

Chapter 2:

Introduction

The goal of the Regional Colorado River Conveyance System Feasibility Study is to identify, evaluate, and document mutually beneficial opportunities for cross-border regional cooperation on the development of new water conveyance facilities.

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Chapter 2: Introduction

2.1 Introduction

2.1.1 Purpose

This is the final report of the Regional Colorado Conveyance System Feasibility Study. The report has been prepared for the San Diego County Water Authority by Boyle Engineering Corporation and its subconsultants, and with technical coordination assistance from the project Binational Technical Committee.

The purpose of the study is to identify, evaluate, and document mutually beneficial opportunities for cross-border regional cooperation on the development of new water conveyance facilities. These facilities would transfer agricultural water from the Imperial and Mexicali valleys to the San Diego and Tijuana metropolitan areas.

2.1.2 Chapter Outline

This chapter is organized into the following three additional sections:

- **2.2: Project Authorization**
- **2.3: Project Background**
- **2.4: Report Outline**

2.2 Project Authorization

2.2.1 U.S. – Mexico Treaty Minute No. 301

On October 14, 1999, Minute No. 301, *Joint Colorado River Water Conveyance Planning Level Study for the San Diego, California-Tijuana, Baja California Region* was approved by the United States and Mexico Sections of the International Boundary and Water Commission (IBWC). This Minute authorized the joint planning level study of Colorado River water supply conveyance options in the United States and in Mexico or partly in each country to the San Diego, California and Tijuana, Baja California regions, under the guidance of a Binational Technical Committee (BTC) composed of institutions from both countries that are involved with water supply.

The BTC will provide directions at each stage of the project. It is integrated by both sections of IBWC, Mexico's Comisión Nacional de Aguas (CNA), the Comisión Estatal del Agua (CEA), the Comisión Estatal de Servicios Públicos de Tijuana (CESPT), the Dirección General de Ecología (DGE), the State Department of Water Resources (DWR), the San Diego County Water Authority (SDCWA) and the consultants.

The basis of the Minute was the "Joint Report of the Principal Engineers and Technical Advisors to Facilitate a Joint Colorado River Water Conveyance Planning Level Study for the San Diego, CA-Tijuana Region, BC," signed by Principal Engineers of the IBWC U.S. and Mexico Sections, the General Manager of the SDCWA, the Border Affairs Coordinator for CNA, and the Director of the State Water Commission for the State of Baja California. The joint Report established the international coordination arrangement, the basic scope of work and financing responsibilities for the planning level study to evaluate, in a joint manner, the opportunities for increasing the conveyance capacity, storage and treatment of Colorado River water for its delivery to the San Diego-Tijuana region.

2.2.2 Boyle Contract

The San Diego County Water Authority (SDCWA) contracted with Boyle Engineering Corporation (Boyle) to provide professional engineering services and prepare the "Regional Colorado River Conveyance System Feasibility Study" (Study). The project concept under study is the conveyance of 300,000 to 500,000 acre-feet per year of water from the Colorado River to the Tijuana-San Diego region for municipal water supply. The goal of the Study is to identify, evaluate, and document mutually beneficial opportunities for cross-border regional cooperation on the development of new or expanded conveyance facilities of Colorado River Water to Tijuana, Baja California, Mexico and San Diego, California. Boyle examined the water supply, storage and water quality needs of both San Diego and Tijuana-Rosarito by using data supplied by Mexico's consultants and data supplied by previous SDCWA consultants. This data was then combined and incorporated into the Study as the project planning criteria. Specific tasks performed by Boyle's team included:

- Preliminary Analysis
- Near-Term Water Supply Options
- Water Quality / Treatment Options
- Mexico – U.S. Interconnections

- Review of Mexico Report
- Environmental Constraints Review and Analysis
- Pipeline Geotechnical and Tunneling Review & Analysis
- Storage Review and Analysis
- System Integration / Alternatives Refinement / Cost Analysis
- Implementation Planning
- Feasibility Report
- Project Coordination Assistance
- Project Management, Quality Control, and Administration

Subconsultants to Boyle included Haley & Aldrich for tunneling analyses, URS Corporation for geotechnical and storage site evaluations, EDAW, Inc. for environmental screening analyses, and Emilio de la Fuente, Consulting Engineer, for analysis of near-term water supply options for the Tijuana region.

