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METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

EXECUTIVE SECRETARY

August 5, 1994

To: Board of Directors (Water Problems Committee--Information)

From: General Manager

Subject: San Diego County Water Authority Water Repurification Feasibility Study

Report

In an effort to reduce San Diego County's reliance on imported water supplies, the San Diego County Water Authority (SDCWA), in cooperation with Metropolitan and the City of San Diego, conducted Phase I of a Water Repurification Feasibility Study (Study). Water repurification, in which reclaimed water receives an additional advanced level of treatment prior to direct discharge to a potable water supply reservoir, may represent another potential local water supply which is not currently permissible. The purpose of the Study was to evaluate the introduction of repurified water into the City of San Diego's San Vicente Reservoir.

The Study involved the identification of regulatory requirements for the water repurification project. In addition, Phase I included development of a detailed project proposal and an assessment of public acceptance of indirect potable reuse of reclaimed water. The total cost of Phase I was in excess of $300,000, of which Metropolitan's share was $75,000.

The Study, which was completed in June, recommended that the repurified water must exceed both conventional drinking water and surface water quality standards and provide a level of safety equal to the current raw water supply. To achieve that end, the reclaimed water would receive advanced treatment, including reverse osmosis followed by disinfection. Further, to enhance overall safety and reliability, the recommendations of the Study required an average detention time of one year be provided in the reservoir to enable blending with imported and local surface supplies, and that the inlet and outlet be configured to avoid short-circuiting. A copy of the executive summary of the report is attached for your information.

SDCWA submitted a comprehensive project proposal to the California Department of Health Services (DHS) in June 1994 to assist in the development of project guidelines for permit approval. DHS has indicated that it will provide comments on the proposal to SDCWA by the end of the month. If DHS is receptive to the project, SDCWA and the City of San Diego will implement Phase II of the Study which will involve developing a more detailed project and facilities plan, conducting field studies that DHS may require, commencing an environmental evaluation, and further assessing the public acceptability of potable reuse.

Board Committee Assignment

This letter is referred for information to the Water Problems Committee because of its authority to study, advise, and make recommendations with regard to water conservation, reclamation, reuse and underground storage of water and the use of thereof pursuant to Administrative Code Section 2481 (i).

Recommendation

For information only.

John R. Wodraska
General Manager

By: Debra C. Man
Debra C. Man
Chief of Planning and Resources

Concur:

for
John R. Wodraska
General Manager

AMH:esa

EXECUTIVE SUMMARY

To reduce San Diego County's reliance on limited imported water supplies, the San Diego County Water Authority (SDCWA) and its member agencies are encouraging the development of alternative water supplies, along with comprehensive water conservation programs. Alternative supplies include development of local groundwater, improvements in conveyance and storage facilities, seawater desalinization, and conventional non-potable reclaimed water use.

Water repurification, in which reclaimed water receives a separate, advanced level of treatment prior to discharge to a potable supply reservoir, may represent another potential local water supply. Based on the findings of previous water repurification studies throughout the country, and the successful operation of Water Factory-21 in Orange County, where up to 15 million gallons per day of highly treated reclaimed water has been injected into that community's domestic groundwater supply system since the mid 1970's, the City of San Diego has been actively studying the water repurification concept.

Through its Total Resource Recovery Program, the City has been evaluating the safety and reliability of water repurification since 1983. The pilot phase of that program, conducted in Mission Valley and known as Aqua II, included a comprehensive five-year health effects study. That study's findings were consistent with the findings of other health effects studies conducted throughout the country, with project investigators concluding that the level of safety associated with repurified water is equal to that of the area's current domestic water supply. The City's evaluation of water repurification continues with operation of the larger-scale Aqua III facility in San Pasqual Valley. In addition to continued health effects testing, City staff will gain valuable experience in the operation of the full-scale water repurification treatment system.

The next step in establishing the viability of water repurification in San Diego County is the development of a plan to introduce repurified water into the region's water supply in a safe and reliable manner. This study, authorized by the SDCWA, the City of San Diego, and the Metropolitan Water District of Southern California, develops a conceptual water repurification project that can be considered by the regulatory community. In developing this project, necessary barriers for the protection of public health are identified and specific water quality and operational requirements are recommended.

For purposes of developing a conceptual project, it was assumed that 1) the City of San Diego North City Water Reclamation Plant would serve as the source of supply to an advanced water treatment facility, and that 2) repurified water would be conveyed about 20 miles to the City of San Diego's San Vicente Reservoir to blend with and supplement local runoff and

imported water. Withdrawals from San Vicente Reservoir are conveyed to the City of San Diego Alvarado Water Filtration Plant for conventional potable treatment and disinfection prior to distribution through the existing potable water system. The location of project facilities is presented on ***Figure ES-1***. A schematic of the overall repurification process considered in this report is presented on ***Figure ES-2***.

Major conclusions and recommendations of this investigation are as follows.

