

From: Ray Hiemsta [<mailto:ray@coastkeeper.org>]

Sent: Wednesday, March 02, 2016 2:45 PM

To: Green, Cathy; Bilodeau, Denis; Nguyen, Dina; Brandman, Jordan; Flory, Jan; Anthony, Phil; Reyna, Roman; Yoh, Roger; Dewane, Shawn; Sheldon, Stephen; OceanDesalExploration; Ayala, Gina; Durant, Janice; jbrandman@anaheim.net

Cc: 'Ray Hiemsta '

Subject: Orange County Coastkeeper Comments for OCWD Poseidon Distribution Workshop #2

. March 2, 2016

Dear Orange County Water District Board Members,

Orange County Coastkeeper would like to submit the following comments in regards to the decisions to be made regarding the proposed Poseidon Huntington Beach Desalination Plant distribution options workshop on March 2nd

First we would like reiterate our opposition to OCWD's continued consideration of buying the water from the plant. Our opposition centers on the lack of need for the water and the significant environmental impacts the proposed plant will have. Our concerns are documented by the recent study by MWDOC showing a 90,000 acre foot reduction in future demand for water in Orange County and the attached White Paper from the City of Garden Grove, Coastal Commission Staff report, and Poseidon's HB Waste Discharge Permit from the Santa Ana Regional Water Quality Control Board.

Of the distribution options being considered Coastkeeper has the following comments:

First of all the concept of taking potable water from the Poseidon Desalination plant and contaminating it by putting it in the ground is absurd. This idea makes it clear that proceeding with this project is like trying to put a square peg in a round hole. It just does not fit with OCWD. Furthermore, as documented in the recent letter from IRWD. Putting the desalinated ocean water in the aquifer will degrade the aquifers existing water quality and expose IRWD and other agencies to unnecessary costs and expensive equipment modifications to pump and retreat the desalinated water.

Option 1D.

Using option D results in the annual loss of 3,000 AF/yr. of free stormwater that would normally be captured and added to the aquifer. This amounts to 150,000 AF over the proposed life of the project, and equals almost three years of Poseidon's proposed production.

The description of this option also erroneously states that it would add \$200,000,000 in costs to GWRS phase three. The fact is that four of the wells described for this option were developed for GWRS phase three and are part of its existing cost estimate. Poseidon is the new project with the new nine well capacity requirement. This option for Poseidon's water will require the additional well capacity (on top of GWRS phase three) at a cost of approximately \$200,000,000 so the existing cost estimate of \$160,000,000 for this option is actually closer to 360,000,000.

Option 2A

This option carries the same problems as option 1D with the additional problem of developing contracts with the Cities of Huntington Beach, Newport Beach and the Municipal Water District of Orange County to purchase Poseidon's water. These agencies have been approached before by Poseidon with not luck. OCWD remains the only agency willing to even consider buying this unnecessary and overpriced water and is likely to remain so.

Options 2B, 3 and 4

All of these options carry the fatal flaw of needing producers in OCWD's service area or South Orange County to agree to directly purchase the water. After Poseidon huge sales pitch to local water agencies in 2012 only Seal Beach and the Santa Margarita Water District agreed to an interest in purchasing Poseidon's water, and this interest amounted to less than 10% of the capacity of the plant. As an example of the lack of interest in the water, attached is a White Paper by the City of Garden Grove detailing the lack of need for Poseidon's water in that city. San Clemente has also made it clear it is not interested in obtaining Poseidon's water via the MWD East Orange County Feeder as that does nothing to increase reliability of water in their service area in the case of an emergency that destroys the feeder. Additionally IRWD as adamantly opposed to having any desalinated water in its system either directly or through the aquifer due to the impacts it will have on their system. Any thought that local producers will directly take up any portion of Poseidon's water is pure speculation with no backing in reality.

Environmental Impacts

Additionally we would like to provide some facts regarding the environmental impacts of the plant. While Poseidon continues to misrepresent the environmental impacts of their existing and proposed plants in statement to the board and during tours of the Carlsbad plant the facts of the environmental impacts are clear and are documented in regulatory documents related to the plant. As an example Poseidon repeatedly said the plant will not pollute the ocean.

The fact is that the propose plant will discharge waste to the ocean and is therefore required to have a Waste Discharge Permit. This permit details that the plant will discharge waste including 6.3 million gallons per day of filter backwash and up to 290,000 gallons a day of filter rinse water to the ocean. This discharge will include chemicals including chlorine, coagulants such as ferric chloride and ferric sulfide, polymers, sulfuric acid, and sodium bisulfate. A copy the relevant sections of the Waste Discharge Permit is attached. These wastes along with the hypersaline brine from the plant will impact the ocean and adjacent marine life and recreational uses. Will you be willing to take your family to swim in the effluent from this plant?

Additionally the Coastal Commission has documented the potential impacts of the plant in their 2013 staff report on the plant stating "This project raises significant and complex coastal protection policy issues under both the Coastal Act and the City's LCP, including conformity with policies that require protection of marine life, water quality, wetlands, environmentally sensitive habitat areas, and listed species, and policies meant to avoid or minimize hazards associated with flood, tsunami, and geologic hazards.

A key issue here is Poseidon's proposed use of an open water intake that will result in significant adverse effects to marine life. Poseidon's use of the intake will entrain more than 80 million fish larvae, eggs, and invertebrates each year that originate in areas along about 100 miles of shoreline, including areas within Marine Life Protected Areas (MLPAs)." The summary of the Coastal Commission Staff Recommendation for Poseidon is attached.