2.3 Project Background

The SDCWA – IID Transfer Agreement calls for up to 200,000 acre-feet per year of water to be made available to SDCWA.

2.3.1 SDCWA – IID Transfer Agreement

The San Diego County Water Authority negotiated a landmark agreement with the Imperial Irrigation District (IID) to bring 200,000 acre-feet of conserved Colorado River water to San Diego. On April 29, 1998, the Water Conservation and Transfer Agreement was signed between the SDCWA and IID. This agreement provides for the implementation of voluntary, extraordinary conservation measures by Imperial Valley farmers. The conserved water will then be made available to SDCWA. A contingency of the SDCWA-IID agreement was that SDCWA is responsible for securing a way to convey the transfer water to the San Diego region. The initial term of the transfer agreement is for 45 years, with a provision that either agency may extend the agreement for an additional 30-year term.

Tijuana needs additional water supplies to serve its growing population and economy.

2.3.2 Tijuana Water Supply Setting and Needs

Rapid population growth in the Tijuana municipal area has brought water demands close to the capacity of the existing water supply system. According to information presented in the draft report of Mexico’s consultant team for this project, the current rapid population growth in the Tijuana-Rosarito area is projected to continue. Historical and projected area populations indicate that by approximately 2020,

the population of the Tijuana municipality alone will be equal to that of San Diego County. Projected water demands exceed current developed supplies.

As part of a near-term solution to Tijuana's water supply needs, the Comisión Estatal del Agua (CEA) has recently requested the reactivation and reconstruction of the interconnect facilities to allow for the delivery of up to 0.60 m³/s of Mexico's Colorado River treaty entitlement water to the Tijuana region via Otay Mesa. These deliveries would continue until CEA and CESPT can implement a long-term solution, such as a Regional Colorado River Conveyance System project, to augment the Tijuana area's water supply.

2.3.3 Black & Veatch Studies

The Black & Veatch studies identify alignment segments within the U.S.

In 1996 the consulting firm of Black & Veatch completed a study (*Feasibility Level Engineering for Facilities to Transfer Water from the Imperial Irrigation District*, September 1996) for the SDCWA of conveyance facilities from IID along alignments that are entirely in the United States and serve only San Diego's demand. The report identified five alignments, of which two were selected as finalists. The two finalist alignments are: 1) a pipeline alignment (know as "5C"); and 2) a long tunnel alignment (know as "5A"). Preliminary analyses of environmental and geotechnical issues were included along with cost estimates for the alignments. This study is referred to throughout this report as the 1996 Black & Veatch Study.

Subsequent to the 1996 Study, SDCWA commissioned Black & Veatch to prepare a cost update and refinement of the original 1996 investigation. The cost update work included additional geotechnical exploration of the two finalist alignments, and a comprehensive review and update of the cost estimates to 2001 conditions. This study is referred to throughout this report as the 2001 Black & Veatch Study.

2.3.4 2001 PSC Study

The PSC study identifies alignment segments within Mexico.

Population and economic growth in the Tijuana-Rosarito metropolitan area has created a growing interest in Mexico to evaluate the transfer of additional portions of that country's Colorado River water entitlement to Tijuana through a new or expanded conveyance facility. Planeacion Sistemas y Control, S.A. de C.V. (PSC), a consultant for Mexico's National Water Commission (CNA) provided the following reports for review in this Study:

- “Estudio de Factibilidad para la Conduccion de Agua del Rio Colorado a la Region de Tijuana, B.C.-San Diego, CA” (Draft Report, April 2001)
- “Estudio de Refraccion Sísmica para la Caracterizacion del Subsuelo Somero en las Tres Opciones del Proyecto Acueducto” (Draft Report, June 2001)

