California Regional Water Quality Control Board
Santa Ana Region

July 30 - 31, 2020
August 7, 2020

Item: 4

SUBJECT: Public Hearing – Order R8-2020-0005 - Renewal of Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit (NPDES No. CA8000403) for Poseidon Resources (Surfside) L.L.C., Huntington Beach Desalination Facility

BACKGROUND

Poseidon Resources (Surfside) L.L.C. (Discharger) proposes to construct and operate a desalination facility in Huntington Beach — the proposed Huntington Beach Desalination Facility (Facility). The proposed Facility will be located at 21730 Newland Street, Huntington Beach on twelve acres at the AES Huntington Beach Generating Station (AES HBGS). The Discharger proposes to modify and operate the AES HBGS intake and discharge systems for its desalination operations. The Facility will produce an average annual volume of 50 million gallons per day (MGD) of potable water through a reverse osmosis (RO) process. The treatment process requires an intake of seawater averaging 106.7 MGD; and a discharge of concentrated brine averaging 56.59 MGD. The Discharger submitted an application to renew the National Pollutant Discharge Elimination System (NPDES) permit for the Facility and a request for a Water Code section 13142.5, subdivision (b) determination.

Water Code section 13142.5(b) states "for each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, **the best available site, design, technology, and mitigation measures feasible shall be used to minimize intake and mortality of all forms of marine life.**" To provide direction to regional water quality control boards for evaluating seawater desalination facilities pursuant to California Water Code section 13142.5(b) and to ensure a consistent statewide approach for minimizing the intake and mortality of all forms of marine life, in May 2015, the State Water Resources Control Board (State Water Board) adopted an amendment that added chapter III.M. to the Ocean Plan to address environmental impacts associated with the construction and operation of seawater desalination facilities.

On November 22, 2019, Santa Ana Water Board staff released the Tentative National Pollutant Discharge Elimination System (NPDES) Number CA8000403, Waste Discharge Requirements and draft California Water Code section 13142.5(b) determination for the proposed Facility (Tentative Order) for public review and comment. The written comment period closed on January 21, 2020. Staff has reviewed

all timely written comments and prepared responses to them. Staff has also made revisions to the Tentative Order based on comments from the public and the Board.

On December 6, 2019, and May 15, 2020, the Santa Ana Water Board held public workshops to discuss details of the draft tentative NPDES permit and draft Water Code 13142.5(b) determination, and to receive comments from the public.

The December 6, 2019 workshop focused on the following:

- Identified need for the desalinated water;
- Facility onshore location;
- Intake considerations (including subsurface and surface intake systems);
- Concentrated brine discharge considerations;
- Calculation of the marine life mortality impacts; and
- Determination of the best available mitigation project feasible.

The May 15, 2020 workshop focused on the following:

- Identified need for the desalinated water; and
- Marine life mitigation requirements

The staff reports from these workshops include additional background information on the Facility and Tentative Order and are attached for the Board's convenience.
At both the December 6, 2019, and May 15, 2020, workshops, the Santa Ana Water Board had several inquiries and information requests for staff to address. This staff report summarizes the questions raised and provides the additional information requested; summarizes some of the issues raised during the written comment period and provides the pertinent comment numbers for easy reference; and highlights the revisions made to the Tentative Order in response to those comments.

QUESTIONS FROM THE SANTA ANA WATER BOARD MEMBERS

Responses to questions raised by the Santa Ana Water Board are provided. For additional detail, where the question was also raised in the public comments, reference to the relevant comment/response is provided.

BEST AVAILABLE SITE FEASIBLE: SUBSURFACE INTAKES

The Ocean Plan specifies requirements which aim to reduce the entrainment and impingement of marine life resulting from the intake of seawater. To address entrainment and impingement effects, the Ocean Plan requires the use of subsurface intake facilities unless subsurface intakes are not feasible. Subsurface intakes withdraw water from under the seafloor and thus eliminates entrainment and impingement of marine life.

1. What are the approximate costs for installation of required slant wells?

   Response: Evaluation of the feasibility of subsurface intake systems is found in the two CONCUR reports. The reports were prepared by an independent scientific and

technical panel (ISTAP) in two phases. The analysis focused on the feasibility of subsurface intakes, and the different factors related to feasibility. The report's conclusions are summarized below.

See also responses to comments 0035.02, California Coastkeeper Alliance (CCKA) comments CCKA I.B, and CCKA I.C. (Note: responses to CCKA's comments are in a separate document.)

ISTAP Phase I Report (October 9, 2014) managed by CONCUR: The Phase I report focused on the technical feasibility of several subsurface intake designs for the Facility. Specific question addressed in the report was *"Will any of the currently available subsurface intake designs be technically feasible at the proposed site in Huntington Beach?"* The report evaluated nine types of subsurface intake systems for technical feasibility at the proposed Facility to determine if there were any fatal flows associated with the subsurface intake system types from the technical perspective, such as, hydrogeology, oceanography, and geochemistry.

Summary of the subsurface technologies and their challenges:

a. shallow vertical wells – low well yields, high water quality risk
b. deep vertical wells – complications with OCWD seawater intrusion barriers
c. shallow and deep vertical wells – same as a. and b. above
d. radial collector wells – high performance risk due to inappropriate geologic conditions
e. slant wells - complications with OCWD seawater intrusion barriers
f. seabed infiltration gallery – complex construction
g. surf zone infiltration gallery – complex construction, impacts from beach re-nourishment
h. horizontal direction drilled wells – performance risk and maintenance of wells
i. water tunnel – complex construction, high performance risk at this scale

The recommendation that came out of the Phase I report was to further evaluate seabed infiltration gallery (f) and surf zone gallery (g) in Phase II, and to compare these to an open ocean surface intake system. Phase I only evaluated technical feasibility, not the environmental, social, or economic factors associated with feasibility.

ISTAP Phase II Report (November 9, 2015) managed by CONCUR: The Phase II Report evaluated the broader feasibility of the seabed and surf zone infiltration galleries (SIG) to include economic, environmental, and social factors. There were two options for constructing the galleries evaluated in the Phase I report that included using a trestle elevated above the waves, and a float-in method where prefabricated components are transported using floating equipment/methods. A comparison of three alternatives were included in this report; using a trestle to construct a SIG, using the float-in method to construct a SIG, and a surface water intake system. The alternatives were evaluated for construction activities,

operational treatment requirements, effects on air quality, and marine life impacts. Additionally, the report performed a sensitivity analyses that included evaluating product capacities of 12.5, 25, 50, and 100 million gallons per day (MGD), lifetime of the project at 30 and 50 years, and discount rates of 3% and 7% for the life cycle unit costs.

In addition, further evaluation of the slant wells was done by Waterboards staffs and the Discharger. The Discharger was required to perform several model runs for various scenarios using slant wells. This effort also determined that slant wells are not technically feasible at the Facility. Because slant wells were deemed technically infeasible, costs were not evaluated. However, as summarized in the Phase II ISTAP report, installation costs for the feasible subsurface technology (seafloor gallery and surf zone gallery) were compared to an open ocean intake (Attachment G to the Tentative Order, Findings 6, 19 and 20; Attachment G.1 to the Tentative Order, Section 2). These costs are summarized in Tables 1 and 2.

Table 1 Comparison of Capital and Annual O&M Costs (in 2015 $millions)

	Surface Intake	SIG - Trestle	SIG – Float-in
	Capital Costs		
ISTAP High Estimate	852	2,347	2,115
ISTAP Low Estimate	899	1,936	2,109
	Operations & Maintenance		
ISTAP High Estimate	54	58	58
ISTAP Low Estimate	49	42	42

Table 2 Scale impacts on Unit Costs ($/acre-foot)

Scale (MGD-product)	Surface Intake	SIG – Trestle	SIG – Float-In
12.5	1,694	2,497	2,646
25	1,650	2,282	2,410
50	1,517	2,121	2,279
100	1,466	2,011	2,156

Source: Adapted from CONCUR Inc., ISTAP Phase II Report

2. Are there desalination facilities utilizing subsurface intakes world-wide?

Response: Table 3 provides a summary of world-wide subsurface intake facilities, the type of subsurface technology utilized and the intake volume. As noted in Table 3, the largest subsurface intake facility extracts 21 MGD of seawater, which is well below the planned 50 MGD of the proposed Facility.

Table 3: Desalination Facilities Using Subsurface Intakes

Plant	Location	Capacity (MGD)	Type	Date Installed
Sur	Oman	21	Vertical wells	2009
Pinatar	Spain	17	Horizontal wells	2003
Alicante IV	Spain	17	Vertical wells	2008
La Tordera	Spain	16	Vertical wells	2009
Fukuoka	Japan	13	Offshore Gallery	2005
Alicante II	Spain	10	Horizontal wells	2008
Pembrooke	Malta	7	Vertical wells	1994
Santa Barbara	Curacao	6.6	Onshore Karst Pit	2012
Ghar Lapsi	Malta	6,5	Vertical wells	1983
W.E.B.	Aruba	6.3	Vertical wells	2011
Los Cabos	Mexico	5.5	Vertical wells	2006
Salina Cruz	Mexico	4.0	Radial well	2000
Ibeza	Spain	3.3	Vertical wells	2009
Blue Hills	Bahamas	2.9	Vertical wells	2008
Windsor	Bahamas	2.5	Vertical wells	1997
North Side	Cayman	2.4	Vertical wells	2009
Castillo	Cayman	2.4	Vertical wells	1987

Source: Water Desalination Report. September 2014. Vol. 50, No. 33.

BEST AVAILABLE SITE FEASIBLE: IDENTIFIED NEED FOR DESALINATED WATER

The Ocean Plan, chapter III.M.b.(2) requires that "the identified need for desalinated water" be "consistent with" an applicable urban water management plan (UWMP) prepared in accordance with Water Code section 10631, or other water planning documents if an UWMP is not available. The Ocean Plan does not define "need" or elaborate on what it means to be "consistent with" water planning documents. As such, the Board has discretion in its interpretation of these terms. Staff's proposed interpretation of the terms is included in Attachment G.2 to the Tentative Order and briefly discussed here.

1. What agencies have indicated they are willing to purchase the Poseidon desalinated water and at what volume?

   Response: The City of Huntington Beach has an agreement to purchase up to 3 MGD of the desalinated water and OCWD has entered into a non-binding Term Sheet. Other agencies have indicated support for the project but have not specified whether they will purchase the water or how much water they would purchase.

Santa Ana Water Board staff reviewed the comments received from water agencies/cities on the Tentative Order to evaluate which agencies plan on purchasing desalinated water from the Facility or which agencies support the proposed Facility. Table 4 presents a summary of those comments along with the respective comment number.

Table 4: Summary of Water Agencies Comments

Agency Population served Estimated Water Demand	Comment Number	Support the Facility? (Yes/No)	Comment Overview
Orange County Water District 2.5 million people 415,000 acre-feet/year (AFY)	0015, 0060, and 0148	Yes (2) No (1)	Two OCWD Board members submitted comments that support the project and state that the desalinated water will reduce reliance on imported water; one OCWD Board member submitted a comment indicating that the water is not needed and that OCWD has sufficient water supply
Irvine Ranch Water District 441,000 people 96,000 AFY	0008	No	Concerned with possible injection of desalinated water for OC Basin recharge and the impacts injection could have on water quality
City of Huntington Beach 204,000 people 28,000 AFY	0002, 0017, 0018, and 0180	Yes	Supports the project as a new, climate-resistant supply and the mitigation project. The City has an agreement to receive 3 MGD at a 5% discounted rate.
East Orange County Water District (Orange, North Tustin, unincorporated OC areas) 92,000 people 4,000 AFY	0145	Yes	Provides needed environmentally sustainable, drought-resistant water supply
Mesa Water District (Costa Mesa, Newport Beach, unincorporated OC area) 108,000 people 20,000 AFY	0160	Yes	Diversification of water supply needed, drought-proof supply

Agency Population served Estimated Water Demand	Comment Number	Support the Facility? (Yes/No)	Comment Overview
Santa Margarita Water District (South OC Agency) 160,000 people 37,000 AFY	0140	Yes	The district relies on imported water, and this project would provide diversify the water supply
Moulton Niguel Water District (South OC Agency) 173,000 people 37,000 AFY	0181	Yes	The water from the Facility is needed to diversify water supply
Metropolitan Water District of Southern California	0197	Yes	Seeking 2.4 MAF of local supply production, which includes seawater desalination; the Facility is eligible for Local Resources Program (LRP) funds.

2. Will Metropolitan Water District of Southern California (MWD) pay for Poseidon desalinated water to be distributed throughout its service area and thus spread the costs across Southern California, instead of concentrating the costs to a few retailers?

   Response: The MWD comment letter states that MWD's long-term Integrated Water Resources Plan (IRP) includes a local supply production goal of 2.4 million acre-feet (MAF) by 2040. Seawater desalination is included in the local supply production goal and the proposed Facility is listed in the IRP as a project that can help meet this MWD goal. In addition, MWD has indicated that the proposed project is eligible for the Local Resources Program (LRP); these are incentive funds and could be about $450/AF of local water supply produced. In their May 15, 2020 presentation to the Santa Ana Water Board, OCWD indicates that this LRP subsidy could reduce the cost of the desalinated water from $1,916/AF to $1,441/AF.

   See also MWD Comment letter 0197 located in the responses to comments table and the OCWD May 15, 2020 presentation (Attachment 3 to this Staff Report).

3. Can a smaller project be supported?

   Response: Board staff asked this question of Poseidon in the January 8, 2020 letter. Poseidon's response (January 11, 2020) indicated that a volume less than the 50 MGD of proposed facility would not be consistent with the project goals (as

identified in the Facility's 2005 FSEIR and the 2010 FSEIR) in that a smaller facility size would not satisfy regional water planning goals.

Further, in their May 15, 2020 presentation to the Santa Ana Water Board, OCWD indicated that the proposed 50 MGD facility provides an "economy of scale" (OCWD, slide 13 [Attachment 3]). Board staff solicited additional information from OCWD about the cost for various facility sizes to assist in the evaluation of facility size effects on costs. In a letter dated June 26, 2020, OCWD states: 'A materially smaller plant (i.e., 30-35 MGD) would significantly diminish the value of the project and require the District to pursue an additional (and as of today unidentified) large-scale water supply project or numerous smaller projects to help fill the gap." With respect to cost impacts, OCWD did not provide a direct unit cost comparison; instead they indicate that unit cost would be affected by permitting and the fact that the Facility's buildings would not be able to be scaled down and therefore construction and material costs would remain the same. OCWD does acknowledge that there would be some cost savings associated with pretreatment and reverse osmosis units, but that those costs would not reduce the unit cost of the desalinated water.

See also responses to CCKA comments I.D and I.E.

4. What is OCWD's total water demand in 2020 and total water demand in 2025 which is the projected first year that the Facility will be operational?

   Response: During OCWD's May 15, 2020 presentation, OCWD provided water demand for 2020 and 2040 with and without the Poseidon desalinated water (slides 7, 8, and 9, respectively [Attachment 3]). In their June 26, 2020 letter, OCWD indicates that the 2025 water demand is 423,000 AFY. Total water demand for the three years is shown in Table 5.

   Table 5: OCWD Total Water Demand

Year	Total Water Demand (AFY)
2020	415,000
2025	423,000
2040	447,000

5. With the recent expansion of OCWD's Groundwater Replenishment System(GWRS), is it at full capacity? If not, how much more could the recycling operations expand?

   Response: Orange County Sanitation District (OCSD) and OCWD are planning on expanding the GWRS from 100 MGD to 130 MGD. After this initial GWRS

expansion, OCSD has estimated that their remaining average effluent flow which will be discharged to the ocean will be 60 MGD in 2025. At this time, OCWD is not planning any future GWRS expansion beyond the 130 MGD expansion (email from John Kennedy, July 13, 2020), although the OCSD Strategic Plan calls for 100% recycling of the wastewater (see Attachment G, Finding 11 and November 21, 2016 letter from OCSD [Discharger's Appendix DDD]).

