000	May	8	808,500
Raw Water Facilities	445,000	June	*9*	808,500
Instrumentation	1.135.000	July	10	808,500
Electrical	1.250.000	August	11	970,200
		September	12	970,200
Total Construction Cost	14,000,000	October	13	970,200
		November	14	970,200
Estimated Engineering Cost MOM	700.000	December	*15*	970,200
=		January 97	16	970,200
Total Estimated Cost	14.700.000	February	17	970,200
		March	18	970,200
Contingency (ten percent)	1,470.000	April	*19*	970,200
=		May	20	*539,000*
Total Cost Plus Contingency	16,170.000			$15.092.000

Note: Shortfall between $15,092,000 and **needed** $16,170,000
to be coverd by Grants or a Series B COP issue if Grants are not received.

start-up, shutdown, safety concerns, trouble shooting, installation, alignment, and recommended corrective and preventative maintenance procedures.

d Investment Timetable

For information on the financing plan, please refer to section 4 of this submittal. Please refer to page 13A for the sequence to be followed in order to implement different stages of the project, as prepared by the Water Treatment Plant Engineers, Black & Veatch. For project development information, please refer to the Preliminary Engineering Report for the Brawley Water Treatment Plant. The Preliminary Engineering report was submitted to the Border Environment Cooperative Commission under separate cover two weeks prior to this submittal.

4 Economic and Financial Feasibility

a. Cash Flow, Balance Shoot, Income Statement, and Sources of Financing

A report was prepared by Douglas Ayres, a consultant to the City for a conventional financing package, entitled, "City of Brawley Water System Improvement Program Financing" (May, 1995). Please refer to **Attachment B** which contains financial information in table form, including: 1) estimated

b. Recovery of Investment and Operation and Maintenance Costs

As is indicated in the preliminary financial analysis report initiated by the City of Brawley, it is proposed that debt service coverage, maintenance and operation costs, and the establishment of an economically sustainable system by adequately funding a reserve account for long term capital improvement requirements, can be realized by initiating several strategies to increase revenues. The primary source of revenues is proposed to be through rate increases over an extended period of time (currently proposed for six years). Rates were increased by 30% in fiscal year 1994-1995. Additional increases of 30% for each of three additional, consecutive fiscal years from 1995-96 to 1997-1998 have also been proposed, but not yet approved. Two final increases, at a rate of 3%, are currently proposed for the fiscal years 1998-1999 and 19992000. These rate increases, together with increased impact fees, metering, and acquiring the most cost effective and available financing, were analyzed, and resulted in the cash flow projection presented in Attachment B. This was based on a worst case basis, and considers conventional financing on a non-credit rated basis, at 7.00% for 30 years. As proposed, these rate increases, together with other increased revenues, will result in a WTP operation that is economically sustainable throughout the life of the project. The City, however, is dedicated to seeking the most cost effective means of acquiring financing for the WTP, and endeavors to seek financing that will minimize debt service (thus reduce rate increases) to the maximum extent possible. For a list of financing options currently being pursued by the City, please refer to the "source of financing" table in Attachment B.

The City of Brawley has conducted numerous hearings and meetings with water users, educating local citizens on the need for the new WTP, and the need for rate increases to finance the provision of potable water. To date, the presentations have all been positive. Surprisingly,

comments have also been positive with statements such as, "I don't like the fact that the rates are increasing, but I am fully aware of the need for VVTP improvements, and I will willingly **pay** the increased cost". The response from water users been positive. Regarding rate payment collection, the City of Brawley has an established rate collection policy.

c . Sensitivity Analysis

A sensitivity analysis has been conducted. The following issues have been analysed:

1 . Current climate in the California State and municipal capital financings;
2. Positive economic response to water system improvements, hence, desirability of water system financing;
3. Uncertainty of maintenance and operation costs;
4. Uncertainty of construction costs; and
5. Uncertainty of interest rate fluctuations.