The first report is a feasibility study of conveying Colorado River water from the terminus of the All American Canal to the Tijuana - San Diego region, using alignments within Mexico. The second report is a geotechnical characterization report. The reports identify alignment alternatives and reservoir sites, and include discussions on land use, environmental issues, geotechnical investigations for the alternate conveyance system alignment corridors and reservoir storage sites, and energy issues. They include preliminary assessments of environmental issues and constraints along the identified alignments focusing on land use and environmental constraints, including sensitive biological resources, archaeological sites, and hazardous materials storage sites. PSC’s geotechnical investigations included geologic mapping, geophysical surveys, test borings, and laboratory testing. The PSC reports provide the basis for the Mexico alignment segments presented in this report.

2.3.5 Binational Coordination

Under Minute No. 301 of the IBWC, a Binational Technical Committee (BTC) comprised of institutions from Mexico and the United States as described in Section 2.2 was established to facilitate coordination between the countries and the consultants and to ensure that the common goals and methods necessary to accomplish the Study goals were met.

2.4 Report Outline

This report is organized into chapters as follows:

Chapter 1 - Summary

Provides a summary overview of the report and its findings.

Chapter 2 - Introduction

This chapter.

Chapter 3 - Alignments

Describes the alternative alignment systems developed for conveying water from the All American Canal to delivery locations in San Diego and Tijuana.

Chapter 4 - Design Criteria

Presents the design criteria utilized for conceptual design of the binational alignment alternatives, and the methodologies used to estimate costs for these alignments.

Chapter 5 - Near-Term Supplies

Documents the near-term water supply options available to the Tijuana – Rosarito area that are necessary to sustain the continuing growth and economic development of the area until a long-term supply project, such as the Regional Colorado River Conveyance System, can be completed.

Chapter 6 - Water Quality

Reviews water quality objectives and treatment alternatives for a binational aqueduct project evaluating two types of treatment 1) drinking water treatment for delivery of potable water to consumers, and 2) demineralization treatment for reduction of total dissolved solids (TDS).

Chapter 7 - Environmental

Reviews the environmental issues associated with each of the alignment system alternatives for construction of a binational aqueduct.

Chapter 8 - Geotechnical

Reviews the preliminary geotechnical information developed by PSC, and assists with interpretations of the geotechnical data for pipeline/tunnels and storage site evaluations and construction cost estimating.

Chapter 9 - Tunnels

Investigates the geologic setting, constructability, and costs of the various tunnel segments included in the binational pipeline alignment system alternatives.

Chapter 10 - Storage Analysis

Reviews the operational, seasonal, carry-over and emergency storage needs for both the U.S. and Mexico and identifies preliminary storage sites.

Chapter 11 - Cost Analysis

Presents analysis of costs for each alignment, including initial draft allocations of costs to each country, and including capital costs, annual costs for operation and maintenance, and unit costs of water delivered for each alternative alignment system.

Chapter 12 - Finance Options

Examines options available to the SDCWA and Mexico for financing their respective shares of the project's capital costs, and includes traditional (national) sources, international finance institutions, U.S.-Mexico Binational finance institutions, and other sources.

Chapter 13 - System Evaluations

Identifies the set of criteria used to evaluate the project alternatives and includes the range of values assigned to each criteria, method and weighting factors to use in comparing the feasibility of the alignments.

Chapter 14 - Next Steps

Identifies the future steps necessary for development of the binational aqueduct project and the issues that need to be resolved prior to the project moving forward.

Appendices

Cost analysis spreadsheets are included in the following appendices:

- Appendix A: Total Equivalent Annual Costs and Unit Cost of Water Delivered
- Appendix B-1: Alignment Cost Summaries – Construction Costs
- Appendix B-2: Alignment Cost Summaries – Total Project Costs
- Appendix C-1: Pipeline Component Cost Estimates
- Appendix C-2: Other Component Cost Estimates
- Appendix D: Operation and Maintenance Costs
- Appendix E: Energy Cost Calculations and Cost Shares