SUBMIT OPTION SUBMITTAL FORM BY: MWD COMMENTS

1. EMAIL TO: COLORADORIVERBASINSTUDY@USBR.GOV
2. U.S. MAIL TO: BUREAU OF RECLAMATION, ATTENTION MS. PAM ADAMS, LC-2721, P.O. BOX 61470, BOULDER CITY, NV 89006-1470
3. FACSIMILE TO: 702-293-8418

Option Submittal Form

Contact Information (optional): ☐ **Keep my contact information private.**

Contact Name: ____________________ Title: ____________________

Affiliation: ____________________

Address: ____________________

Telephone: E-mail Address:

Date Option Submitted: ____________________

Option Name:

Large Scale Pacific Ocean Desalination

Description of Option:

This option includes implementing ocean desalination projects that are above the current plans within the MWD service area. During years when MWD has Colorado River supply shortages, the first increment of this water would meet that demand. Any amount of water produced above that amount could be exchanged with other Colorado River water users (with the operational ability to make the exchanges).

Location: Describe location(s) where option could be implemented and other areas that the option would affect, if applicable. Attach a map, if applicable.

During a brainstorming session with MWD water resources professionals, it was noted that several potential sites could be considered. However, all of them will have some challenges related to hydraulic integration with the MWD system or with member agency systems. When considering large scale desalination plants of approximately 200 mgd, there are still a few locations that could accept that amount of water year round. Two specific locations mentioned include:

1) Desalination plant near Oxnard with a pipeline delivering water to Castaic Lake.

2) Larger desalination plant at the Camp Pendleton site currently being evaluated with a pipeline delivering water to Diamond Valley Lake.

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Quantity and Timing: Roughly quantify the range of the potential amount of water that the option could provide over the next 50 years and in what timeframe that amount could be available. If option could be implemented in phases, include quantity estimates associated with each phase. If known, specify any important seasonal (e.g., more water could be available in winter) and/or frequency (e.g., more water could likely be available during above-average hydrologic years) considerations. If known, describe any key assumptions made in order to quantify the potential amount.

The maximum quantity of water developed for this option would be limited to the amount of water needed for projected MWD Colorado River shortages plus the amount that could be operationally exchanged to other Colorado River users. This amount was estimated at 0.6 MAFY as outlined below.

a) MWD has goal of a full Colorado River Aqueduct (CRA), equal to 1.25 MAFY.

b) Estimated dry year deliveries to the CRA for MWD (without future improvements to the CR system) = 0.85 MAFY

c) Assumptions in a) and b) result in a 0.4 MAFY MWD Colorado River supply shortage

d) Existing exchange agreements between MWD and Coachella Valley Water District (CVWD) and Desert Water Agency (DWA) require MWD to import 0.15 MAFY through the CRA to facilitate the CVWD-DWA exchange.

e) Assumptions b) and d) result in an estimated 0.7 MAFY (0.85 MAFY – 0.15 MAFY) of CRA imports left for MWD in dry year

f) MWD estimates that the minimum CRA supply MWD could operate at for the benefit of MWD is 0.5 MAFY (considering operational balance between other supplies and cost effective power usage agreements).

g) Assumptions e) and f) result in an estimated 0.2 MAFY (0.7 MAFY – 0.5 MAFY) that MWD could reduce deliveries to the CRA and make that water available for other Colorado River users via exchange with a local desalter supply.

h) Assumptions c) and g) result in 0.6 MAFY (0.4 MAFY + 0.2 MAFY) as the estimated maximum usage large-scale Pacific Ocean desalter supply quantity.

Additional Information

Technical Feasibility: Describe the maturity and feasibility of the concept/technology being proposed, and what research and/or technological development might first be needed.

The concepts are technically feasible. However, hydraulic integration with existing system, water quality compatibility, and handling mismatches in timing of water versus demand with peaking capacity or storage are all technical issues that must be addressed.

Also, some of the pipeline alignments may be challenging considering the existing urban development in the alignment.

Costs: Provide cost and funding information, if available, including capital, operations, maintenance, repair, replacement, and any other costs and sources of funds (e.g., public, private, or both public and private). Identify what is and is not included in the provided cost numbers and provide references used for cost justification. Methodologies for calculating unit costs (e.g., $/acre-foot or $/million gallons) vary widely; therefore, do not provide unit costs without also providing the assumed capital and annual costs for the option, and the methodology used to calculate unit costs.

The cost for all of these alternatives would require extensive alignment evaluations and will be highly dependent on the ability to acquire easements, the need to relocate other utilities, and the ability to construct in heavily congested traffic corridors. Very rough estimates based on typical unit cost databases adjusted using engineering judgment for the more heavily congested corridors are shown below. Because these estimates are a very rough estimate, a range of unit costs are presented. The costs include ocean desalination, pumping facilities, and conveyance facilities.