See also response to comment 0149b.06.

6. For OCWD's water distribution, what is the total capital cost for the construction of the distribution system and ongoing operation and maintenance costs? Approximately how long would the distribution system be from the desalination plant to the OCWD facility?

   Response: According to OCWD, there are number of factors that affect both OCWD entering into a final agreement with the Discharger for the desalinated water and the final distribution plan. At the May 15, 2020 workshop, OCWD informed the Santa Ana Water Board that a final agreement with the Discharger is contingent upon the Discharger obtaining full project permitting, the distribution plan being finalized (OCWD may construct and operate the distribution system or they have the option to have the Discharger construct and operate the distribution system), and obtaining the Metropolitan Water District (MWD) Local Resources Program (LRP) subsidy to assist in offsetting project and operational costs.

   To further clarify OCWD's distribution system considerations, Board staff reached out to OCWD. Their response is provided below.

   Responses from OCWD (email dated July 2, 2020): "We have come up with about 7-8 different options for distributing the water. The capital cost ranges from $200 M to $500 M. The O&M for these options ranges from about $2 to $4M per year. In general, we are: (1) sending the water to cities and water agencies who want to participate in the project and (2) OCWD is taking the remaining water and constructing pipelines and injection wells to recharge the water into the groundwater basin. The capital cost generally increases as the percentage of water OCWD is taking increases due to the cost of the injection wells.

   "The necessary pipeline to get Poseidon water to our Fountain Valley campus is about 5 miles. That pipeline along with a new pump station would allow us to blend the Poseidon water into our existing 14-mile GWRS pipeline that goes up to Anaheim. We would also construct spurs off of the GWRS pipeline to feed the new injection wells we would construct to recharge the blended (GWRS and Poseidon) water into the groundwater basin."

   See also responses to comments 0008.03 and 0148.10, and responses to CCKA comment V.B.

BEST AVAILABLE SITE FEASIBLE: DATA ANALYSIS

Chapter III.M.2.e.(1)(a) of the Ocean Plan requires that a Discharger proposing to use a surface seawater intake use the ETM/APF method to evaluate entrainment impacts. The Discharger utilized data from the 2003-2004 entrainment study conducted by the Huntington Beach Generating Station (HBGS). Chapter III.M.2.e.(1)(a) and Chapter III.M.2.d.(1)(c)iii provides the Regional Water Board this authority and both state, "at their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement."

1. **Environmental Impact data -** the environmental impact data provided is from more than 15 years ago. How appropriate is it to utilize this data? Can the Board ask for a new environmental impact analysis to be conducted prior to approval of a new permit? Do the environmental data vary that much in 14 years?

   Response: To address concerns regarding the age of the data, the Discharger conducted a study in 2014-2015 to determine if the plankton data from the 2003-2004 study were representative of the current ichthyoplankton community (Appendix Q, Tenera Environmental, dated November 6, 2015). Both the 2014-2015 and 2003-2004 studies were conducted offshore and within 330 ft. of the HBGS intake. Appendix Q concluded that (1) the results of the 2014–15 study indicated that the data from the 2003–04 study was representative of nearshore larval fish populations in the vicinity of the AES HBGS intake; (2) the core group of common resident species was equally represented in both studies suggesting the entrainment impacts to species in any given year can be accurately assessed using the 2003–04 data; and (3) although there were differences in the numbers of taxa collected from the two studies, as well as the sampling frequency, the differences largely reflected the greater sampling effort in the 2003–04 study.

   As discussed in Attachment G.1 to the Tentative Order, Section 3, based on input from the neutral-third party expert, the use of the 2003-2004 had data limitations that were not completely understood until the neutral-third party review. Nonetheless, if the Santa Ana Water Board believes that more recent data are needed, they can request that of the Discharger. Conducting an additional entrainment study would require additional time for the Discharger to develop a proposed sampling plan, submit that plan for approval and then conduct the field studies. The actual sampling effort would be a year-long sampling effort, thereby delaying project consideration for potentially 2 or more years. As stated in Attachment G, Finding 38, Board staff recommends that the Santa Ana Water Board find that the 2003-2004 dataset is sufficient for the purposes of evaluating marine life impacts.

   See also response to CCKA comment III.A.

BEST AVAILABLE TECHNOLOGY FEASIBLE

Pursuant to Ocean Plan requirements, chapter III.M.2.d.(1)(c)ii., to minimize entrainment of marine life, the Discharger is required and proposes to modify the existing HBGS intake structure with an array of four 91-inch, cylindrical wedgewire screens (WWS) with 1-mm slot widths with a through-screen velocity of 0.5 feet per second or less.

1. How effective are the 1 mm wedgewire screening technologies in reducing marine life impacts?

   Response: Modeling data have demonstrated that even though wedgewire screens may preclude a small portion of the larval population from entrainment, a significant percentage of the population (e.g., all of the smaller sized organisms) can still pass through the screen slots. As a result. the portion of organisms that are not entrained because of the wedgewire screens is relatively small compared to the number of organisms in the water column. The reduction in entrainment mortality due to the use of wedgewire screens is only approximately one percent (1%) when compared to unscreened intakes. However, small slot-sized wedgewire screens and low intake velocity rates significantly reduce impingement and protect larger (greater than 1mm head size) larval, juvenile, and adult fish from entrainment.

   See also responses to comments 0004.03.

BEST AVAILABLE MITIGATION FEASIBLE

Water Code section 13142.5(b) requires that the best available mitigation measures feasible be used to minimize the intake and mortality of all forms of marine life. Chapter III.M.2.e of the Ocean Plan sets forth requirements to implement mitigation measures in compliance with Water Code section 13142.5(b).

1. What are the differences in mitigation requirements between Water Boards and Coastal Commission?

   Response: Pursuant to the Coastal Act, the Discharger must obtain a Coastal Development Permit (CDP) from the California Coastal Commission for the proposed Facility. If the Coastal Commission issues the CDP, they will include any mitigation requirements needed to conform to applicable Coastal Act and Local Coastal Program polices and regulations. One of the differences between the Santa Ana Water Board's and Coastal Commission's mitigation requirements is that the Commission has the authority to require a discharger to implement a particular mitigation project, while the Santa Ana Water Board does not. Pursuant to Water Code, section 13360, the regional water boards cannot specify the manner of compliance. Thus, the Santa Ana Water Board must review the Discharger's proposed mitigation plan as submitted in the Marine Life Mitigation Plan (MLMP) and then approve or deny the project proposal.

Coastal Commission staff have indicated that while they support the proposed mitigation at the Bolsa Chica wetlands, the Discharger cannot receive mitigation for the dredging of the ocean inlet. Coastal Commission has already allocated mitigation credit to the Ports of Los Angeles and Long Beach (Ports) that included the maintenance dredging. Although the Ports have already received their mitigation acreage and have no further obligation to do the maintenance dredging, Coastal Commission staff insists that the Discharger cannot receive mitigation acreage for dredging that supports the areas restored by the Ports. Coastal Commission staff would, however, recommend approval of some mitigation acres for the Discharger if the dredging activities in Bolsa Chica support areas that the Discharger restores above and beyond what the Ports have restored or sustained. As such, Commission staff have indicated that because of this "double counting" issue, they would only allocate approximately 20-40 acres of credit to the Discharger for the Bolsa Chica wetlands improvements. As a reminder, Santa Ana Water Board staff are recommending that the Discharger be allocated 129 acres of mitigation for the Bolsa Chica restoration project.

As previously noted, Santa Ana Water Board staff have worked extensively with Coastal Commission staff in the evaluation of the proposed project including the proposed mitigation at the Bolsa Chica wetlands. Santa Ana Water Board staff have asked Coastal Commission staff where in the Coastal Act "double counting" requirements or prohibitions are specified. Coastal Commission staff have indicated that it is a matter of "precedence."

Santa Ana Water Board and State Water Board staff continued recent discussions with Coastal Commission staff about the mitigation plan; however, no resolution was obtained. As the Discharger indicated at the May 15, 2020 workshop, they recognize they will face different mitigation requirements when they apply for their Coastal Development Permit from the Coastal Commission. As such, if the Board approves the proposed mitigation, the Discharger may be required to do additional mitigation to comply with the Coastal Commission's requirements.

See also responses to comments 0070.05, 0070.06, 0070.07, 0177.02, 0177.03, 0177.04, and 0177.07.

2. During the May 15, 2020 workshop, Coastal Commission staff raised the option of creating an artificial reef to possibly provide any necessary additional mitigation. The rock for the artificial reef construction could potentially be quarried from Catalina Island, meaning the barge trip between Catalina and Huntington Beach would be a lot shorter than if a reef was built off San Diego. Coastal Commission staff speculated that this could make the cost of constructing an artificial reef comparable to the proposed Bolsa Chica activities.

Response: While an artificial reef is a potential mitigation project, the Discharger has not proposed the creation of an artificial reef as part of their application to the Santa Ana Water Board. Again, pursuant to the Water Code, the Santa Ana Water Board cannot require the Discharger to implement a project that they have not proposed. Among the alternative mitigation projects that were considered, staff recommended Bolsa Chica as the best available mitigation feasible. The Board could, however, require additional information from the Discharger regarding the feasibility of an artificial reef if the Board believes it is needed to determine whether the proposed mitigation project is the best available mitigation feasible.

See also response to comment 0214.11.

OTHER QUESTIONS

1. Has board staff done an analysis of the comments that have been presented in the workshops?

   Response: As discussed below, Santa Ana Water Board staff has carefully considered comments received in providing the responses to those comments. Table 6, below, provides a list of the subjects of the major comments received and the reference response numbers that pertain to that subject area. The responses are located in the attached Response to Comment Table and the CCKA Response to Comment Table.

WRITTEN PUBLIC COMMENTS AND RESPONSES

Following the November 22, 2019 release of the Tentative Order determination, the 60-day public comment period closed on January 21, 2020. Santa Ana Water Board staff received 217 unique comment letters that include comments from concerned citizens, environmental groups, current and former elected officials, water agencies, business organizations, federal, state, and local agencies, and the Discharger. All comment letters have been made available to the public through the State Water Board's FTP site since February 28, 2020.

The 217 separate comment letters that were submitted varied in size and content. There were comments that were one-page letters in support or opposition of the proposed Facility. Other letters had many pages of comments, some with 20 pages and others with over 200 pages, with multiple comments related to the Tentative Order and Water Code 13142.5(b) determination. In addition, a few comment letters were form letters with multiple signatures and these letters are listed as one comment letter.

The responses to the timely written comments are provided in three documents that total over 700 pages (this includes separate documents for responses to comments from the California CoastKeeper Alliance (CCKA) and a copy of the Order and attachments that contained strikeouts and insertions suggested by the Discharger). To help the Board navigate the documents, a high-level summary of the comment topics is

compiled in Table 6, below. The table includes the comment topic and the reference numbers for some of the comments and responses that relate to the topic. The table is only a summary and does not cover all of the comments received.

Table 6: Summary of Subjects of the Comments Received and their Response Numbers

	Comment Topic	Reference Numbers For Responses
Best Available Site Feasible	Feasibility of the subsurface intake systems	0035.02, 0035.03, and CCKA I.B
	Onshore location of the Facility	CCKA II.A and II.B
	Offshore location of proposed surface intakes	CCKA II.C
	Brine disposal location and comingling with wastewater	0004.01 and 0004.13
	Need for the 50 MGD desalinated water or smaller capacity	0014.04, 0055.01, 0148.09, CCKA I.D and I.E
	Cost of the desalinated water compared to alternate water supplies	0004.19 and 0032.01
Best Available Technology and Design Feasible	Proposed surface intake system	0004.03
	Proposed brine disposal	0004.01 and 0036.01
	Technical and economic analysis for pipelines to alternate intake stations	0149b.13
	Product water quality used as drinking water or recharge activities	0008.02, 0026.05, and 0062.02
	Best technology being used	0024.03
Best Available Mitigation Feasible	Environmental data used to calculate the mitigation requirements	0004.13 and CCKA III.A
	Marine life impacts from the surface intake systems	0004.03, 0006, 0033.02 and 0062.02
	Marine life impacts from the concentrated brine disposal	0004.01, 0006, 0033.01, 0036.01, 0055.02 and 0062.02
	Bolsa Chica as the mitigation project	0017.02, 0017.03, 0070.05, 0070.06, 0080.03, 0177.02 and 0177.03
CEQA	A subsequent environmental impact report is required for the Facility under CEQA	0008.03, CCKA V.D
	CEQA comments related to energy usage, cumulative impacts, climate change, noise, and socio-economics concerns	0004.05, 0004.12, 0004.15, 0004.17, 0008.03, 0014.01, 0014.02, 0014.03, 0017.05 and 0148.10

	Comment Topic	Reference Numbers For Responses
Other	Performance of the Carlsbad Desalination Facility	0026.05, 0193.07
	Human right to water	0188.01, 0192.01
	The Board did not provide sufficient opportunities for the public to comment	0192.02
	Should the Facility be permitted	0017.01, 0018.01, 0022.04, and 0060.01

Additionally, several federal and state resource agencies submitted comments on the Tentative Order:

- **National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), West Coast Region** (Comments 70.01–70.07): The comment letter from NMFS addresses the proposed mitigation at Bolsa Chica. NMFS does not agree with staff's proposed calculation for the mitigation acreage available at Bolsa Chica. Staff recalculated the mitigation acreage in response to some of NMFS's comments. However, as discussed in the responses to NMFS's comments, staff did not agree with all of NMFS's suggestions related to the calculation.

- **State Lands Commission** (Comments 0176.01–0176.12): The comment letter from the State Lands Commission focuses on the CEQA Addendum. Staff revised the CEQA Addendum to address their comments.

- **California Coastal Commission** (Comments 0177.01–0177.14): The comment letter from Coastal Commission focuses on the operating life of the facility, proposed mitigation, coastal hazards, needs for the water, and ocean acidification. The operating life of the proposed facility was addressed throughout the Tentative order; coastal hazards are not within the Regional Water Board's purview; staff does not concur with the concerns regarding "double counting" of mitigation; and concerns regarding ocean acidification were also addressed.

COMMENTS ON VIRTUAL MEETING PLATFORM

With onset of COVID-19 and the move by the State Water Board and regional boards to conducting board meetings through a virtual meeting platform, Board staff have received several requests to postpone consideration of the Tentative Order until the Santa Ana Water Board resumes in-person meetings. The commenters argue that controversial projects such as the Tentative Order for the proposed Facility are not considered "essential" by COVID-19 shelter-in-place orders and should be postponed. These letters are posted on the Santa Ana Water Board's website and can be accessed through this link:

https://www.waterboards.ca.gov/santaana/water_issues/programs/Wastewater/Poseidon.html

Given the controversial nature of the proposed Facility permit and Water Code determination, is Santa Ana Water Board consideration of the permit considered "essential" under the Governor's executive orders? Should permit consideration proceed utilizing a virtual meeting?

RESPONSE: The issue of whether an activity is "essential" is relevant to whether an activity is excepted from the Governor's shelter-in-place orders. Because board meetings are being conducted virtually, whether a particular matter that is before the Board is "essential" is not relevant.