- Repurified water must exceed both conventional drinking water and surface water quality standards and provide a level of safety equal to the current water supply.

- It is recommended that repurified water receive advanced reverse osmosis treatment. In addition, an additional chemical disinfection step (ozone/hydrogen peroxide) is recommended to provide redundancy.

- Limited data suggest that algae growth in San Vicente Reservoir may be sensitive to nitrogen levels in the repurified water. As a result, it is recommended that ion exchange treatment be included in the advanced water treatment system to further reduce product water nitrogen concentrations.

- To enhance overall repurification system safety and reliability, repurified water would be retained in a reservoir prior to potable water treatment to 1) enable blending with imported and local surface flows (with a resultant reduction in mineral concentrations and hardness in the reservoir), and to 2) provide time to verify the quality of the repurified water. It is recommended that the reservoir provide an average detention time of one year, and that the inlet and outlet be configured to avoid short-circuiting.

- A repurified water discharge of up to 20 mgd to San Vicente Reservoir would be in conformance with these recommendations.

- The water repurification project concept developed in this study provides extensive treatment process redundancies and overall system reliability. Key reliability assurance features of this project include:

  - industrial contaminant source control (in place),

  - redundant treatment processes providing multiple barriers for microbiological and organic constituents,

  - continuous monitoring of the product water, and diversion of product water not meeting specified criteria,