- Oxnard to Lake Bard WTP = $2.5 Billion Capital, $190 Million per Year O&M, $1,500-$2,000 / AF Unit Cost (Financial Method)

- Camp Pendleton to Diamond Valley Lake = $ 3.3 Billion Capital, $190 Million per Year O&M, $1,600 - $2,100 / AF Unit Cost (Financial Method)

Note, electricity costs are one of the largest uncertain cost items related to annual O&M estimates for for ocean desalination facilities. Recent reports have used assumed energy costs as low as $0.08/kwh and as high as $0.12/kwh for the Carlsbad desalination plant. Due to the high level nature of this concept at this time $0.10/kwh for energy costs was assumed..

Permitting: List the permits and/or approvals required and status of any permits and/or approvals received.

Permitting could be difficult for these projects. The Carlsbad project in San Diego County is smaller, but similar in nature to these larger projects. The Carlsbad project has received the required permits. The permitting process for the Carlsbad project took about 7 years.

This is because California requirements are extensive and affect every facet of a desalination project – from intake to treatment to concentrate disposal to conveyance. A project will require preparation of an Environmental Impact Report (EIR) and/or an Environmental Impact Statement (EIS), under, respectively, the California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA). Many specific permits are also required, involving a large number of federal and state agencies (particularly the California Coastal Commission through the California Coastal Act of 1976), and also local utilities, water districts, health departments, and air quality districts. Concerns have been raised on similar projects regarding potential negative impacts to marine life from impingement and entrainment using such ocean intake structures. However,measures are available to minimize such impacts.

Legal / Public Policy Considerations: Describe legal/public policy considerations associated with the option. Describe any agreements necessary for implementation and any potential water rights issues, if known.

Most legal hurdles are related to permitting issues described above. In regards to public policy, there are several Ocean Desalters being considered at the time of this writing in Southern California and a large scale version may be within the current policy trends.

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Implementation Risk / Uncertainty: Describe any aspects of the option that involves risk or uncertainty related to implementing the option.

Acquiring permits and acquiring easements for the conveyance facilities through the already heavily congested corridors may be the primary implementation risks.

Reliability: Describe the anticipated reliability of the option and any known risks to supply or demand, such as: drought risk, water contamination risk, risk of infrastructure failure, etc.

The availability of ocean water results in an extremely reliable supply of drinking water. The feasibility of an individual project depends upon a dependable source of electricity. Electrical energy availability needs to be better understood.

Water Quality: Identify key water quality implications (salinity and other constituents) associated with the option in all of the locations the option may affect.

Pacific Ocean salinity ranges from 28,000 to 37,000 milligrams per liter (mg/L), but may be slightly lower in some bay areas. Treated water can be produced to meet all regulatory requirements.

Energy Needs: Describe, and quantify if known, the energy needs associated with the option. Include any energy required to obtain, treat, and deliver the water to the defined location at the defined quality.

Energy Required	Source(s) of Energy
A 200 mgd dual-pass plant would need about 130 MW of power and additional power would be needed for the pumping facilities.	The potential greenhouse gas effect is a concern. However, alternative energy strategies with lower or no greenhouse gas emissions are also possible.

Hydroelectric Energy Generation: Describe, and quantify if known, any anticipated increases or decreases in hydroelectric energy generation as a result of the option.

Location of Generation	Impact to Generation
None.	

Recreation: Describe any anticipated positive or negative effects on recreation.

Location(s)	Anticipate Benefits or Impacts
Colorado River	If these facilities result in additional water in the Colorado River due to less diversions by MWD, there could be positive impacts on recreation. However, it is likely that the water not divered by MWD would be divered by Arizona or Nevada and therefore no major positive or negative impacts on recreation are anticapted.

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Environment: Describe any anticipated positive or negative effects on ecosystems within or outside of the Colorado River Basin.

Location(s)	Anticipated Benefits or Impacts
S. Cal	Air quality could be impacted if the energy source is fossil fuels. However, utilities which serve the region have a mix of energy sources and at this time it is unclear whether the source of energy would impact air quality.
Marine Environment	Environmental issues primarily relate to impingement and entrainment of marine life at the intake and concentrate disposal.

Socioeconomics: Describe anticipated positive or negative socioeconomic (social and economic factors) effects.

There would be new employment related to constructing and operating the $2 billion in facilities. Also, assisting in producing sufficient water to assist in maintaining a strong economy in the Southwest United States will have positive socioeconomic impacts.

Other Information: Provide other information as appropriate, including potential secondary benefits or considerations. Attach supporting documentation or references, if applicable.