Proceeding with controversial matters through virtual board meetings during the COVID-19 emergency is consistent with the Governor's relevant executive orders. The Bagley-Keene Open Meeting Act (Act) governs meetings of state boards and commissions, including the Santa Ana Water Board. The Act permits state boards and agencies to hold meetings by teleconference—that is, through audio or video, or both—provided that, among other requirements, the public portion of the meeting is audible to the public and the public has an opportunity to participate. To facilitate meetings by teleconference during the COVID-19 emergency, the Governor has waived provisions of the Act that require the physical presence of members, staff, or the public as a condition of participation in a public meeting and suspended specific notice requirements for teleconference meetings. (Exec. Order N-29-20.) This allows the Board to proceed with virtual meetings without a physical meeting location, while also providing opportunities for members of the public to observe and address the Board. Neither the Act nor Executive Order N-29-20 limits what the Board may consider during virtual meetings to matters that are non-controversial. Provided that the Board's meetings are noticed and held in a manner consistent with applicable provisions of the Act and Executive Order N-29-20, the Board may proceed with its regular meetings and consider items under its jurisdiction using the virtual meeting platform.

The comments expressed concern that virtual meetings limit public participation in that the public are not able to stay on-line or on the phone for the entire length of the meeting. However, this is less onerous than having to drive to a physical meeting location and wait in the audience for the same length of time.

The comments also expressed concern that members of the public need a computer or smart phone to provide comments through the Zoom system. While Zoom provides the option to participate using a computer or smart phone, participants also have the option to call in by phone to join the meeting. Thus, the public can comment on agenda items by calling in from a land line or mobile phone.

DISCHARGER COMMENTS

1. Prohibitions on Discharge and Intake

   As discussed in the December 6, 2019 Staff Report, Board staff recommends the inclusion of a prohibition on the intake of seawater and discharge of waste from the Facility. Specifically, Section III.I of the Tentative Order, states the following:

   > The discharge of waste under this Order is prohibited unless and until (1) the Discharger has submitted the supplemental plans in accordance with the MLMP Schedule (Attachment K), including the Final MLMP; (2) the Santa Ana Water Board has approved the Discharger's supplemental plans; (3) the Discharger has obtained all permits and other governmental approvals necessary to implement all components of the approved mitigation project (including the components included in supplemental plans required under the MLMP Schedule (Attachment K)); and (4) the Discharger has begun dredging of the Bolsa Chica inlet in accordance with the current MLMP (Appendix TT4).

   A similar prohibition is also included for the intake of seawater in section IV.B.12 of the Tentative Order.

   In their written comment letter, the Discharger proposed revisions to the recommended prohibitions that would eliminate condition (3), the requirement that all permits for the mitigation project be obtained prior to intake and discharge. The Discharger insists that this condition "prohibits the successful and timely completion of the project because it impedes Poseidon's ability to secure construction financing." (Poseidon Comment Letter, p. 2, Jan. 21, 2020.)

   RESPONSE: Staff recommended the prohibition provisions in the Tentative Order to avoid a situation where Discharger would be operating and impacting marine life without the restoration components that would mitigate for these impacts. The conditions of the prohibitions ensure that the all components of the proposed MLMP will be shovel-ready before the Discharger begins operating. While the Discharger has indicated that they intend to initiate the inlet dredging project in a timely manner, the dredging alone is not an adequate mitigation project. All mitigation project components, i.e., the Field Stone restoration, the Oil Pads restoration, and the Muted Tidal Basin enhancement – are all necessary to fully mitigate impacts from the Facility. Therefore, Board staff continues to recommend that the prohibitions remain in the Order as proposed.

2. Recommended Addition of Conditional Requirement Related to Need for the Desalinated Water

   Via letter dated June 1, 2020, as a follow-up to the May 15, 2020 Santa Ana Water Board workshop on need for the desalinated water, the Discharger formally

requested that the Santa Ana Water Board incorporate a condition in the Final Order related to the purchase of the desalinated water. The Discharger recognized that the Santa Ana Water Board raised concern with the fact that there are no formal commitments to purchase the full 50 MGD from the Facility and thus, the Facility could be over-sized and result in unnecessary environmental impacts. To address this concern, the Discharger recommended that the following language be incorporated into the Tentative Order:

> "Prior to discharge, the Discharger shall provide the Regional Board with an executed water purchase agreement between the Facility and a water agency (or agencies), which would therefore demonstrate the need for the capacity from the Facility."

Response: Santa Ana Water Board staff are not recommending that this language be incorporated into the Order. As written, Poseidon's proposed condition seems to suggest that the Board defer the finding regarding the identified need for the desalinated water until a water purchase agreement is executed.

In determining whether the project uses the best available site and technology, the Board must assess (1) whether the identified need for desalinated water is consistent with an applicable urban water management plan, (2) the feasibility of subsurface intakes based on the volume of water identified as needed, and (3) whether a combination of subsurface and surface intakes is the best feasible alternative to meet the identified need. Attachment G.2 of the Tentative Order includes an analysis supporting the proposed findings for these need provisions. If the Board finds that the analysis and the other information in the record does not support a finding of need, the Discharger's proposed condition cannot be used to cure such a deficiency by deferring the finding. Instead, the appropriate action for the Board in such a situation would be to find that the need provisions have not been met.

SUMMARY OF REVISIONS TO THE TENTATIVE ORDER

The modifications that were made to the Tentative Order and Water Code 13142.5(b) determination include:

1. A revision to the Mitigation Ratio to determine the mitigation requirements – Attachments G.4, G.5 and Attachment G, Finding 50;
2. Modifications to Attachment G.2 in response to comments interpreting the provisions related to the need for the desalinated water and to incorporate information presented to the Board at the workshop on May 15, 2020 and related correspondence from MWDOC and OCWD;
3. Additions to the Monitoring and Reporting Program, Attachment E, to incorporate monitoring requirements for boron and effluent pH continuous monitoring;
4. Addition of a finding on the human right to water in response to comments and to address the Board's adoption of Resolution R8-2019-0078;

5. Modifications to the deadlines for milestones for the Marine Life Mitigation Plan detailed in Attachment K of the Tentative Order; and
6. Minor grammatical and clarifying language changes throughout the documents.

STAFF RECOMMENDATION

Adopt revised Tentative Order R8-2020-0005

Link to the Tentative Order:
https://www.waterboards.ca.gov/santaana/board_decisions/tentative_orders/docs/2020/R8-2020-0005_Revised.pdf

ATTACHMENTS

Attachment 1: December 6, 2019 Santa Ana Water Board Staff Report
Attachment 2: May 15, 2020 Santa Ana Water Board Staff Report
Attachment 3: May 15, 2020 Orange County Water District Presentation to the Santa Ana Water Board

Attachment 1

December 6, 2019

Santa Ana Water Board Staff Report

California Regional Water Quality Control Board
Santa Ana Region

December 6, 2019

Item: 9

SUBJECT: NPDES Permit Renewal of the Proposed Huntington Beach Desalination Project

BACKGROUND

On June 30, 2016, Poseidon Resources (Surfside) (Discharger) submitted a Report of Waste Discharge (ROWD) for the renewal of the permit for the Huntington Beach Desalination Plant (Facility), Order Number R8-2012-0007, National Pollutant Discharge Elimination System (NPDES) Number CA8000403, Waste Discharge Requirements for Poseidon Resources (Surfside) L.L.C., Huntington Beach Desalination Facility. The Facility will be located at 21730 Newland Street, Huntington Beach on twelve acres at the AES Huntington Beach Generating Station (AES HBGS). The Discharger proposes to modify and operate the AES HBGS intake and discharge systems for its desalination operations. The Facility will produce an average annual volume of 50 million gallons per day (MGD) of potable water through a reverse osmosis (RO) process. The treatment process requires an intake of seawater averaging 106.7 MGD; discharge of concentrated brine will average 56.59 MGD. The proposed permit is the third generation of the Discharger's permit; previous permits were issued in 2006 (Order Number R8-2006-0034) and as noted above, in 2012 (Order Number R8-2012-0007). No construction of the Facility took place under the 2006 permit nor the 2012 permit.

Water Code section 13142.5(b) states "for each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize intake and mortality of all forms of marine life."

To provide direction to regional water quality control boards for evaluating seawater desalination facilities pursuant to California Water Code section 13142.5(b) and to ensure a consistent statewide approach for minimizing the intake and mortality of all forms of marine life, in May 2015, the State Water Resources Control Board (State Water Board) adopted an amendment that added chapter III.M. to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) to address environmental impacts associated with the construction and operation of seawater desalination facilities. The Office of Administrative Law approved the amendment on January 28, 2016, and the United States Environmental Protection Agency (U.S. EPA) approved the provisions implementing the Clean Water Act on April 7, 2016. These provisions provide a consistent statewide approach based on best available science for minimizing intake and mortality of all forms of marine life, in addition to protecting water quality and related beneficial uses of ocean waters. The proposed Facility is considered a new facility subject to the Ocean Plan and Water Code section 13142.4(b).

The focus of the Ocean Plan desalination provisions is to minimize the intake and mortality of all forms of marine life resulting from the construction and operation of desalination facilities. To achieve this, the Ocean Plan specifies requirements which aim to reduce the entrainment and impingement of marine life. Entrainment occurs when organisms are drawn in through the intake and perish when exposed to high pressure and heat inside the desalination system. Typically, entrainment affects smaller organisms, such as plankton, algae, larvae, and eggs; studies have shown that organisms typically do not survive entrainment. Impingement occurs when organisms get trapped against intake screens and cannot escape the suction power of the surface intake. To address entrainment and impingement effects, the Ocean Plan requires the use of subsurface intake facilities. If subsurface intakes are not technically and/or economically feasible, the Ocean Plan requires the use of slotted intake screens and the reduction of the intake flow velocity.

In addition to marine life mortality associated with an open ocean intake, there is also mortality associated with the discharge of concentrated brine. Mortality to planktonic organisms near the discharge port can be caused by shear stress as the organisms become entrained in the turbulent jet. Further, the brine is twice the salinity of ocean waters[1]. Concentrated brine can behave differently than traditional wastewater effluent plumes because of its greater density. The increased density can cause the brine plume to sink and spread on the seafloor instead of mixing with the surrounding water thus impacting bottom-dwelling (benthic) organisms to the concentrated brine and any pollutants in the brine discharge. To minimize the mortality associated with the brine discharge, the Ocean Plan's preferred method of brine discharge is to commingle the brine with wastewater. If wastewater is not available, the next best preferred method is to utilize multiport diffusers to achieve rapid mixing of the brine discharge.

<u>Permit and Water Code section 13142.5(b) Determination Development Milestones</u>
The following major milestones summarize the process to date for conducting the Water Code section 13142.5(b) determination and for renewal of the 2012 Order:

- **March 15, 2016** – The Discharger submitted a request for a Water Code section 13142.5(b) determination for the Huntington Beach Desalination Facility

- **June 30, 2016** – The Discharger submitted a Report of Waste Discharge to renew the 2012 Poseidon Order.

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[1] State Water Resources Control Board, "Final Staff Report Including the Final Substitute Environmental Documentation, Amendment to the Water Quality Control Plan for Ocean Waters of California Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-Substantive Changes," May 6, 2015

- **July 29, 2016**, **October 31, 2016, and May 23, 2017** - the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) Executive Officer notified the Discharger of additional information which would be needed to deem the application administratively complete and allow the detailed review of submittals to commence.

- **August 27, 2017 and October 1, 2018** – the Santa Ana Water Board Executive Officer deemed the Discharger's application for a Water Code section 13142.5(b) determination and Report of Waste Discharge to renew the 2012 Order complete for the original design (August 27, 2017) and for the re-designed diffuser design (October 1, 2018).

State Agency Coordination
In addition to the NPDES permit and Water Code section13142.5(b) determination from the Santa Ana Water Board, the Facility will also need to obtain a Coastal Development Permit from the California Coastal Commission and enter into a lease agreement with the State Lands Commission for the intake and discharge structures. In order to facilitate permitting by these state agencies, the Ocean Plan, chapter III.M.2.a.(4) requires interagency collaboration. In October 2016, the State Lands Commission, California Coastal Commission, and the Santa Ana Water Board entered into an interagency sequencing agreement. The agreement set forth the process and sequence of the respective agencies action(s) on the proposed Facility in accordance with the agreement. The intent of the collaboration is to ensure that each of the respective agencies are considering a consistent project for each agency's respective permitting process in an effort to streamline the process. Further, the Santa Ana Water Board and State Water Resources Control Board, (collectively, Water Boards) staff have worked closely with the State Lands Commission and California Coastal Commission to develop the tentative Order and proposed Water Code determination.

PROJECT DESCRIPTION

The Discharger proposes to construct and operate the desalination facility on a 12-acre parcel at the AES HBGS. Once constructed, the Facility will discharge wastewater to the Pacific Ocean, a water of the United States. The Discharger was initially regulated by Order R8-2006-0034 that expired on August 1, 2011. Order No. R8-2006-0034 was superseded and rescinded by Order R8-2012-0007 that expired on February 1, 2017. Under both the 2006 and 2012 permits, the Discharger planned to operate the facility in conjunction with AES HBGS by using the AES HBGS cooling water as the RO process source water and planned to comingle the brine discharge with the cooling water discharge.

Under the tentative Order, there will be no commingling of the concentrated brine from the RO process with the AES HBGS cooling water discharge. Further, the Facility will complete construction after AES HBGS ceases to use the intake and discharge systems

(scheduled for cessation by December 31, 2020[2]), therefore, the Facility will be a stand-alone facility.

The proposed Facility is designed to produce potable water for delivery into the water distribution and/or groundwater recharge systems within Orange County. The Discharger will receive its source water directly from the AES HBGS's intake system. Pursuant to Ocean Plan requirements, the intake system will be equipped with a screening system consisting of four 1.0-mm slot wedgewire screens with a through-screen velocity of 0.5 feet per second or less. The wedgewire screen must have rotating brush-cleaned screens composed of stainless steel. The Discharger may use a boat-based air burst system or deploy divers to remove debris that accumulates on the screens.

The desalination process will consist of source water screening, coagulation, filtration, pH control, chlorination, de-chlorination, RO membrane separation, and product water chlorination and chemical conditioning. The RO system will use high-rejection seawater membranes. The proposed Facility will produce a 12-month average of 50 MGD of potable water and discharge an annual average of 56.59 MGD of concentrated wastewater and process water (e.g., backwash water, RO cleaning solutions) that will be discharged to the ocean through the existing AES HBGS outfall structure. At the discharge tower, the Discharger will install a multiport diffuser consisting of 14 ports equipped with Tideflex diamond shaped-nozzles (or similar) with an open area of 1.28 square feet.

Additional details of the proposed project and process description is provided in the Fact Sheet to the Tentative Order (Attachment F).

WATER CODE SECTION 13142.5(B) DETERMINATION

Since the receipt of the Discharger's ROWD, regular meetings have been held between the Discharger, Water Boards staff, California Coastal Commission staff and State Lands Commission staff, to develop the tentative Order and proposed Water Code section 13142.5(b) determination. This effort required the review of hundreds of documents and the input from both an independent reviewer whose review was necessary to determine the best design for the discharge diffuser and a neutral, 3rd-party reviewer who provided input on the evaluation of marine life impacts. All the Discharger's documents, documents provided by the independent and peer reviewers, and documents submitted by other agencies and non-governmental organizations were used to develop the tentative Order and proposed Water Code section 13142.5(b) determination.

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[2] Pursuant to the Once-thru Cooling Policy for Coastal and Estuarine Waters (Resolution 2010-0020), once-thru cooling is required to phased out by December 2020.

A summary of the key areas required by the Ocean Plan on which the Santa Ana Water Board is required to make a determination, is provided in the following discussion and includes:

- Facility onshore location;
- Intake considerations including subsurface and surface intake systems;
- Identified need for the desalinated water;
- Concentrated brine discharge considerations;
- Calculation of the marine life impacts; and
- Determination of the best feasible mitigation project available.

Please note that additional detailed discussions on all these key areas, are provided in the Fact Sheet (Attachment F to the tentative Order), and the draft Water Code section 13142.5(b) determination with its respective attachments (Attachment G to the Order).