  - comprehensive monitoring of water retained in San Vicente Reservoir, and

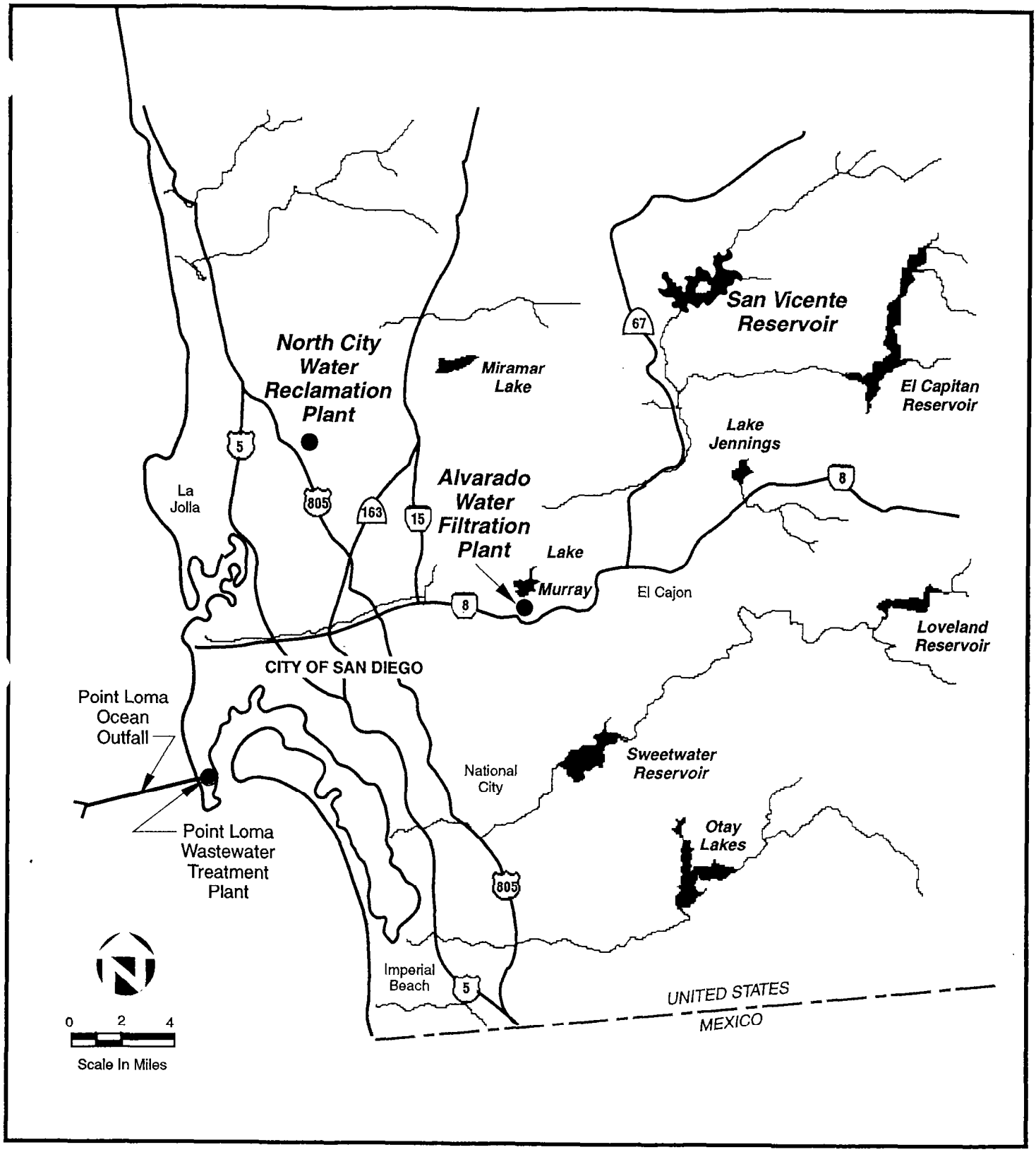

Figure ES-1
Location of Key Project Features

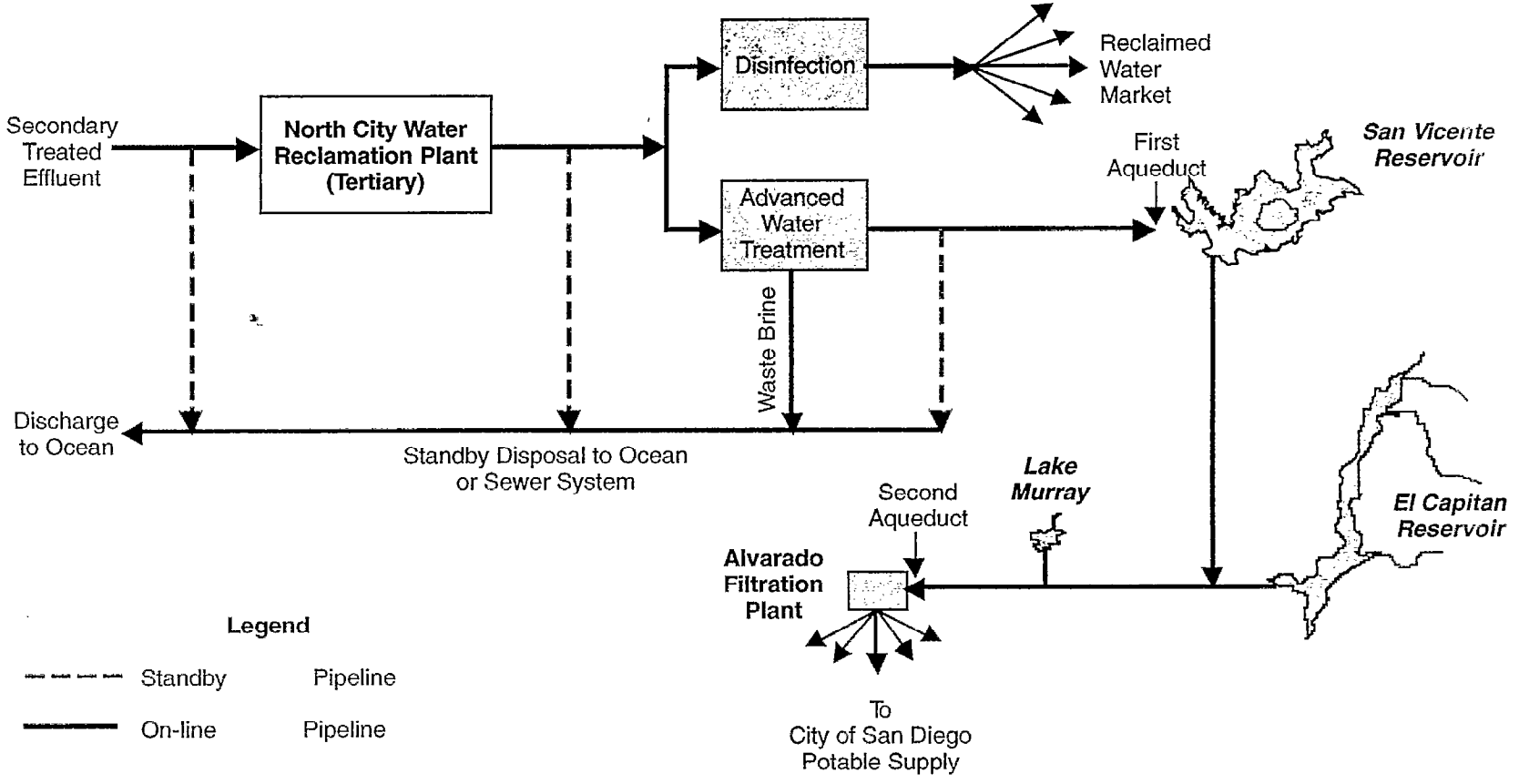

Figure ES-2
Schematic of Water Repurification Concept

- conventional potable water treatment at Alvarado Water Filtration Plant prior to distribution for use.

The comparative safety of repurified water as a potable water supply has been demonstrated through previous studies in San Diego and elsewhere. In this feasibility study, a conceptual project is developed that would introduce repurified water into the SDCWA and City of San Diego water supply systems in a safe and reliable manner.

Should the regulatory feasibility of water repurification be established, implementing agencies can evaluate the public acceptability, environmental, institutional, and economic feasibility of water repurification. If implementing agencies choose to move forward with water repurification, it may prove feasible to implement a water repurification project by the end of this decade.