As indicated above, the proposed approach to secure debt service coverage, insure sufficient funds to cover maintenance and operations costs, and allow for revenues to fund long term capital improvements, was based, at the time the financial report was prepared, on a "worst case scenario". The City has already moved to implement the rate schedule increases, and is holding community meetings and hearings to present all the issues. At the same time, the City is intensely involved in seeking a financial package, utilizing a variety of funding sources, to minimize, to the extent feasible, long term debt.

d . Financial Statements for a 15 Year Horizon

As has been discussed, the City continues to design a financing package that will provide maximum benefit at minimal cost to the users. A 15 year financial statement is not yet available.

5. Social Aspects

a. Project Impacts on Local Populations

As discussed earlier in this application, the new Brawley WTP will directly benefit approximately 23,830 people located in the City of Brawley, the City of Westmorland, and the Poe "Colonia". Brawley has experienced a constant downward slide in its overall economy. City economic development staff efforts, in the past few years, have resulted in positive response by business owners, developers, and investors interested in expanding existing businesses, or developing new businesses, in the City of Brawley. The positive results of these efforts have been drastically

curtailed, however, due to the citation received by the City requiring construction of a new Water Treatment Plant.

The estimated number of jobs to be created and retained, as well as the amount of private investment, was difficult to determine without the benefit of objective, empirical data. Yet, it is realistic to expect that the creation and retention of jobs, and the infusion of private investment capital, will result from the development of the new WTP.

The most immediate potential resulting from the development of the new WTP is the retention of existing jobs within the City. Withiout the new WTP, two large employers, *Araujo & Araujo and Clinicas De Salud del Pueblo*, employing nearly 500 people, would be forced to terminate operations in Brawley. Both businesses rely upon an adequate and dependable supply of safe water. Without such a guarantee and water supply, the businesses could not, and would not, remain in Brawley.

The Alamitos Land Company is currently requesting an amendment to the City's General Plan and Sphere of Influence boundary to include an area known as Lucky Ranch, comprised of 1,842 acres. The Developer is requesting that the property be annexed to the City of Brawley. A current issue of concern to the Local Area Formation Commission (LAFCO), the County organization responsible for the review and approval of the request for an expanded sphere of influence and annexation, is the City of Brawley's domestic water situation. Unless, and until, the City of Brawley is able to insure domestic water that meets or exceeds state and federal regulations, LAFCO will be unable to approve the request for annexation.

Unless a water treatment plant is built, Lucky Ranch will not be able to complete annexation procedures or project development. Lucky Ranch, as currently proposed, includes a mixed use development of commercial and industrial areas, seven residential neighborhoods, recreational facilities, and educational facilities. It is estimated that Lucky Ranch will generate approximately 9,350 new full-time jobs.

A substantial investment has already been made towards the development of Lucky Ranch. Therefore, the developer is extremely interested in the City of Brawley's ability to acquire the financing necessary to construct a new Water Treatment Plant, as required by state and federal agencies. This project is critical to the future existence of the City of Brawley, and especially to the City's economic future.

The City is now focusing on finding the most cost-effective means of constructing a new Water Treatment plant, especially in light of the fact that 55% of the residents are low-income, 25% are in poverty, and the City has an unemployment rate of approximately 24%. The City has initiated a strategy to minimize user fees, which includes the use of grant funding, low interest loans, and bond financing. Timeliness is a major issue for several reasons:

1) If the City does not comply with the citation timeline, heavy fines will be imposed on a City with declining financial revenues;
2) opportunities for economic growth will be lost; and
3) the existing water treatment and supply system could ultimately be shut-down.

With a new, modern VVTP and system, capable of supplying dependable, safe, and affordable water, the City of Brawley can become a center of commercial and industrial development in the northern Imperial County. The new WTP will allow the existing agriculturally-based industries to remain, and become more competitive and profitable.