Facility Onshore Site Location

The Ocean Plan requires that alternative sites be evaluated in order to determine the best site feasible to minimize the intake and mortality of all forms of marine life. In their application, the Discharger evaluated potential sites along the Orange County coast for the proposed Facility location. The Discharger separated the Orange County coastline into nine segments from Seal Beach to San Clemente. The proposed Facility location is in Segment 1, Site 1G. The site criteria used to evaluate and compare the segments included the suitability for subsurface and surface intakes, brine disposal options, and proximity to biological and marine resources with an emphasis on marine protected areas, and sensitive species habitat.

Based on the site criteria, the proposed Facility location in Segment 1 which is north of the Santa Ana River and more specifically at the AES HBGS in the City of Huntington Beach is Santa Ana Water Board's staff recommended best site feasible[3] for the Facility location.

Santa Ana Water Board staff's detailed analysis of the "Narrowing of the Sites" process is presented in Attachment G.1 to the proposed permit, Sections 1 and 2.

[3] Feasible is defined in the Ocean Plan as follows: "FEASIBLE shall mean capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

INTAKE CONSIDERATIONS INCLUDING SUBSURFACE/SURFACE INTAKE SYSTEMS

The Ocean Plan, chapter III.M.b.(1) requires that a seawater desalination facility use subsurface intakes unless the Regional Board determines that a subsurface intake system is not feasible. Subsurface intakes extract marine water from beneath the sea floor through wells with slotted screens which naturally filters the water as it moves through sediments. This provides a natural barrier to organisms, thus eliminating impingement and entrainment that are the responsible for mortality encountered with open ocean surface intakes. In addition, subsurface intakes can filter out contaminants such as suspended solids, silt, organic contaminants, and oil and grease.

The Discharger evaluated the technical feasibility for utilizing subsurface intakes at the proposed location at the AES HBGS facility and at the 9 segments along the Orange County Coast. This analysis consisted of a hydrogeological analysis that included assessment of potential impacts to inland freshwater aquifers and sensitive wetland areas. Of the nine segments evaluated, the Discharger found that only Segment 1, including the Discharger's proposed Facility location, has the technical feasibility for the installation of subsurface intakes.

To further evaluate the feasibility of subsurface intakes at the proposed Facility location in Segment 1, the Discharger modeled several possible slant-well designs (the modeling was done in lieu of installing test wells). Among other parameters, the model predicts how much freshwater may be drawn into the wells from inland freshwater aquifers. Because the proposed Facility location is near freshwater aquifers managed by the Orange County Water District (OCWD), Santa Ana Water Board staff sought input from OCWD staff to determine the maximum amount of freshwater from the inland aquifer that could be extracted without impacting OCWD's management of the inland aquifer – most importantly, the sea water intrusion barrier. OCWD staff responded that 1,000 acre-feet/year (3.8 MGD) or approximately 3.5% of the required intake volume (106.7 MGD) could be collected using slant-well subsurface technology without impacting the inland aquifer and OCWD's operations. Therefore, slant wells are not technically feasible as the sole intake of the required volume. A combined subsurface and surface intake would result in a system where 3.5% of the intake would be a subsurface and 96.5 percent of the intake would be surface intake. Though technically feasible, Santa Ana Water Board staff believe that it that the reduced marine life mortality from the partial subsurface intake would not offset the subsurface intake construction costs or other socio-economic factors such as impacts to beach recreation associated with the construction of subsurface intakes.

Santa Ana Water Board staff reviewed the Discharger's analyses, including their supplemental hydrogeological modeling, and determined that the Discharger has demonstrated that subsurface intakes (e.g., seafloor infiltration galleries and slant wells) are technically infeasible for the proposed annual average intake volume of 106.7 MGD

of seawater based on hydrogeological conditions at the proposed site and alternative sites.

Santa Ana Water Board staff's detailed analysis of the hydrogeological considerations in "Narrowing of the Sites" is presented in Attachment G, Finding Numbers 6, 10, 19 and 20 and Attachment G.1, Sections 1 and 2.

IDENTIFIED NEED FOR DESALINATED WATER

The Ocean Plan, chapter III.M.b.(2) requires that an identified need for the desalinated water must be consistent with an urban water management plan (UWMP) prepared in accordance with I section 10631, or other water planning documents if an UWMP is not available. The Municipal Water District of Orange County (MWDOC), the City of Fullerton, the City of Anaheim, and the City of Santa Ana have UWMPs that specifically identify the proposed Facility as an opportunity to develop a water supply and this represents support for the need for desalinated seawater. The UWMPs explain that the desalinated water would offset imported water demands and could be used to augment recycled water supplies used in the Talbert Seawater Barrier to prevent seawater intrusion. The UWMP also lists the 56,000 acre-feet/year of desalinated water produced by the proposed Facility could improve water supply and system reliability in Orange County.

It should, however, be noted that MWDOC recently released its 2018 reliability study that projects water supply and demand in Orange County through the year 2050 and compares local projects that can meet the forecasted water demands. The proposed Poseidon project is among the local projects that were compared and ranked last based on system reliability and supply reliability metrics. The purpose of the study, however, was not to determine which projects should be implemented; rather, it was intended to provide information to local decisionmakers charged with choosing local projects. While there may be more cost-effective projects to meet water supply needs in Orange County, the proposed Project is among the potential projects that local suppliers can choose to pursue to meet water demand. The cost of the proposed Facility's water is a factor that water suppliers will likely consider, but it is not an issue that falls within the guidelines set forth in the Ocean Plan for the determination of need for desalinated water.

Santa Ana Water Board staff's detailed analysis of the "Identified Need for Desalinated Water" is presented in Attachment G.2.

CONCENTRATED BRINE DISCHARGE CONSIDERATIONS

The Ocean Plan, chapter III.M.2.d.(2)(a) requires the commingling of brine discharge with wastewater as the preferred technology to minimize the intake and mortality of all forms of marine life. If commingling with wastewater is not available, the Ocean Plan,

chapter III.M.2.d.(2)(b) requires the use of multiport diffusers as the next best discharge technology[4].

In their ROWD and Water Code section 13142.5(b) request, the Discharger proposed to modify the existing AES HBGS cooling water discharge pipe for brine disposal with the installation of a 3-port, 47-degree angle diffuser. Santa Ana Water Board staff, through a USEPA contract, hired Dr. Philip Roberts[5] to review the proposed diffuser design to determine if the design was the best available feasible to minimize the intake and mortality of marine life. Dr. Roberts determined that the Discharger's proposed 3-port diffuser design was not the best available technology as it would create surface boil and result in significantly greater shearing-related mortality (three times as much) than other feasible diffuser designs.

Dr. Roberts recommended a different diffuser design to meet the Ocean Plan requirement to maximize the dilution and minimize the brine mixing zone thereby reducing the mortality to marine life. Subsequently, the Discharger revised the diffuser design using the methodology recommended by Dr. Roberts and is proposing a fourteen-port linear diffuser to be installed at the end of the HBGS's current outfall to discharge the effluent brine. This diffuser design will result in less shear and therefore, reduced impacts to marine life.

Santa Ana Water Board staff's detailed discussion of the diffuser design considerations is presented in Attachment G, Findings 27 and 28

CALCULATION OF MARINE LIFE IMPACTS

Pursuant to Ocean Plan, chapter III.M.2.e.(1), the Discharger must estimate the marine life mortality resulting from construction and operation of the Facility after accounting for the required site, design, and technology measures. The Discharger submitted their estimate of mortality as part of their Marine Life Mitigation Plan. As required by chapter III.M.2.e.(1)(a) of the Ocean Plan, the Discharger used the Empirical Transport Model/Area of Production Foregone (ETM/APF) method to estimate entrainment of marine life that could occur at the proposed intake/discharge location (Segment 1, Site 1G, Station E) from construction and the 30-plus year operation of the proposed Facility

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[4] Multiport diffusers are defined in the Ocean Plan as follows: "MULTIPORT DIFFUSERS are linear structures consisting of spaced ports or nozzles that are installed on submerged marine outfalls. For the purposes of chapter III.M, multiport diffusers discharge brine* waste into an ambient receiving water body and enable rapid mixing, dispersal, and dilution of brine* within a relatively small area."

[5] Dr. Roberts is considered an expert on the design of diffuser systems and served as the Chair of the Expert Panel on the Impacts and Effects of Brine Discharges convened by the State Water Board to provide technical input on the desalination amendments to the Ocean Plan.

(Discharger's Appendix V). The Discharger relied on the ETM/APF method required by the Ocean Plan chapter III.M., as the best method for assessing ecological risk of a potential surface intake location since this method has been used extensively in California for assessing impacts from surface intakes[6].

The Discharger conducted the ETM/APF analysis for the proposed intake location as well as alternate stations, relying on biological data from a 2003-2004 entrainment study for the AES HBGS. Seven stations, including a station located near the AES HBGS existing intake (the Discharger's proposed Station E) were sampled as part of the 2003-2004 study.

Calculation of the ETM/APF is a complex process and given the fact that Santa Ana Water Board staff, State Water Board staff and Coastal Commission staff are not experts in these analyses, Santa Ana Water Board staff, through a contract with the Coastal Commission, hired a neutral third-party expert to review the project and supporting data used to compare intake locations. Dr. Pete Raimondi from UC Santa Cruz, a well-known expert in performing ETM/APF analyses, was contracted to provide this review.

In summary, Dr Raimondi noted that, while the 2003-2004 study did include sampling at stations other than the Discharger's proposed intake (Station E), the sampling was designed to characterize the source water body for only the existing AES HBGS intake. There were insufficient larval length data collected at the six alternate stations to calculate a robust ETM/APF for those stations. Dr. Raimondi's review further concluded that, in order for the 2003-2004 study to have collected sufficient data for an ETM/APF analysis at multiple alternative intake locations, the study would have had to replicate the sampling done at Station E, for all locations (i.e., bi-weekly sample collection for a period of 1 year). Prior to Dr. Raimondi's review, the Discharger, as well as State Water Board staff, Santa Ana Water Board staff and Coastal Commission staff, were not aware of these data limitations. These data limitations were not identified in the Discharger's submittals that were used to approve the use of the 2003-2004 AES HBGS dataset to assess whether the existing surface intake (Station E) was the best site feasible to minimize intake and mortality of all forms of marine life.

Due to the lack of data at all seven alternate locations that would have been needed to calculate ETM/APF for those stations, Dr. Raimondi suggested incorporating other quantitative approaches and comparing results among approaches to assess if an

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[6] The APF translates marine life mortality into the number of acres of marine life productivity that will need to be mitigated to offset impacts to marine life from the construction and operation of the proposed desalination Facility. ETM is a method for determining the spatial area where organisms are at risk of entrainment by the proposed Facility (also known as the source water body).

alternate location had less marine life mortality than the proposed Station. This approach narrowed down the seven sites to three sites: Station E - the Discharger's proposed intake location; Station U2 – located 4 kilometers upcoast of Station E; and Station D2 – located 4 kilometers downcoast from Station E. The results of this analysis demonstrated that Stations U2 and D2 would result in lower marine life mortality than the Discharger's proposed Station E.

Santa Ana Water Board staff then worked with the Discharger to evaluate other factors as required by the Ocean Plan – technological, economic, and social factors to determine site feasibility of siting the intake at Station D2, U2 or the Discharger's proposed Station E. Based on considerations of technological, economic, and social factors and the additional time that would be needed to move the surface intake for the proposed Facility to an alternative location at Station U2 or D2, the Santa Ana Water Board staff recommends that the existing surface intake and discharge structures at the AES HBGS (located adjacent to Station E) be used for the proposed desalination facility and upgraded as required by the Ocean Plan (i.e., installation of 1-millimeter wedgewire screen to the intake structure and installation of a multiport diffuser to the discharge structure).

Santa Ana Water Board staff's detailed discussion of the open ocean intake station evaluations is presented in "Narrowing of the Sites", Attachment G.1, Sections 2 and 3.

<u>Final APF Calculation for Station E (Acres of Impacts)</u>
In order to determine the acres of impacts from the proposed Facility's construction and operation, the Ocean Plan, chapter III.M.2.e. requires the APF for intake, discharge (shearing impacts and brine mixing zone) and construction of the intake and discharge infrastructure, to be determined. In addition, the regional water board may apply a one percent (1%) credit to the intake APF if the Discharger opts to use a 1-millimeter slot size screen on the intake to reduce entrainment-related mortality (which the Discharger is proposing to do).

The Ocean Plan, chapter III.M.2.e. also allows a ratio to be applied to the acres of impacts based on whether the area being impacted is less productive than the area being used to mitigate for the impacts. In developing an appropriate mitigation amount, the Ocean Plan, chapter III.M.2.e.(3).(b).vi specifies for out-of-kind mitigation the following: "…The mitigation ratio shall not be less than one acre of mitigation habitat for every ten acres of impacted open water or soft-bottom habitat. For in-kind mitigation, the Ocean Plan, chapter III.M.2.e.(3).(b).vii specifies the following: "…, the mitigation ratio shall not be less than one acre of mitigation habitat for every one acre of impacted habitat.

In-kind mitigation involves creating/restoring the same type of habitat that's being impacted by the facility. This type of mitigation is preferred in the Ocean Plan and is

required for most impacts. Out-of-kind mitigation involves creating/restoring more biologically productive habitat than the habitat that's being impacted by the facility. The regional board may allow out-of-kind mitigation for soft-bottom or open ocean habitats and species only. This is because it's typically not practical or feasible to create/restore soft-bottom or open ocean habitats. The Ocean Plan gives the Regional Board discretion to apply mitigation ratios for out-of-kind mitigation. For the proposed Facility, the Santa Ana Water Board staff recommends a ratio of 1 acre of mitigation habitat for every 5.8 acres of impacted habitat (1:5.8) be applied to the out-of-kind mitigation for soft bottom and open coast habitats and species.

Santa Ana Water Board staff consulted with California Coastal Commission staff, National Marine Fisheries Service staff and State Water Board staff in developing the proposed mitigation ratio. The proposed mitigation ratio was applied to the ETM/APF calculations for Station E that were reviewed and approved by Dr. Raimondi, the neutral third-party reviewer. The amount of mitigation that will be required once the mitigation ratio is applied to the area impacted (APF) by the proposed Facility is as follows:

Impact	**Impact APF (acres)**	**APF to be mitigated (acres)***
Seawater intake	161.2	34.3
Brine Discharge (shearing)	258.1	54.8
Brine Mixing Zone	1.09	0.19
Intake Construction	0.88	0.15
Diffuser Construction	0.15	0.03
Total	**421.42**	**89.47**

*mitigation ratios applied are based on the relative biological productivity of the impacted habitat and the mitigation habitat. The ratio for out-of-kind mitigation for soft-bottom, open water species (coastal taxa) shall be 1 acre of mitigation habitat for every 5.8 acres of impacted habitat (1:5.8). The ratio for in-kind mitigation (estuarine species) shall be one acre of mitigation habitat for every one acre of impacted habitat (1:1).

Based on the ETM/APF calculations for Station E, located near the existing seawater intake, and with input from other resource agencies, Santa Ana Water Board staff is recommending that the proposed Facility be required to mitigate for 89.47 acres of impacts from its construction and 30-plus year operational life.

A detailed discussion of the proposed mitigation ratio can be found in "ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location)" and "Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF)", Attachments G.3 and G.4, respectively.

DETERMINATION OF THE BEST AVAILABLE MITIGATION MEASURES FEASIBLE

Water Code section 13142.5(b) requires that the best available mitigation measures feasible be used to minimize the intake and mortality of all forms of marine life. Chapter III.M.2.e of the Ocean Plan sets forth requirements to implement mitigation measures in compliance with Water Code section 13142.5(b).

The Ocean Plan requires a specific type of mitigation to offset the desalination facility impacts. Chapter III.M.2.e.(3)(b)i requires:

> "Mitigation shall be accomplished through expansion, restoration or creation of one or more of the following: kelp beds, estuaries, coastal wetlands, natural reefs, MPAs, or other projects approved by the regional water board that will mitigate for intake and mortality of all forms of marine life associated with the facility".

