THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

INFORMATION

- **Board of Directors**
  Water Quality and Operations Committee

March 10, 2009 Board Meeting

9-2

Subject

San Joaquin Valley Agricultural Water Recovery Demonstration Projects

Description

This information letter describes staff's progress to date in developing a potential water supply through the recovery of agricultural water in the San Joaquin Valley. Under this initiative, agricultural water would be recovered from perched groundwater basins and tile drain systems located south of the Delta. As a result, this potential supply is a part of Metropolitan's five-year supply actions that would enhance water supply reliability over the next several years even under continued drought conditions and court-ordered restrictions affecting the Delta. The five-year supply actions include six initiatives: conservation, Colorado River transactions, near-term Delta actions, State Water Project transactions, groundwater recovery, and local resources.

Feasibility assessments of potential groundwater recovery projects both within Metropolitan's service area and agricultural areas in the San Joaquin Valley have been completed. The assessments have identified two potential demonstration projects for agricultural water recovery that would be jointly implemented by local water districts and Metropolitan. With authorization to proceed with implementation in April, these demonstration projects could yield 4,000 – 11,000 acre-feet (AF) per year starting in late 2010. If demonstrated as cost-effective and feasible water supplies, these demonstration projects could be expanded to collectively deliver about 50,000 AF per year over the next 20 years.

Background

Though the San Joaquin Valley contains some of the nation's most highly productive farmland, irrigation practices and local geology have contributed to the problematic accumulation and disposal of agricultural drainage water. In order to prevent dissolved salts in irrigation water from concentrating in the root zone and reducing productivity, excess irrigation water is applied beyond a specific crop's consumptive use to carry the salts below the root zone. As a rule of thumb, an additional 0.5 AF of water per year is needed to flush the salts from one acre of cropland.

The salinity of the flushed or drained water in the San Joaquin Valley ranges widely from 2,000 – 20,000 mg/L. This water is often trapped by semipermeable clay layers located 40 to 300 feet below the ground surface. These clay layers limit the depth to which the water can percolate resulting in a shallow, saline groundwater aquifer.

During the irrigation season, the salty water trapped by the clay layers can rise to within a few feet of the ground surface. When this condition persists, crop yields reduce or land is forced out of agricultural production. In some areas of the San Joaquin Valley, on-farm tile drainage systems are used to keep the saline shallow groundwater below the crop root zone. Disposal of the collected drainage water must be carefully managed because of the potential for wildlife toxicity from accumulated minerals such as selenium.

Vast amounts of shallow, salty groundwater underlie nearly 750,000 acres of irrigated farmland in the western San Joaquin Valley. Both the United States Bureau of Reclamation and the State Water Resources Control Board have put agencies on notice that this unsustainable practice must be addressed. To date, agricultural districts have addressed the accumulation of perched, saline water largely through irrigation efficiency improvements and retiring land from production.

Water Supply Opportunity

The dual challenge of reducing agricultural drainage while increasing water supply provides an opportunity for Metropolitan to begin mutually beneficial, cooperative partnerships with agricultural districts in the San Joaquin Valley. Staff recently completed a conceptual-level analysis of alternative water supply projects with different agencies in the western San Joaquin Valley. The yields for these initial demonstration projects range from 4,000 to 11,000 AF per year. If expanded, these projects could collectively deliver about 50,000 AF per year.

The technical approach examined for these projects includes the following steps: (1) collection of drain water from a tile-drain system or from shallow wells; (2) pre-treatment to prevent membrane fouling; (3) desalting using reverse osmosis membranes; (4) return of treated water via exchange to the California Aqueduct; and (5) brine disposal. Ultimately, a pipeline may be constructed to return treated water directly to the California Aqueduct.

As mentioned earlier, disposal of agricultural drainage water presents a number of technical and environmental challenges. For these demonstration projects, the proposed brine management methods include a combination of enhanced solar evaporator ponds with supplemental mist-spray evaporators. In this configuration, the ponds would be designed for seasonal storage of brine and would be operated in a manner to discourage waterfowl use (e.g., a combination of steep sides, limited vegetation or cover, and waterfowl netting or hazing). Also, mist evaporators would draw water from the storage pond and spray the water over the pond surface as a very fine mist at high velocity to accelerate the natural evaporation from the pond. The mist evaporators further serve as a waterfowl hazing method. Between the use of reverse osmosis technology and mist evaporators to concentrate the brine, the volume of brine to be managed—and, in essence, the ecological "footprint"—is reduced by approximately 30-fold compared to typical tile-drain collection and disposal.

Preliminary cost analyses of two proposed demonstration projects indicate a present-value cost of the water (delivered to the California Aqueduct in the San Joaquin Valley) to range from $400 to $600 per AF based on a 20-year term and depending on the drainage water quality. The demonstration projects will allow staff to optimize the treatment approach and costs.

Proposed Key Terms for Agreements

As envisioned, Metropolitan would enter into a reimbursable agreement with other districts to implement one or two demonstration projects. The basic terms listed below are currently under negotiation:

General terms:

1. Initial term of the agreement will be 10 years with two 5-year automatic extensions, unless declined at Metropolitan's sole option, for a total of 20 years; and
2. Metropolitan will have the right to 100 percent of all water recovered.

Agricultural agency will:

1. Be responsible for completion of all California Environmental Quality Act (CEQA) documents;
2. Be responsible for design, construction, startup, and operation of the project; and
3. Provide exchange water into the California Aqueduct—to the maximum extent possible—for water recovered by the project.

Metropolitan will:

1. Review and approve the preliminary design, final design, and contract award prior to proceeding with the next phase;
2. Reimburse agricultural agency for most of the costs associated with CEQA compliance, design, construction, startup, and operation of the project; and
3. Relinquish any interest in the developed facilities to the agricultural agency at the end of the agreement term.

Next Steps

Metropolitan and its potential partners are refining the scope of their responsibilities and negotiating the terms of proposed reimbursable agreements to complete CEQA and subsequently begin design and construction. Metropolitan staff anticipates returning to the Board in April or May 2009 for authorization to execute a Memorandum of Understanding between the parties.

Policy

Metropolitan Water District Administrative Code Section 2481: Duties and Functions of Water Quality and Operations Committee

Fiscal Impact

A preliminary estimate of the capital costs for the treatment systems ranges from $17 million for a 4,000 AF per year facility to $35 million for an 11,000 AF per year facility that could be operated over a 20-year period.

2/26/2009
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BLA #6527