The City can use the new WTP and distribution system as an effective marketing tool, together with affordable land, an abundant labor supply, transportation routes, and other financial incentives, including redevelopment. All of these factors contribute to increased employment and investment opportunities. In addition, the beneficial "multiplier effect," characteristic of revitalized, dynamic economies, will further the creation of jobs and continue public and private "reinvestment."

b . Project Impacts on Cultural Resources

As determined during the Environmental Review process conducted to meet California Environmental Quality Act (CEQA) requirements, there will be no impact on Cultural Resources. For greater detail on this issue, please refer to the Environmental Impact Report prepared for the City of Brawley by Brian Mooney Associates. The full report was submitted to the Border Environment Cooperation Committee under separate cover.

c **Characterization of Local Economic Situation**

The City of Brawley now exists on an area once declared by the Federal government to be of little value and not suitable for agricultural production. However, through determination, hard work, and increased diversions from the Colorado River, the area gradually developed. In 1903, a rail line was provided to the

community. In 1908, the City of Brawley was incorporated. The City served as a bedroom-community for farmers and cattlemen working the northern Imperial Valley. The City continued to develop and was the largest city in Imperial County until World War II.

Now the third largest city in Imperial County, Brawley has gradually slipped in regional importance to El Centro, and Calexico, due to those cities' proximity to interstate traffic, major railroad lines, and the international border. The City continues to be a bedroom community for farmers, ranchers, and others employed throughout the County. Brawley also offers retail, government, and professional services to the north Imperial Valley.

The City has played an important and significant role in the agriculturalbased economy that characterizes Imperial County. Brawley's strategic crossroads location at several highways and rail lines facilitated easy access for residents, visitors, businesses, and regional shipping services. Ironically, this ideal location for centralized agricultural industries, together with historic investment of resources in that industry, has exacerbated the economic distress now facing the City.

The economic base of Brawley and the County remains agriculture: production, processing, and distribution of crops including lettuce, alfalfa, cotton, melons, and sugar beets. In addition, secondary agricultural industries are prevalent including equipment, supply, irrigation, and financing.

Unfortunately, slow progress has been made in diversifying the City's economic base. Limited success has been achieved in the geothermal industry, light industrial and manufacturing, warehousing, and commercial/retail enterprises. The recent construction of State prisons has spurred housing construction and demand for retail services. However, the City of Brawley continues to suffer from chronic economic distress. The City is experiencing a declining or stagnant tax base, limited resources, and annual shortfalls in revenues. As the Imperial Valley declines in relative importance to other agricultural areas, many labor-intensive support industries (i.e., packing sheds) will end operations in the area. Furthermore, due to better locations than Brawley can offer, several large retail enterprises have selected the southern end of the Imperial Valley. These businesses are generating significant sales tax revenues for the Cities of Calexico and El Centro and continuing the &I sales leakage" phenomenon in Brawley. There is very little news pertaining to the opening or expansion of businesses in the City. There has been much talk and speculation regarding the North American Free Trade Agreement, yet benefits of increased international trade have been negligible.

Another consequence of the City's economic distress is a large, growing population of limited skilled residents suffering from low-incomes, unemployment, and increasing poverty.

The 1990 Census reported a median family Income for the City of Brawley at $25,679. Nearly 55% of the City's population is considered low-income (below 80% of the Area Median Income).

Some Census blocks have low-income concentrations of 75% to 100%.

The unemployment rate for Imperial County is presently 24%. The City of Brawley rate is consistent with the County's unemployment rate. The unemployment rate for the last four (4) years has averaged over 25%. No quick-fix or reversal of the unemployment rate is expected. Much of the high rate is institutional and not associated with National or State economic performance. The City has an overall poverty rate exceeding 24% (1990 Census). The poverty rate in 1980 was 15%. A large segment of this population possesses limited, marketable job skills, insufficient education or training, and faces challenging cultural barriers as well. As noted earlier, one of the City's Census Tracts was included in an Enterprise Community (EC) designation. This community, one of only two in the State, has some of the highest rates of poverty, unemployment, minority concentrations, and other ailments resulting from severe economic distress.

Another irony facing the City is a strong demand for housing, thus continuing the historic" bedroom-community" image. Unfortunately, the new housing need is proceded by a growing population placing an ever increasing demand upon governmental services and infrastructure, thereby further straining limited public resources.

The City has acknowledged that it must be prepared to meet the demands of the 21st century: a competitive global economy; application of advanced technology; and effective, strategic, governmental planning. A modern, dependable, and efficient WTP will serve as the foundation upon which the City will ensure its economic future. Through assistance from the Border Environment Cooperation Commission (BECC), the City will be able to replace the existing WTP and help to initiate the process of sustainable economic and community development that will reach all segments of the City's population.