Based on Santa Ana Water Board staffs' estimation of marine life mortality, the required acres needed to mitigate for marine life mortality impacts related to the Facility's construction and stand-alone operations is 89.47 acres (see summary table above). To fulfill the required mitigation acreage, the Discharger proposed in their Marine Life Mitigation Plan (MLMP) to conduct maintenance dredging of the ocean inlet at Bolsa Chica to support the Bolsa Chica Lowlands Restoration Project in order to maintain full tidal flow within the Bolsa Chica wetlands. The inlet channel has historically shoaled and filled with sand limiting tidal exchange between the ocean and the wetlands. Maintenance dredging of the inlet will provide essential tidal connectivity between the wetlands and the Pacific Ocean. In addition, dredging will help maintain the existing wetland system as well as support restoration and enhancement activities. The maintenance dredging of the ocean inlet will be done as needed to meet performance standards specified in the MLMP.

Santa Ana Water Board staff determined that the inlet maintenance dredging would be considered a "preservation" form of mitigation, not "expansion," "restoration" or "creation" as is required by the Ocean Plan. The proposed maintenance dredging alone would only preserve the already existing habitat at Bolsa Chica.

Therefore, to be in compliance with the Ocean Plan, Santa Ana Water Board staff have worked extensively with the Discharger to ensure that the best available mitigation project feasible includes compliant restoration components. There are several areas within Bolsa Chica where the Discharger has proposed restoration activities: Fieldstone Property (Cell 46, and Cell 42 of the Bolsa Chica Lowlands Restoration Project). The Fieldstone property consists of approximately 12 acres of dry, barren salt pans, with marsh and subtidal habitat. Within this property, the discharger proposes to restore approximately 4.5 acres of subtidal and tidal wetlands in addition to upland restoration. At several sites within Cell 46 and 42, oil pads and roads will be removed, and the areas restored to upland habitat. The individual sites for these activities are scattered

throughout Cells 46 and 42 but will result, in total, in approximately 1.2 acres of additional restoration.

For these restoration projects to succeed, the Discharger must make improvements to the water circulation within the Muted Tidal Basins in Bolsa Chica. The circulation improvements constitute enhancement activities, which is considered a type of restoration, but most importantly, based on input from Resource Agency staff (National Marine Fisheries, Coastal Commission and State Lands Commission), these improvements are required for the restoration projects to be fully successful.

The Discharger has not fully developed detailed descriptions of the restoration components of their proposed mitigation plan in the MLMP that has been submitted. The full development of the restoration components requires additional studies and information that are not currently available. Therefore, Santa Ana Water Board staff recommends that the Water Code section 13142.5(b) determination be conditioned on the Board's approval of supplemental plans submitted by the Discharger in accordance with the Marine Life Mitigation Plan Schedule included in Attachment K to the tentative Order. Provided that the Discharger satisfies the requirements of Attachment K, the mitigation at the Bolsa Chica Lowlands Restoration Project would provide the mitigation acreage identified below.

Total Bolsa Chica Mitigation Acreage

Preservation of the Full Tidal Basin via inlet maintenance dredging	108 acres
Restoration of the Fieldstone property to subtidal habitat	4.5 acres
Restoration of the Oil Pads to subtidal habitat	1.2 acres
Enhancement of water circulation within the Muted Tidal Basins	15 acres
Total	**128.7 acres**

It is Santa Ana Water Board staff's position that if Poseidon Water successfully implements the above components, they will have adequately mitigated for the construction and operation of the Facility over the 30-plus year life-span of the Facility. The approval of all mitigation acreage is contingent upon:

a. Completion of all tasks in the Marine Life Mitigation Plan Schedule (Attachment K to the tentative Order)
b. Successful implementation of all four mitigation components in table above (as determined by performance standards)

Previous Inlet Dredging Mitigation Projects
While the inlet dredging maintenance was originally funded by the Ports of Los Angeles and Long Beach as a Coastal Commission mitigation project for activities within the ports, the mitigation effort was based on a finite expenditure rather than funds necessary to maintain the mitigation efforts over a pre-determined amount of time. The funds identified for the Ports mitigation efforts have run out and it has been difficult to acquire the additional funding from the State or other sources necessary to continue those mitigation efforts. Dredging of the inlet would help preserve the wetlands and allow them to continue to function as designed.

Conditional Mitigation Requirements
Because Poseidon Water's proposal to mitigate for the marine life impacts associated with the construction and operation of the Facility at the Bolsa Chica Lowlands Restoration Project requires additional information to flush out the final details of their plan, Santa Ana Water Board staff recommends that the Water Code section 13142.5(b) determination be made conditional on Poseidon Water's submission of a Coordination and Communication Plan, a Final Restoration Plan for the Fieldstone Property, a Final Restoration Plan for the Oil Pads and Road, and a Final Adaptive Management Plan in accordance with the schedule established in the Marine Life Mitigation Plan Schedule (Attachment K).

The Discharger must also coordinate with the State Lands Commission, the Santa Ana Water Board and the Coastal Commission on the detailed project submittals.

The tentative Order requires that Poseidon Water's final MLMP (as revised by the plans required under the Marine Life Mitigation Plan Schedule) come back to the Santa Ana Water Board for consideration and approval.

A detailed discussion of the proposed mitigation site and how Santa Ana Water Board staff arrived at the proposed mitigation acreage can be found in "Approach for Mitigation of the Facility", Attachment G.5.

ADDITIONAL PROPOSED PERMIT REQUIREMENTS
Pursuant to the Clean Water Act and 40 Code of Federal Regulations (CFR), the tentative Order specifies technology-based effluent limitations and water quality-based effluent limitations.

The Ocean Plan, chapter III.M.3.b.(2) requires the implementation of receiving water limitations for salinity. Based on modeling studies conducted by the Discharger, the tentative Order proposes a salinity effluent limit as a daily average salinity effluent limitation of 65.5 ppt.

The Clean Water Act section 308 and 40 CFR sections 122.41(h), (j)-(l), 122.44(i), and 122.48 require that all NPDES permits specify monitoring and reporting requirements.

Water Code sections 13267 and 13383 also authorize the Santa Ana Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The tentative Order specifies a Monitoring and Reporting Program in Attachment E, that includes the following components: influent monitoring, effluent monitoring, toxicity testing and receiving water monitoring.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) COMPLIANCE

The action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code section 21100 et seq.) in accordance with section 13389 of the Water Code. The Water Code section 13142.5(b) determination set forth in Attachment G to this Order is issued under state law authority only and is a discretionary approval subject to compliance with CEQA. The City of Huntington Beach prepared and certified a Final Subsequent Environmental Impact Report (2010 FSEIR) on September 2010. On October 2017 the California State Lands Commission certified a Supplemental Environmental Impact Report for the revised outfall/intake modifications.

Subsequent to the certification of the 2017 FSEIR, the Discharger made modifications to the diffuser design to comply with Water Code section 13142.5(b) and the Ocean Plan. The changes to the diffuser do not involve new significant environmental effects or a substantial increase in the severity of previously identified significant effects that would require the preparation of a subsequent environmental impact report under CEQA Guidelines section 15162. As such, an addendum to the 2010 FSEIR and the 2017 FSEIR is the appropriate documentation to address the changes to the diffuser design (see Diffuser Design Considerations discussion above).

The full environmental analysis of the environmental impacts of the Facility are set forth in the 2010 FSEIR (available at https://www.huntingtonbeachca.gov/Government/Departments/Planning/major/poseidon.cfm), the 2017 FSEIR (available at https://www.slc.ca.gov/ceqa/seawater-desalination/), and the Addendum. An analysis of CEQA compliance and the requisite CEQA findings are included in section II.F of the tentative Order and section III.B of the Fact Sheet.

RECOMMENDATION

Direct staff to solicit comments on the tentative Order and draft Water Code section 13142.5(b) determination, prepare written responses to comments received and bring an appropriately revised Order and Water Code determination back to the Santa Ana Water Board for consideration at a future public hearing.

COMMENT SUBMITTAL

Comments on the tentative Order and draft Water Code section 13142.5(b) determination should be submitted to the following email address:

RB8-PoseidonHB.comments@waterboards.ca.gov

ATTACHMENTS

Tentative Order R8-2020-0005 and Attachments

- Attachment A – Definitions
- Attachment B – Map
- Attachment C – Flow Schematic
- Attachment D – Standard Provisions
- Attachment E – Monitoring and Reporting Program
- Attachment F – Fact Sheet
- Attachment G – Water Code section 13142.5(b) Determination
  - G.1 – Narrowing of the Sites
  - G.2 – Identified Need for Desalinated Water
  - G.3 – ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location);
  - G.4 – Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF)
  - G.5 – Approach for Mitigation of the Facility
- Attachment H – Minimum Levels of Ocean Plan Appendix I
- Attachment I – Not Applicable
- Attachment J – Receiving Water Monitoring Stations
- Attachment K – Marine Life Mitigation Plan Schedule

Addendum to the Final Subsequent Environmental Impact Report

ATTACHMENT 2

MAY 15, 2020

SANTA ANA WATER BOARD STAFF REPORT

California Regional Water Quality Control Board
Santa Ana Region

May 15, 2020

Item: **3**

SUBJECT: **Second Workshop for the Permit Renewal for Poseidon Resources' Proposed Huntington Beach Desalination Facility**

BACKGROUND

On November 22, 2019, Santa Ana Water Board staff issued the Tentative National Pollutant Discharge Elimination System (NPDES) Number CA8000403, Waste Discharge Requirements and draft California Water Code section 13142.5(b) determination for the Poseidon Resources' (Surfside) L.L.C. (Poseidon Water or Discharger) proposed Huntington Beach Desalination Facility (Facility) (Tentative Order). The Facility will be located at 21730 Newland Street, Huntington Beach on twelve acres at the AES Huntington Beach Generating Station (AES HBGS). The Discharger proposes to modify and operate the AES HBGS intake and discharge systems for its desalination operations. The Facility will produce an average annual volume of 50 million gallons per day (MGD) of potable water through a reverse osmosis (RO) process. The treatment process requires an intake of seawater averaging 106.7 MGD; discharge of concentrated brine will average 56.59 MGD.

On December 6, 2019, the Santa Ana Water Board held a public workshop to discuss details of the proposed Facility, to discuss the details of the draft tentative NPDES permit and draft Water Code 13142.5(b) determination, and to receive comments from interested parties. Topics summarized in the December 6, 2019 staff report and at the workshop included:

- Identified need for the desalinated water;
- Facility onshore location;
- Intake considerations (including subsurface and surface intake systems);
- Concentrated brine discharge considerations;
- Calculation of the marine life mortality impacts; and
- Determination of the best feasible mitigation project available.

At the December workshop, the Santa Ana Water Board had several inquiries and information requests for staff to address at a subsequent meeting. The inquires related to the identified need for the desalinated water, the marine life mitigation requirements, a more detailed cost comparison for intake system alternative sites, and performance of the Carlsbad seawater desalination facility.

Due to the complexity of this project, Santa Ana Water Board staff recommended that a second workshop be conducted on May 15, 2020 specifically to focus on the identified need for the desalinated water and the marine life mitigation requirements. The cost comparison of the intake system alternative sites, and performance of the Carlsbad seawater desalination facility are discussed later in this staff report.

PROJECT DESCRIPTION

As a reminder, the Discharger proposes to construct and operate the proposed Facility on a 12-acre parcel adjacent to the AES HBGS site. Once constructed, the Facility will discharge wastewater to the Pacific Ocean, a water of the United States.

The proposed Facility is designed to produce potable water for delivery into the water distribution and/or groundwater recharge systems within Orange County. The Discharger will receive its source water directly from the AES HBGS's intake system. Pursuant to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) requirements, the intake system will be equipped with a screening system consisting of four 1.0-mm slot wedgewire screens with a through-screen velocity of 0.5 feet per second or less. The wedgewire screen must have screens composed of stainless steel and include a rotating brush-cleaning system. The Discharger may use a boat-based or onshore air burst system or deploy divers to remove debris that accumulates on the screens.

The desalination process will consist of source water screening, coagulation, filtration, pH control, chlorination, de-chlorination, RO membrane separation, and product water chlorination and chemical conditioning. The RO system will use high-rejection seawater membranes. The proposed Facility will produce a 12-month average of 50 MGD of potable water and discharge an annual average of 56.59 MGD of concentrated wastewater and process water (e.g., backwash water, RO cleaning solutions) that will be discharged to the ocean through the existing AES HBGS outfall structure. At the discharge tower, the Discharger will install a multiport diffuser consisting of 14 ports equipped with Tideflex diamond shaped-nozzles (or similar) with an open area of 1.28 square feet.

WATER CODE SECTION 13142.5(B) DETERMINATION

Water Code section 13142.5(b) states “for each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize intake and mortality of all forms of marine life.”

To provide direction to regional water quality control boards for evaluating seawater desalination facilities pursuant to California Water Code section 13142.5(b) and to ensure a consistent statewide approach for minimizing the intake and mortality of all forms of marine life, in May 2015, the State Water Resources Control Board (State Water Board) adopted an amendment that added chapter III.M. to the Ocean Plan to

address environmental impacts associated with the construction and operation of seawater desalination facilities. The amendment was subsequently approved by the Office of Administrative Law and the United States Environmental Protection Agency. These provisions provide a consistent statewide approach based on best available science for minimizing intake and mortality of all forms of marine life, in addition to protecting water quality and related beneficial uses of ocean waters.

The focus of the Ocean Plan desalination provisions is to minimize the intake and mortality of all forms of marine life resulting from the construction and operation of desalination facilities. To achieve this, the Ocean Plan specifies requirements which aim to reduce the entrainment and impingement of marine life. Entrainment occurs when organisms are drawn in through the intake and perish when exposed to high pressure and heat inside the desalination system. Typically, entrainment affects smaller organisms, such as plankton, algae, larvae, and fish eggs; studies have shown that organisms typically do not survive entrainment. Impingement occurs when organisms get trapped against intake screens and cannot escape the suction power of the surface intake. To address entrainment and impingement effects, the Ocean Plan requires the use of subsurface intake facilities. Subsurface intakes withdraw water from under the seafloor and thus have no entrainment or impingement of marine life. If the regional water board determines subsurface intakes are not feasible, the Ocean Plan requires the use of screened intake (slot size $\leq$ 1 millimeter) and the reduction of the intake flow velocity ($\leq$ 0.5 ft/s).

In addition to marine life mortality associated with a screened, open ocean intake, there is also mortality associated with the discharge of concentrated brine. Mortality to planktonic organisms near the discharge port can be caused by shear stress as the organisms become entrained in the turbulent jet. Further, the brine is twice the salinity of ocean waters[7]. Concentrated brine behaves differently than traditional wastewater effluent plumes because of its greater density. The increased density can cause the brine plume to sink and spread on the seafloor instead of mixing with the surrounding water thus impacting bottom-dwelling (benthic) organisms from the concentrated brine and any pollutants in the brine discharge. To minimize the mortality associated with the brine discharge, the Ocean Plan's preferred method of brine discharge is to commingle the brine with wastewater. If wastewater is not available, the next best preferred method is to utilize multiport diffusers to achieve rapid mixing of the brine discharge.

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[7] State Water Resources Control Board, "Final Staff Report Including the Final Substitute Environmental Documentation, Amendment to the Water Quality Control Plan for Ocean Waters of California Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-Substantive Changes," May 6, 2015

The Ocean Plan also requires that marine life impacts resulting from the construction and operation of a desalination facility be mitigated via an acceptable and approved Marine Life Mitigation Plan (MLMP).