6 . Community Participation

a. Public Expectations

To date, the City of Brawley has held approximately 20 public hearings. Seven meetings were held to discuss environmental findings in compliance with CEQA. Four meetings were held to

present the water rate increase proposal. Approximately ten meetings have been held through the General Plan Advisory Council. Meetings have been presented in both English and Spanish.

7 . Operation and Maintenance

a. Start-up Operation Program

Prior to start-up of the new water treatment plant, factory testing and field testing of all components of the plant will be conducted to ensure that defects in equipment or workmanship will be identified and corrected before plant start-up.

Factory Tests

All major items of equipment will be test run at the point of manufacturer and the test results delivered to the Engineer. Such equipment will not be shipped until the Engineer has reviewed the test results and advised the Contractor in writing that the equipment is acceptable for shipment. Such acceptance, however, will not be considered as final acceptance. Final acceptance will only be made on the basis of the test results of the equipment after installation.

Preliminary Equipment Tests

All items of mechanical equipment will be tested by the Contractor after installation for proper operation, efficiency, and capacity. The Contractor's test operation of each piece of mechanical equipment will continue for not less than eight hours without interruption. **All** moving parts of equipment and machinery will be carefully tested for operation, and adjusted so all parts move freely and function to secure satisfactory operation. All parts will operate satisfactorily in all respects, under continuous full load and in accordance with the specified requirements, for the full duration of the eight-hour test period.

If necessary, corrections or repairs will be made and the full eight-hour test operation will be completed after all parts operate satisfactorily.

Field performance tests of all process and pumping, equipment, drive motors, including auxiliaries will be made in accordance with the appropriate and approved test codes of the American Society of Mechanical Engineers, Hydraulic Institute Standards, NEMA, and IEEE.

Field testing will be conducted before the work is substantially complete so each item of equipment is ready for integrated operation with other equipment at the plant. Testing, measuring, and calibrating procedures

will be submitted to the Engineer for review and acceptance prior to startup and field testing of equipment. The plant control system must be in place and manufacturers field services completed prior to equipment tests.

All equipment will be tested continuously under actual or simulated operating conditions. Equipment will be tested over the full range of speed, capacity and pressure. Equipment will also be tested at every level of control. Valves will be throttled as required to simulate the full operating range. Curves will be developed from the test data and compared to the specified performance criteria. The Contractor will provide all appurtenances as required, but not limited to flow meters for liquid and gas flow pressure gauges and throttling valves, to verify performance. The Contractor will be fully responsible for the operation and maintenance of the equipment during startup. During testing, pressure, flow rate, amperage, voltage, vibration, equipment temperature, ambient temperature, tank level and the level of all water surfaces will be measured. The manufacturer's representative will make all necessary field adjustments and correct defects in materials or workmanship during this test period

The equipment will be property filled, by the Contractor, with oil and grease, and the Contractor will furnish all power, personnel, water, chemicals, fuels, oil, grease, and auxiliaries necessary for conducting the Contractor's testing of the equipment for proper operation, efficiency, and capacity.

The period of inspection, initial start-up operation, and field adjustment will be as required to achieve satisfactory installation and operation of the items furnished.

Final Test Operation

After all equipment is installed and the entire plant is ready to operate, the Owner will test all equipment for a period not to exceed seven days **by** operating either under actual or simulated operating conditions before final acceptance of the equipment is given. All defects of material or workmanship which appear during this test period will be corrected by the Contractor. After such corrections are made, the seven-day test will be run again before final acceptance of the equipment.

On certain items of equipment, the final adjustments and inspections will be made by factory trained service personnel (other than sales representatives), who will also supervise the test operation. The Contractor will notify the Engineer in writing seven days in advance prior to the service personnel performing the test operation. Each manufacturer who furnishes equipment that requires factory trained service personnel will adjust the equipment until the performance tests have been met and the results of the performance tests have been accepted **by** the Engineer.

As part of final testing the Contractor will operate the WTP at 15 mgd and 22.5 mgd for short periods of time. Water levels will be recorded throughout the plant, The work plan for the 22.5 mgd rate will be coordinated with the Engineer.

Tracer Tests

The Contractor will perform tracer tests of the completed construction to verify the effective contact time for the basin complex and the finished water reservoir. The effective contact time will be determined for each plant component on an individual basis. Under the guidelines of the Surface Water Treatment Rule (SWTR), disinfection credits are presented as part of the CT concept, whereas C is the disinfectant residual concentration and T is the effective contact time which the water is exposed to that residual concentration. The effective contact time, or Tio is defined as the time that it takes for 10 percent of the fluid that enters the contactor at time zero to exit the contactor. In other words, at least 90 percent of the water will be exposed to the disinfectant residual, C, for a time greater than T10.

To determine the T10 values, a series of tracer tests will be performed at four flow rates ranging from 2 mgd to 22.5 mgd. The actual flow rates will be determined by the Engineer.

All tracer tests will be conducted using the slug dose method.
Hydrofluosylicic acid will be used as the tracer. Samples will be obtained from the outlet. Grab samples will be collected at discrete time intervals to determine the concentration profile during the tests. These samples will be obtained in 250 mL Nalgene bottles and allowed to stand in a water bath for 30 minutes prior to analysis in order to allow for temperature equilibration with the fluoride standards. The fluoride concentration in each sample will be determined using an Orion Model

96-09 Fluoride Ion Probe and a direct reading Orion 940 Ion Analyzer.

The analyzer will be calibrated at the beginning of each day of testing.

Sampling will be continued for a period equal to approximately three times the theoretical hydraulic detention time **(Ttheory).** Initial sampling intervals will be one to two minutes. Sampling frequency will be

increased to 30 second intervals in the time period from approximately 0.5 times to 1.5 times Ttheory. Sampling frequency will then decrease until the final sample is taken at approximately 3 times Ttheory.

The results of the testing will be plotted graphically so that the T10 time can be clearly identified.

b . Contingency Program

The performance of factory and field testing, quality control, and site inspection described previously should minimize the need for a contingency program. Any problems that could effect start-up operations will be recognized and corrected during the construction phase of the plant. If a contingency program becomes necessary, the existing water treatment plant will continue to operate until the new water treatment plant becomes operational.

c . **Operation and Maintenance Program**

The operation and maintenance program will consist of preparation of operation and maintenance instruction manuals, comprehensive equipment and process training, annual refresher course training, seminars, and workshops, and fulfillment of certification requirements.

Before start-up of the plant, operations and maintenance personnel will receive comprehensive equipment training as described below:

General

1 The manufacturer will provide the services of a factory trained operations and maintenance specialist to instruct the Owner's maintenance and operations personnel in the operation, disassembly, and assembly of major equipment items, start-up, shutdown, safety concerns, troubleshooting, installation, alignment, and recommended corrective and preventative maintenance procedures for all equipment as specified in the equipment schedule section.

2. The qualification of the specialist will be subject to approval by the Engineer.

3. The Owner will coordinate the time for the training to be accomplished through the contractor. The training will be accomplished at a time approved by the Owner, near completion of the project, but prior to start-up of the equipment.
4. Manufacturer will provide a combination of classroom and field
5. Training performed by the manufacturer's representative is considered by the Owner to be a critical element of this project. Failure to submit the required information on schedule or unsatisfactory training resulting from unprepared or unqualified manufacturer's representatives may result in progress payment retainage of 10 percent of the amount due the Contractor for the respective equipment until satisfactory lead time and training is provided in the opinion of the Owner.
6. Manufacturer will provide the number of days of training for equipment.
7. Final operations and maintenance manuals will be completed for use during training exercises.
8. Training will not proceed until all individual systems have been approved by the manufacturer and completed the required testing required in this section.

Instruction Schedule

1 Manufacturer will provide to Owner a tentative training schedule and contact person 60 days prior to commencement of any training.
2. Manufacturer will submit for approval a proposed Lesson Plan for the instruction 30 days prior to commencement of scheduled training.
3. Manufacturer will submit for approval credentials of its designated instructor. Credentials will include a brief resume and specific details of the instructor's experience with training on maintenance and operation of the equipment provided.