IDENTIFIED NEED FOR DESALINATED WATER

The Ocean Plan, chapter III.M.b.(2) requires that "the identified need for desalinated water" be "consistent with" an applicable urban water management plan (UWMP) prepared in accordance with Water Code section 10631, or other water planning documents if an UWMP is not available. The Ocean Plan does not define "need" or elaborate on what it means to be "consistent with" water planning documents. As such, the Board has discretion in its interpretation of these terms. Staff's proposed interpretation of the terms is included in Attachment G.2 to the Tentative Order and briefly discussed here.

The term "need" has been construed differently by various stakeholders. Environmental groups argue that there is no "need" for desalinated water if there are other sources of water that can meet regional water demands; on the other hand, water supply agencies and other similarly situated stakeholder groups view need as a more flexible concept that considers a range of factors that affect water supply reliability as well as water planning policies and priorities. The administrative record for the Desalination Amendment appears to indicate that the State Water Board intended a more flexible construction of "need' consistent with the latter view — a concept that allows for multiple considerations, including uncertainty of current supplies, competing demands, and the inherent risk of unforeseen circumstances. Further, to be "consistent with" water planning documents does not appear to require that water planning documents specifically identify a project and the specific volume of desalinated water as a source that is absolutely required to meet water demand. Based on guidance from interpretations of "consistent with" in other statutory contexts, staff interpreted "consistent with" water planning documents to require only that a proposed project be "in agreement or harmony with the terms of the applicable plan, not in rigid conformity with every detail thereof." However, these terms are ambiguous and, as noted above, the Board may disagree with staff's interpretation and direct staff to revise their analysis.

As was discussed at the December 6, 2019 workshop, the Municipal Water District of Orange County (MWDOC) and other municipalities have UWMPs that specifically identify the proposed Facility as an opportunity to develop a water supply and this represents support for the need for desalinated seawater. The MWDOC UWMP explains that the desalinated water would offset imported water demands and could be used to augment recycled water supplies used in the Talbert Seawater Barrier to prevent seawater intrusion. The MWDOC UWMP also lists the 56,000 acre-feet/year, or 50 MGD, of desalinated water produced by the proposed Facility as a way to improve water supply and system reliability in Orange County. In addition to the UWMPs, the Orange County Water District (OCWD) has also prepared a Groundwater Management

Plan and a Long-term Facilities Plan. The identified need for desalinated water appears to be consistent with the MWDOC and OCWD management plans.
MWDOC recently released its 2018 reliability study that projects water supply and demand in Orange County through the year 2050 and compares local projects that can meet the forecasted water demands. The proposed Poseidon Water project is among the local projects that were compared, and the proposed Facility ranked last based on system reliability and supply reliability metrics. The purpose of the study, however, was not to determine which projects should be implemented; rather, it was intended to provide information to local decisionmakers charged with choosing local projects. While there may be more cost-effective projects to meet water supply needs in Orange County, the proposed Project is among the potential projects that local suppliers can choose to pursue to meet water demand.

In order to obtain clarification from Poseidon Water on the identified need for desalinated water, on January 8, 2020, Santa Ana Water Board staff requested additional information. Poseidon Water and OCWD submitted responses to Board staff inquiries. These documents have been provided to the Santa Ana Water Board. The May 15, 2020 workshop will be an opportunity for the Santa Ana Water Board to hear directly from the relevant water planning agencies on the identified need for the desalinated water.

DETERMINATION OF THE BEST AVAILABLE MITIGATION MEASURES FEASIBLE

Water Code section 13142.5(b) requires that the best available mitigation measures feasible be used to minimize the intake and mortality of all forms of marine life. Chapter III.M.2.e of the Ocean Plan sets forth requirements to implement mitigation measures in compliance with Water Code section 13142.5(b).

The Ocean Plan requires a specific type of mitigation to offset the desalination facility impacts. Chapter III.M.2.e.(3)(b)i requires:

> "Mitigation shall be accomplished through expansion, restoration or creation of one or more of the following: kelp beds, estuaries, coastal wetlands, natural reefs, MPAs, or other projects approved by the regional water board that will mitigate for intake and mortality of all forms of marine life associated with the facility".

As discussed in the Tentative Order and at the December workshop, Santa Ana Water Board staff estimate that 89.47 acres are needed to mitigate for impacts related to the proposed Facility's construction and stand-alone operations. After consideration of comments received from staff from other resource agencies (specifically, NOAA's National Marine Fisheries Service [NMFS]), however, the acreage needed for mitigation has been increased to 109.5 acres. The reasoning behind Staffs' decision to revise the required mitigation acreage will be described in the Response to Comments currently

being finalized as well as revisions to Attachment G.4 of the Tentative Order which is also being revised.

To fulfill the required mitigation acreage, the Discharger proposed in their Marine Life Mitigation Plan (MLMP) to conduct maintenance dredging of the ocean inlet at Bolsa Chica to support the Bolsa Chica Lowlands Restoration Project in order to maintain full tidal flow within the Bolsa Chica wetlands. The inlet channel has historically shoaled and filled with sand limiting tidal exchange between the ocean and the wetlands. Maintenance dredging of the inlet will provide essential tidal connectivity between the wetlands and the Pacific Ocean. In addition, dredging will help maintain the existing wetland system as well as support restoration and enhancement activities. The maintenance dredging of the ocean inlet will be done for the lifetime of the Project as needed to meet performance standards specified in the MLMP.

Santa Ana Water Board staff determined that the inlet maintenance dredging would be considered a “preservation” form of mitigation, not “expansion,” “restoration” or “creation” as is required by the Ocean Plan. The proposed maintenance dredging alone would only preserve the already existing habitat at Bolsa Chica.

Therefore, to be in compliance with the Ocean Plan, Santa Ana Water Board staff have worked extensively with the Discharger to ensure that the best available mitigation project feasible includes compliant restoration components. There are several areas within Bolsa Chica where the Discharger has proposed restoration activities. The major areas are within the Fieldstone Property (Cell 46, and Cell 42 of the Bolsa Chica Lowlands Restoration Project). The Fieldstone property consists of approximately 12 acres of dry, barren salt pans, with marsh and subtidal habitat. Within this property, the discharger proposes to restore approximately 4.5 acres of subtidal and tidal wetlands in addition to upland restoration. At several sites within Cell 46 and 42, oil pads and roads will be removed, and the areas restored to upland habitat. The individual sites for these activities are scattered throughout Cells 46 and 42 but will result, in total, in approximately 1.2 acres of additional restoration.

For these restoration projects to succeed, the Discharger must make improvements to the water circulation within the Muted Tidal Basins in Bolsa Chica. The circulation improvements constitute enhancement activities and, based on input from other resource agency staff (NMFS, the Coastal Commission, and the State Lands Commission), these improvements are required for the restoration projects to be fully successful.

The Discharger has not fully developed detailed descriptions of the restoration components of their proposed mitigation plan in the MLMP that has been submitted. The full development of the restoration components requires additional analyses and information that are not currently available. Therefore, Santa Ana Water Board staff recommends that the Water Code section 13142.5(b) determination be conditioned on

the Board's approval of supplemental plans submitted by the Discharger in accordance with the Marine Life Mitigation Plan Schedule included in Attachment K to the Tentative Order. Provided that the Discharger satisfies the requirements of Attachment K, the mitigation at the Bolsa Chica Lowlands Restoration Project would provide the mitigation acreage identified below.

Total Bolsa Chica Mitigation Acreage

Preservation of the Full Tidal Basin via inlet maintenance dredging	108.0 acres
Restoration of the Fieldstone property to subtidal habitat	4.5 acres
Restoration of the Oil Pads to subtidal habitat	1.2 acres
Enhancement of water circulation within the Muted Tidal Basins	15.0 acres
Total	**128.7 acres**

It is Santa Ana Water Board staff's position that if Poseidon Water successfully implements the above components, they will have adequately mitigated for the construction and operation of the Facility over the 50-plus year life span of the Facility. The approval of all mitigation acreage is contingent upon:

c. Completion of all tasks in the Marine Life Mitigation Plan Schedule (Attachment K to the tentative Order)
d. Successful implementation of all four mitigation components in the above table (as determined by performance standards)

<u>Previous Inlet Dredging Mitigation Projects</u>
While the Bolsa Chica ocean inlet dredging maintenance was originally funded by the Ports of Los Angeles and Long Beach as a Coastal Commission mitigation project for activities within the ports, the mitigation effort was based on a finite expenditure rather than funds necessary to maintain the mitigation efforts over a pre-determined amount of time. The funds identified for the Ports mitigation efforts have run out and it has been difficult to acquire the additional funding from the State or other sources necessary to continue those mitigation efforts. Dredging of the inlet would help preserve the wetlands and allow them to continue to function as designed.

<u>Conditional Mitigation Requirements</u>
Because Poseidon Water's proposal to mitigate for the marine life impacts associated with the construction and operation of the Facility at the Bolsa Chica Lowlands Restoration Project requires additional information to flesh out the final details of their

plan, the Tentative Order specifies that the Water Code section 13142.5(b) determination be made conditional on Poseidon Water's submission of a Coordination and Communication Plan, a Final Restoration Plan for the Fieldstone Property (this deliverable also requires submittal of an Enhancement Plan to Improve Water Circulation for the Muted Tidal Basins), a Final Restoration Plan for the Oil Pads and Road, and a Final Adaptive Management Plan in accordance with the schedule established in the Marine Life Mitigation Plan Schedule included in Attachment K.

The Tentative Order requires that Poseidon Water's final MLMP be brought back to the Santa Ana Water Board for consideration and approval.

Prohibitions on Discharge and Intake
Related to the outstanding mitigation requirements, the Tentative Order prohibits the discharge of waste and the intake of seawater unless and until (1) the Discharger has submitted the supplemental plans required under the MLMP Schedule (Attachment K), including the Final MLMP; (2) the Santa Ana Water Board has approved the Discharger's supplemental plans; (3) the Discharger has obtained all permits and other governmental approvals necessary to implement all components of the approved mitigation project (including the components included in supplemental plans required under the MLMP Schedule (Attachment K)); and (4) the Discharger has begun dredging of the Bolsa Chica inlet in accordance with the current MLMP (Appendix TT3). Staff included the prohibition provisions in the Tentative Order to avoid a situation where Discharger would be operating and impacting marine life without mitigating for these impacts.

PERFORMANCE OF THE CARLSBAD SEAWATER DESALINATION FACILITY:
The Discharger has maintained compliance with requirements and provisions specified in Order R9-2019-0003, issued by the San Diego Water Board on May 8, 2019, with two exceptions discussed below. There have been two exceedances of the receiving water pH limit, which requires that pH shall not be changed more than 0.2 standard units from the receiving water. The receiving water pH limit was exceeded during the August 29, 2019 quarterly monitoring event (3rd Quarter of 2019) at two surf zone monitoring locations out of a total of 21 monitoring locations sampled (two pH measurements out of a total of 72 taken during the quarterly monitoring event). These two pH results were deemed as erroneous measurements by the Discharger, as these results were not confirmed by additional pH monitoring conducted at the two monitoring locations during the August 29, 2019 monitoring event and the pH of the plant discharge measured in the discharge pond prior to mixing with the receiving water was measured at 0.2 units below the pH of the receiving water. No exceedances of the receiving water pH limit were reported for the monitoring conducted by the Discharger during the 4th Quarter of 2019. Also, during the 3rd Quarter of 2019 the Discharger failed to

collect a final effluent sample for TCDD Equivalents determination[8] and to sample one receiving water monitoring location. No other violations of the current 2019 permit have been reported by the Discharger to date.

Notwithstanding Poseidon's operational and violation history at their Carlsbad facility, if the Discharger violates any Santa Ana Water Board permit requirement, Board staff will take appropriate action.

COST COMPARISON OF ALTERNATIVE INTAKE SYSTEM SITES:

As part of the feasibility analysis, the Discharger developed the cost comparison for equipping the existing intake (Station E) to installing a new intake at one of two locations (Station D2/U2). Station D2/U2 are equidistance from the existing facility; one is located two kilometers up-coast and the other is located two kilometers down-coast. The estimated costs associated with a new intake at either Station D2 or U2 are assumed to be equal. The Santa Ana Water Board requested more cost information related to the alternative analysis regarding the construction costs and the operating and maintenance costs. These costs are show in Tables 1 and 2 below.

Table 1 shows the detailed construction cost comparisons for the alternatives provided by Poseidon in their Appendix RRRRR. Table 1 shows that the main differences in the alternative costs are related to the additional pipeline requiring a trestle for construction for Station D2/U2, four-year variance in the start of construction, and 39-month difference in the construction periods. Table 1 also indicates that costs for the alternative intake location has significant additional costs related to financing debt issuance costs, capitalized interest, and financing fees.

A second question was asked about the costs for each alternative without including the financial costs. These costs can be calculated by removing the estimated costs listed in Table 1 for 'Capitalized Interest During Construction' and 'Financing Fees and Reserves.' The total estimated construction costs without including the financial costs would be: $70.8 million for Station E, and $289.5 million for Station D2/U2.

[8] TCDD Equivalents is the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors.

Table 1. Comparative Construction Costs

Comparison of Proposed Intake to Alternative Intake Cost Estimate ($000s)		
Intake:	**Proposed Intake (E)**	**Alternative Intake (U2/D2)**
Construction Period (Months) (1)	**39**	**72**
Financial Close Pricing Year	**2020**	**2024**
Direct Capital Costs		
Pipeline and Associated Infrastructure	-	26,312
Trestle and Associated Infrastructure	-	31,541
Intake Screen and Related Costs	22,135	22,135
Other Project Costs (Unallocated)	2,178	2,178
Indirect, Insurance and Overhead Costs	13,372	45,192
Subtotal	**37,685**	**127,358**
Engineering (15%)	5,653	19,104
Contingency (40%)	15,074	50,943
Direct Capital Cost (2018$)	**58,412**	**197,405**
Direct Capital Cost Escalation (to Year of Financial Close)	2,957	38,736
Direct Capital Cost ($ in Year of Financial Close)	**61,369**	**236,140**
Development and Construction Costs (2)	9,438	53,367
Capitalized Interest During Construction (3)	12,816	151,540
Financing Fees and Reserves (4)(5)	8,996	32,811
Total Intake Cost Estimate (6)	**92,618**	**473,858**
Total Intake Cost Estimate - Rounded	**93,000**	**474,000**
% Increase over E		*409.7%*

Note: Direct Capital Costs reflect 12-foot Pipeline Diameter

(1) Construction Schedule for U2/D2 assumes new Intake construction commences prior to Plant Construction

(2) Costs include Property Taxes, Title Insurance, Construction Management and Permitting, and Development Costs

(3) Includes a 6 Month Capitalized Interest Contingency

(4) Reserves include Debt Service, Working Capital and Project O&M

(5) Financing Fees include Conduit, Rating Agency, Underwriting, Equity and Advisory Fees

(6) *Proposed Intake (E) Total Intake Cost Estimate is in 2020$ and Alternative Intake (U2/D2) is in 2024$ (both the respective year of Financial Close)*

The Santa Ana Water Board also asked the following questions related to operation and maintenance: what would be the major maintenance schedules for each alternative intake location and the associated costs, and what would be the anticipated annual operating costs for both alternatives excluding debt costs and fees for the life of the project? Poseidon provided the following information in response to these questions. The routine cleaning, maintenance, and inspections are expected to include:

- Offshore inspection and cleaning of the intake systems 4-6 times per year with a 4-person dive team, potentially including boat-based air burst
- Periodic inspection and cleaning of the intake pipeline, including pigging as needed to avoid biomass accumulation (especially in the intake pipeline)
- Intermittent replacement of the wedge wire screens as needed
- Maintenance and replacement of the rotating brushes and motors as needed
- Regular monitoring in the ocean as required

Given the limited number of installations that use active stainless steel wedgewire screen intake manifolds on this scale, the exact cleaning and maintenance schedule will need to be refined during the first year of commercial operations. The incremental costs associated with Stations D2/U2 as compared to Station E are primarily attributable to the longer length of intake piping that includes a 90-degree bend for pipes at Stations D2/U2. This will increase the required energy output and normal wear and tear at the intake pump station due to frictional losses, and it will also take longer and be more costly to inspect and clean the longer length of intake piping.