Instruction Lesson Plan

1 . Manufacturer's proposed Lesson Plan will include the elements presented in the Outline of Instruction Lesson Plan specified herein. Specific components and procedures will be identified in the proposed Lesson Plan.
2. Manufacturer's proposed Lesson Plan will detail specific instruction topics. Training aids to be utilized in the instruction shall be referenced and attached where applicable to the proposed Lesson Plan. "Hands-onn demonstrations planned for the instruction will be described in the Lesson Plan.
3. The manufacturer will indicate the estimated duration of each segment of the training Lesson Plan.
4. Outline of Instruction Lesson Plan:

Equipment operation:

(a) Describe equipment's operating (process) function.

(b) Describe equipment's fundamental operating principals and dynamics.
(c) Identify equipment's mechanical, electrical, and electronic components and features.
(d) Identify all support equipment associated with the operation of subject equipment (i.e., air intake filters, valve actuators, motors).

Detailed component description:

(a) Identify and describe in detail each component's function.

(b) Where applicable, group related components into subsystems. Describe subsystem functions and their interaction with other subsystems.
(c) Identify and describe in detail equipment safeties and control interlocks.

Equipment preventive maintenance (PM):

(a) Describe PM inspection procedures required to:

(1) Perform an inspection of the equipment in operation.

(2) Spot potential trouble symptoms (anticipate breakdowns).
(3) Forecast maintenance requirements (predictive maintenance).

(b) Define the recommended PM intervals for each component.

(c) Provide lubricant and replacement part recommendations and limitations.
(d) Describe appropriate cleaning practices and recommended intervals.

Equipment troubleshooting.

(a) Define recommended systematic troubleshooting procedures
(b) Provide component-specific troubleshooting checklists.

(c) Describe applicable equipment testing and diagnostic procedures to facilitate troubleshooting.

Equipment corrective maintenance:

(a) Describe recommended equipment preparation requirements.
(b) Identify and describe the use of any special tools required for maintenance of the equipment.
(c) Describe component removal/installation and disassembly/assembly procedures.
(d) Perform at least two "hands-on" demonstrations of common corrective maintenance repairs.
(e) Describe recommended measuring instruments and procedures and provide instruction on interpreting alignment measurements, as appropriate.
(f Define recommended torquing, mounting, calibration, and/or alignment procedures and settings, as appropriate.
(g) Describe recommended procedures to check/test equipment following a corrective repair.

Training Aide

1 . The manufacturer's instructor will incorporate training aids as appropriate to assist in the instruction. At a minimum, the training aids will include text and figure handouts. The manufacturer will provide Owner one complete set of all slides, transparencies, diagrams, and other written material used for training purposes. Other appropriate training aids are:

Audio-visual aids (e.g. films, slides, videotapes, overhead transparencies, posters, blueprints, diagrams, catalog sheets).

Equipment cutaways and samples (e.g. spare parts, damaged equipment).

Tools (e.g. repair tools, customized tools, measuring and calibrating instruments).

The manufacturer's instructor will utilize descriptive class handouts during the instruction.

Hands-On Demonstration

1 The manufacturer's instructor will present at least one 'hands-on" demonstration of common corrective maintenance repairs so that key operations and maintenance personnel have the opportunity to witness the demonstration. The manufacturer will provide the tools and equipment to conduct the demonstrations.
2. In any hands-on training situation where Owner's operations or maintenance personnel participate in disassembly or assembly of equipment components, the manufacturer will be responsible for such disassembly or assembly and shall provide written certification of proper equipment operation to the Engineer.

Funds will be reserved in the project budget to ensure adequate support for the operation and maintenance program. **A** preliminary estimate is as **follows:**

Start-up: $10,000
Annual: $ 4,000

d . Safety Program

Plant personnel will be trained to handle all aspects of emergencies, either naturally occurring or manmade. Possible emergencies include earthquake, fire, chemical and operational spills at the plant site, life and safety issues for personnel, and security.

City personnel who operate and maintain the facilities will receive safety training related to their work. Training includes basic first aid, confined space entry, seff contained breathing apparatus and the use of fire extinguishers.
All operations and maintenance personnel will receive annual training for safety and chemical handling and spill procedures.