In Table 2, the annual operating costs provided are an average and assumed to be only subject to inflation. Therefore, the total operating cost for the intake configurations over a 50-year period excluding debt repayment and fees are as follows:

Table 2. Operating and Maintenance (O&M) Costs for Alternative Intake Locations

	STATION E	**STATION (D2/U2)**
First Year of Operation (FYO)	2025	2031
Total Operating Cost Over 50 Years (Constant $FYO)	$180 Million	$330 Million
Total Operating Cost Over 50 Years, Subject to 2.0% Annual Inflation (Nominal $)	$304.5 Million	$558.2 Million

PUBLIC COMMENTS

Following the November 22, 2019 release of the Tentative Order determination, the 60-day public comment period closed on January 21, 2020. Santa Ana Water Board staff received 217 unique comment letters that include comments from concerned citizens, environmental groups, elected officials, water agencies, business organizations, federal,

state and local agencies and the Discharger. All comment letters have been made available to the public through the State Board's FTP site.

Santa Ana Water Board staff is in the process of responding to all of these comments and, where appropriate, revising the Tentative Order and Water Code section 13142.5(b) determination.

RECOMMENDATION

Provide feedback to staff on the Tentative Order and direct staff to continue to prepare written responses to comments received and bring an appropriately revised Order and Water Code determination back to the Santa Ana Water Board for consideration at the July 31, 2020 public hearing.

ATTACHMENT 3

MAY 15, 2020

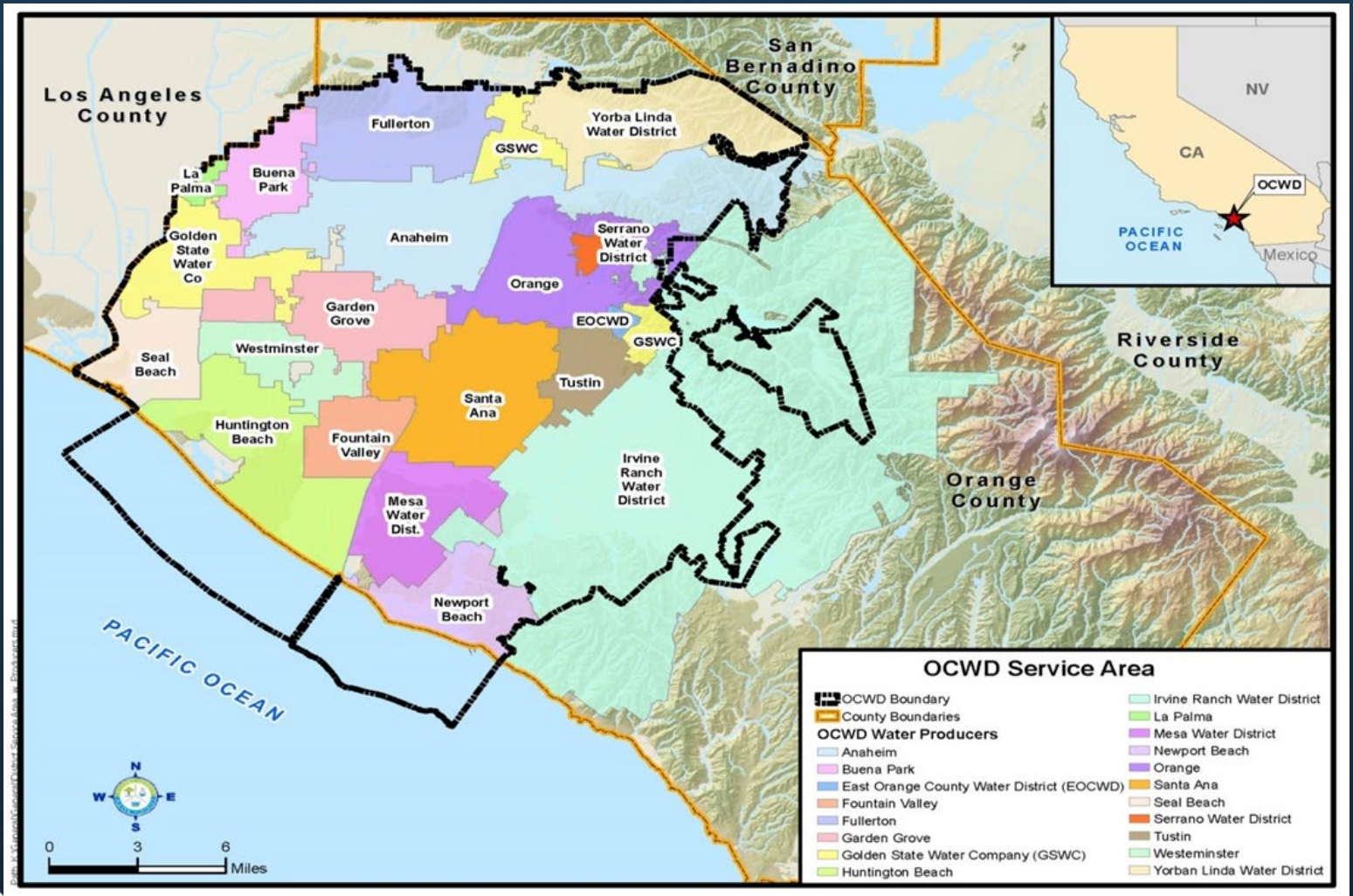
ORANGE COUNTY WATER DISTRICT
PRESENTATION TO THE SANTA ANA WATER BOARD

Orange County Water District Huntington Beach Ocean Desalination Project Presentation

Michael Markus – General Manager

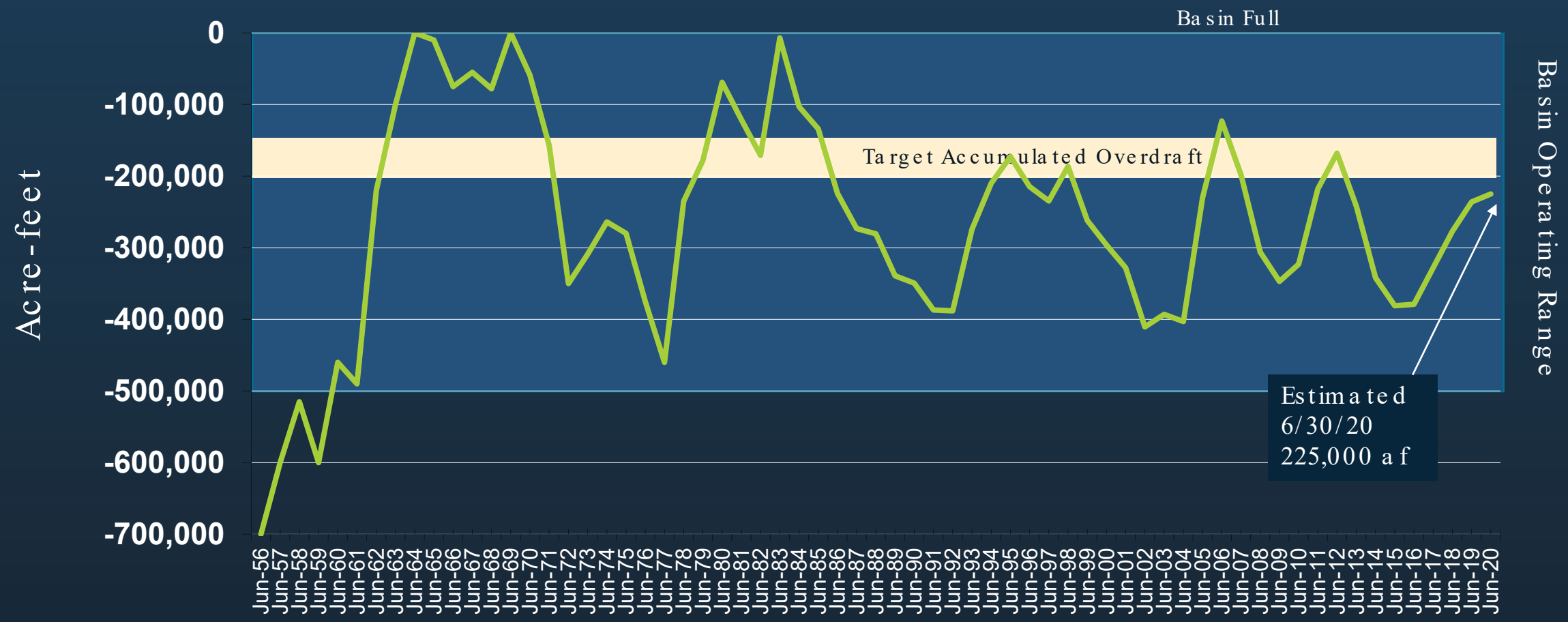
May 15, 2020

Orange County Water District (OCWD)



- Created in 1933
- Manage and protect the O.C. groundwater basin
- Serve approximately 2.5 million residents
- 13 Cities; 5 Retail Water District; 1 Investor Owned Water Agency (Producers)
- 10 member board

OCWD Groundwater Basin Accumulated Overdraft



History

- March 2010 – Entered into water purchase MOU with Poseidon
- May 2013 OCWD Board Resolution – to consider and develop new local water resources to ensure adequate water supplies are always available to the residents and businesses in the District's service territory
- July 2013 – Commissioned study of the economic feasibility of taking the entire 50 MGD / 56,000 AFY of Poseidon water and established a Citizens Advisory Committee
- November 2014 – Adopted OCWD Long-Term Facilities Plan which included consideration of a 50 MGD Poseidon Project
- May 2015 – Approved a Term Sheet with Poseidon to develop the 50 MGD project
- June 2015 – Adopted OCWD Groundwater Management Plan which included consideration of a 50 MGD Poseidon Project
- July 2018 – Approved amendments to the Term Sheet

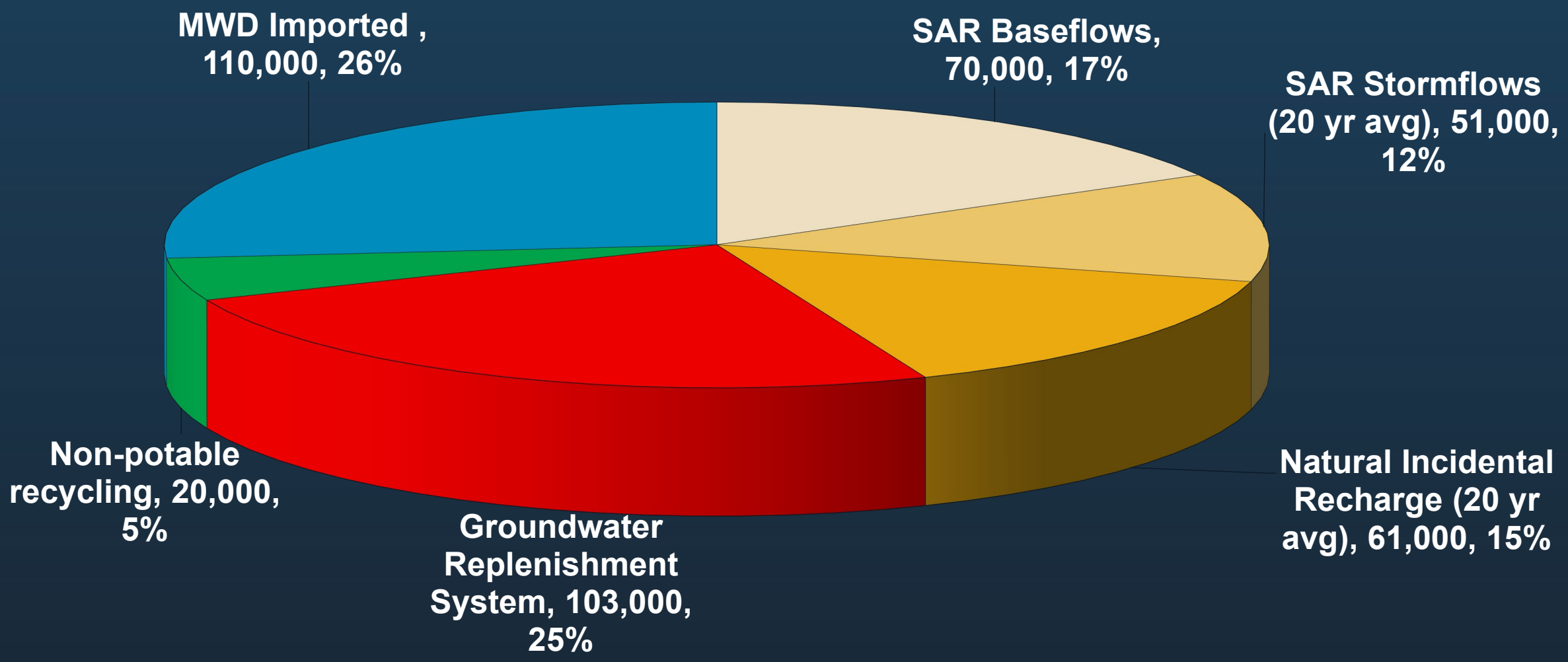
Project Benefits

- New local 50 MGD water supply in OCWD service territory
- Drought proof & climate resilient
- Significant reduction in the amount of imported water from Northern California and Colorado River that is required to meet water demands
- Insurance from climate change impacts
- Further diversifies water sources
- Lower total dissolved solids concentration compared to imported water supplies being replaced
- Improves reliability and security of the region's water supplies
- OCWD takes ownership of project at end of contract term

Poseidon OCWD Term Sheet

Provides key dealpoints to prepare a water purchase agreement

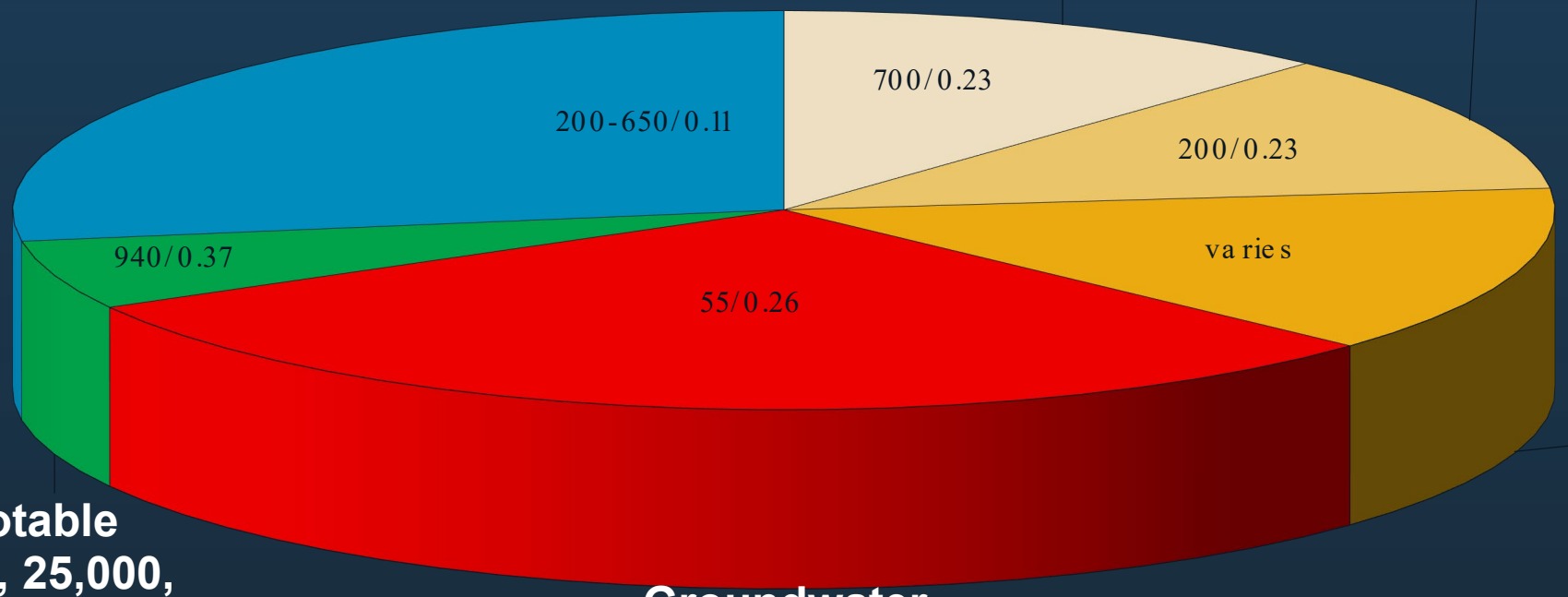
- Poseidon develop, permit, finance, design, construct and operate treatment plant
  - OCWD pays for plant water at the “fence line”
- OCWD develop, permit, finance, design, construct and operate distribution system
  - OCWD has option to have Poseidon design & construct the distribution system
- 30 to 35 year deal
- Conditions Precedent (to finalize a water purchase agreement with OCWD & construct a project)
  - Poseidon obtains necessary permits for plant
  - Distribution Plan is finalized
  - MWD LRP operating subsidy obtained



2020 Total Water Demands of 415,000 afy Within OCWD

Current OCWD Service Territory Water Supply Sources

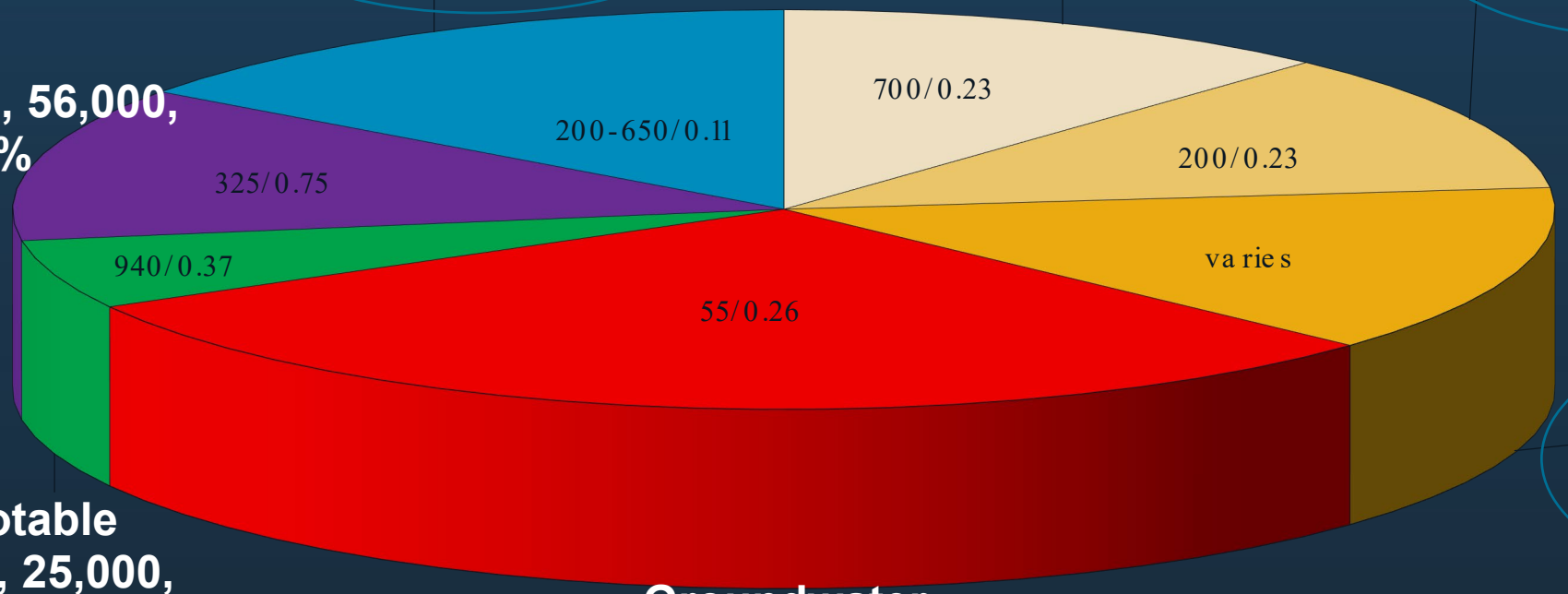
Typical TDS/Boron concentrations in mg/l shown for each supply source in black font



2040 Total Water Demands of 447,000 afy Within OCWD

Potential Future 2040 OCWD Service Territory Water Supply Sources

Typical TDS/Boron concentrations in mg/l shown for each supply source in black font



2040 Total Water Demands of 447,000 afy Within OCWD

Circled Supply Sources Susceptible to climate change impacts

Potential Future 2040 OCWD Service Territory Water Supply Sources

Project Compliance with Ocean Plan Amendment "Need Provisions"

OCWD staff concur with Regional Board staff that project meets Ocean Plan Amendment requirement for need

- OCWD Board approved a Term Sheet with Poseidon for a 50 MGD project
- Project is listed in a regional Urban Water Management Plan
- Project is listed in the OCWD Groundwater Management Plan
- Project is listed in the OCWD Long-Term Facilities Plan
- Metropolitan Water District Integrated Resources Plan and Urban Water Management Plan recognizes role of ocean desalination in meeting local water supply targets

Estimated Year 2022 Project Unit Cost

(Provided to OCWD Board on June 2018)

Item	Unit Cost (30 year deal)
Treatment Plant Cost	$1,916/af
MWD LRP Subsidy	($475/af)
Total Project Unit Cost	$1,441/af

Cost to distribute water not included – ranges from $200/af to $500/af

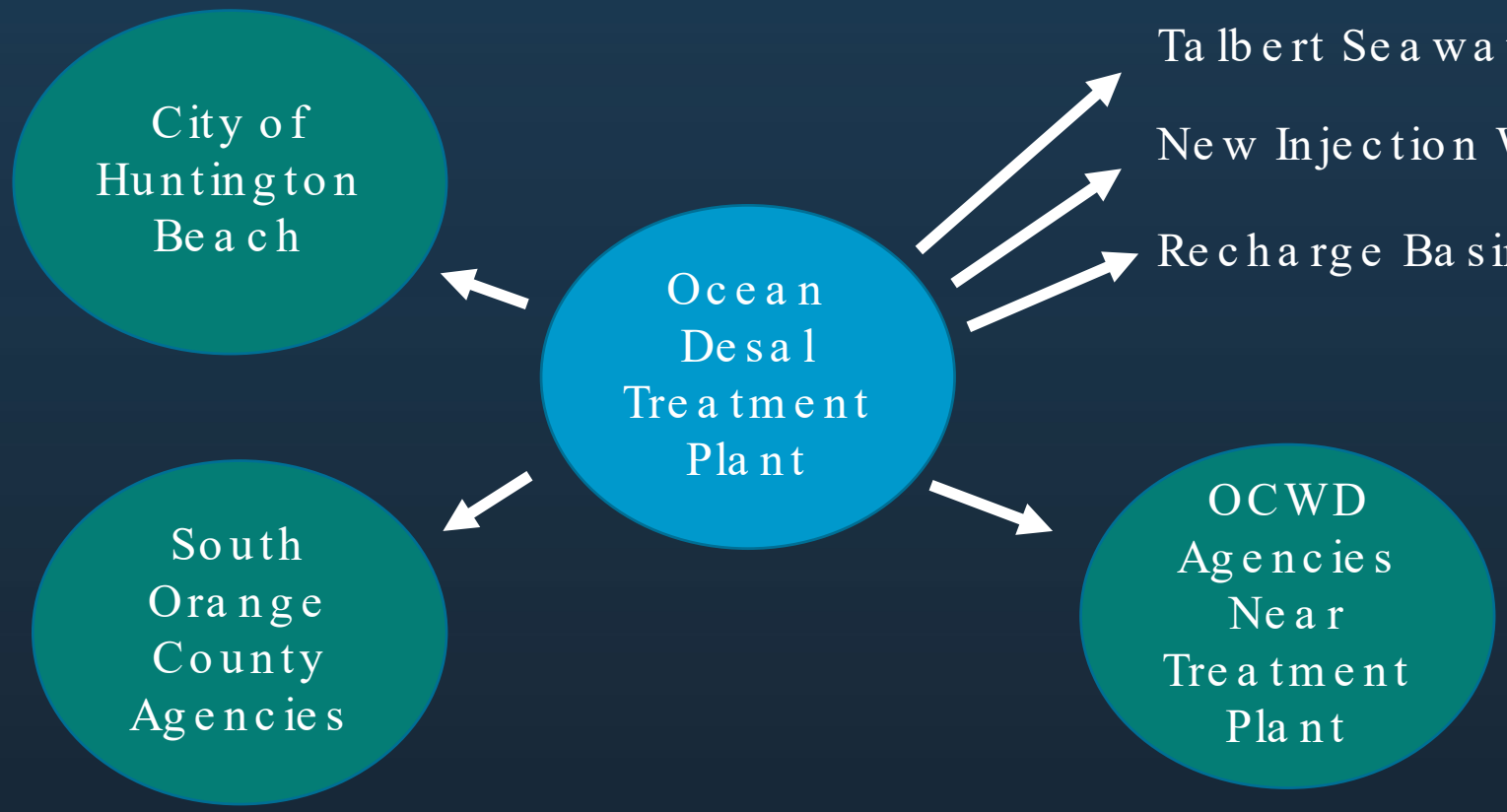
Project Consumer Cost Impacts

- OCWD and Poseidon need to negotiate and finalize a water purchase contract
- Need to select a distribution plan
- Preliminary estimate - $3 to $6 increase to a typical residential monthly water bill

Why is Treatment Plant Sized at 50 MGD / 56,000 AFY?

- Plant would significantly reduce the amount of future imported water needed in the OCWD service area (124,000 AFY)
- Plant would provide insurance against possible climate change impacts (Future needed supplies susceptible to climate change impacts total approximately 288,000 AFY)
- Plant is large enough to benefit from "economies of scale"
- Distribution of 56,000 AFY is manageable

Treatment Plant Distribution Options



OCWD Facilities

Talbert Seawater Barrier Injection Wells

New Injection Wells Along the SAR

Recharge Basins in Anaheim

Water Purchase Agreement Flow Chart

Conditions that must be met before Water Purchase Contract

CEQA – City of Huntington Beach ✓

Orange County Water District ✓

Santa Ana Regional Water Quality Control Board

Coastal Commission

Plant capacity established through Project objectives → Water Purchase Agreement Term Sheet → NPDES Permit → CDP Permit

Water Purchase Agreement Executed AFTER
- **Project Permitted**
- **Construction Contract (Project Costs) finalized**
- **Distribution system finalized**
- **MWD LRP Secured**

Water Purchase Contract Execution

Binding contract to purchase the output of the plant is a condition of project financing and plant construction

Project Financing

Project Construction

MWDOC Water Reliability Study

Future OCWD Maximum Water Supply Need is 22,000 afy

Different Assumptions	Estimated OCWD Amount of Lost Water
Sacramento Delta "Water Fix" Type Project Never Occurs	40,000 afy
Santa Ana River Base Flows Decline to 34,000 afy	19,000 afy
MWD Carson Regional Recycle Water Project not extended to Orange County	20,000 afy
Total	79,000 afy

New Water Supply Need 101,000 afy

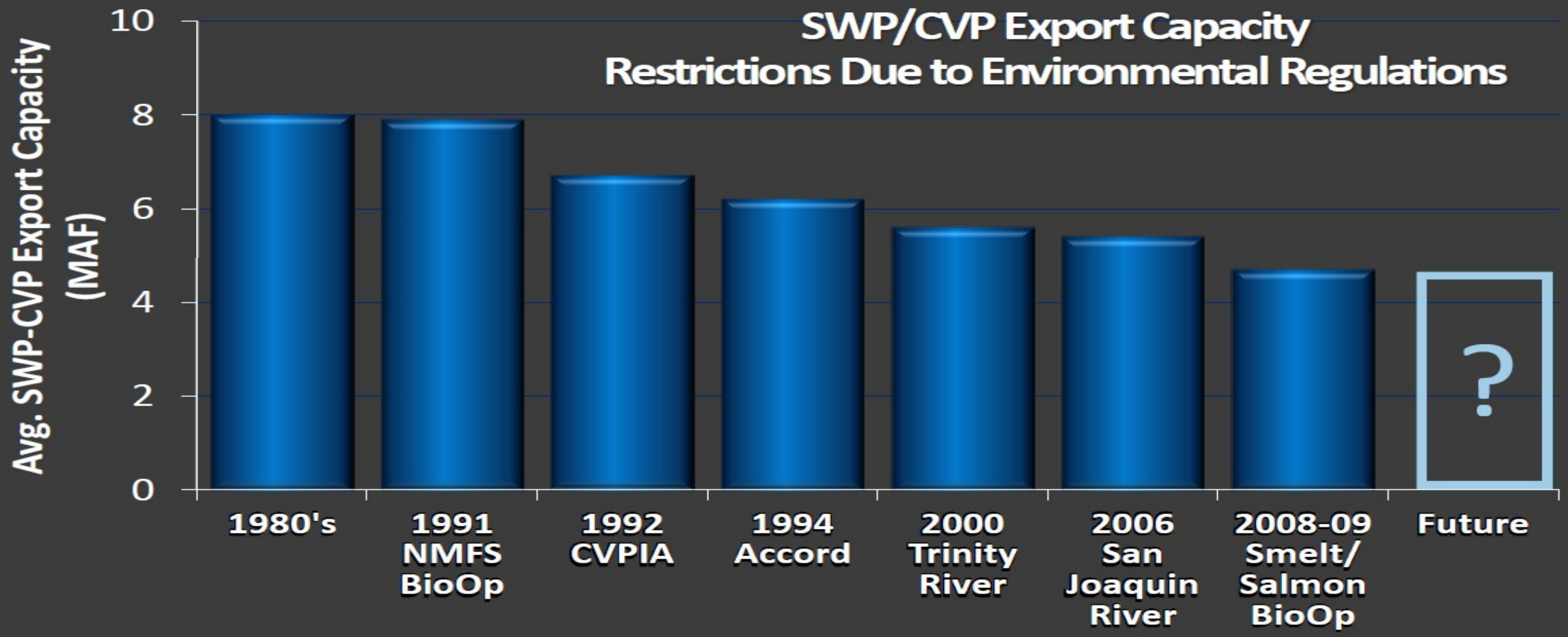
Alternative OCWD Future Water Supply Projects

Project	Possible Water Supply	Comments
CADIZ	5,000 to 10,000 afy	The project has yet to overcome significant regulatory and institutional challenges.
West Orange County Wellfield	3,000 to 6,000 afy	This project has significant feasibility and institutional challenges.
Prado Dam storage operation to elevation 505'	7,000 afy	This project relies upon rainfall capture. During dry winters, it's possible the project would not supply any new water.
GWRS RO Brine Recovery	5,000 to 10,000 afy	Project only needed if OCSD flows to GWRS are insufficient to produce 130 MGD
Santa Ana River Conservation and Conjunctive Use Program	12,000 afy	This is a project to store water for drought cycles. The success of project is dependent on availability of surplus water from the State Water Project.
Peter's Canyon Water Treatment Plant	6,720 afy	This East Orange County WD project has significant feasibility and institutional issues
Total	38,720 – 51,720 afy	

End of Presentation

Additional Slides if Needed

State & Federal Project Supplies
History of Regulatory Restrictions



Lake Mead Photos