The fact is that the Carlsbad plant that Poseidon is so proud of is located next to a degraded lagoon that had been so impacted by the powerplant and Poseidon that it has been discarded as a natural environment. It is now an industrial area for aquaculture. The Aqua Hedionda lagoon marine environment has been completely transformed from a functioning natural system to a degraded state impacted by constant circulation of its water and marine life through Poseidon's intake pumps. This is not what we want for Huntington Beach. We can and should do better in Orange County.

As Orange County Water District continues to investigate the proposed Poseidon Huntington Beach Desalination Plant it is important that all aspects of the plant are considered. Like a mushroom this proposal grows on manure and thrives in the dark. Orange County Water District needs to bring this project out in the light for all to see and make a clear and compelling argument for its environmental and financial costs before proceeding.

Thank You,
Ray Hiemstra
Associate Director
Orange County Coastkeeper

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Addendum #1](#)

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W19a & 20a

Filed: 6/6/13
 180th Day: 12/3/13
 Staff: T. Luster-SF
 Staff Report: 10/25/13
 Hearing Date: 11/13/13

STAFF REPORT: REGULAR CALENDAR

Appeal No.: **A-5-HNB-10-225**

Application No.: **E-06-007**

Applicant: **Poseidon Water**

Agent(s): See Appendix A.

Location: State waters offshore of the City of Huntington Beach and areas within the City and the Huntington Beach Generating Station, Orange County.

Project Description: Remove power plant infrastructure, remediate soil and groundwater contaminants, and construct a seawater desalination facility and water delivery pipeline(s).

Staff Recommendation: **Approval with conditions.**

SUMMARY OF STAFF RECOMMENDATION

Poseidon Water (Poseidon) proposes to construct and operate a seawater desalination facility within the site of the Huntington Beach Generating Station, in Huntington Beach, Orange County. The facility would use the power plant's soon-to-be retired cooling water intake to draw in about 127 million gallons per day (mgd) of seawater to produce up to 50 mgd of potable water for purchase by, and delivery to, local water districts. The proposed project involves three main

A-5-HNB-10-225/E-06-007 (Poseidon Water)

phases: a) demolishing and removing fuel oil storage tanks and other infrastructure formerly used by the power plant; b) cleanup and remediation of contaminated soil and groundwater beneath these tanks and possibly elsewhere within the project footprint; and c) constructing and operating the desalination facility and associated components. The project includes installation and operation of one or two pipelines to allow the water to be delivered to the local and regional water distribution systems in Orange County. Poseidon proposes to operate the facility for approximately 30 years.

Portions of the project are within the Commission's retained jurisdiction and portions are within the certified Local Coastal Program (LCP) jurisdiction of the City of Huntington Beach. This report provides recommended Findings for a coastal development permit (CDP) within the Commission's jurisdiction and a de novo appeal of a CDP issued by the City in 2010 for which the Commission found Substantial Issue.

This project raises significant and complex coastal protection policy issues under both the Coastal Act and the City's LCP, including conformity with policies that require protection of marine life, water quality, wetlands, environmentally sensitive habitat areas, and listed species, and policies meant to avoid or minimize hazards associated with flood, tsunami, and geologic hazards.

A key issue here is Poseidon's proposed use of an open water intake that will result in significant adverse effects to marine life. Poseidon's use of the intake will entrain more than 80 million fish larvae, eggs, and invertebrates each year that originate in areas along about 100 miles of shoreline, including areas within Marine Life Protected Areas (MLPAs). The intake is currently used by the adjacent Huntington Beach power plant to draw in cooling water for its generating units. The power plant plans to end its use of the intake no later than 2020 in conformity with a policy adopted in 2010 by the State Water Resources Control Board to phase out use of these intakes by most of the state's coastal power plants due to their significant adverse effects on marine life. Desalination facilities using these intakes would cause the same type of adverse effects, and the State Board is preparing a follow-up policy that would limit the use of this type of intake for desalination. Poseidon proposes to continue using the intake for an additional 30 years. However, Commission staff has determined there are feasible alternative intake methods that would entirely avoid or significantly reduce the expected adverse effects of Poseidon's proposal. Staff is therefore recommending the Commission require Poseidon to use a subsurface intake to obtain the seawater needed for desalination.

The project would also discharge effluent with salinity concentrations that are harmful to marine life, and cause adverse direct and indirect effects on wetlands on and near the project site. Additionally, the facility site is subject to a number of significant coastal and geologic hazards, including floods, tsunami, surface fault rupture, ground movement, liquefaction, lateral soil spread, and others. Accordingly, the staff is recommending a number of Special Conditions needed to avoid and minimize potential adverse effects of the project as proposed. These Special Conditions include a) use of a subsurface intake design to obtain seawater in a manner that does not harm marine life; b) modifications to the discharge to ensure salinity concentrations within 100 meters of the discharge are not harmful to marine life, as recommended by an expert panel convened by the State Board; c) a reconfiguration of the facility layout to include a 100-foot

buffer from nearby wetlands and measures to ensure noise effects on nearby endangered, threatened, and sensitive species are avoided or minimized; d) wetland mitigation for approximately 3.5 acres of direct wetland impacts; and e) design requirements to address known and anticipated coastal and geologic hazards at the site. Other recommended Special Conditions are meant to ensure that contamination on site does not affect water quality, that project construction does not affect water quality, nearby wetlands, or public access to nearby beaches, that the facility is built to withstand identified coastal and geologic hazards at the site, and that emissions resulting from the project's electricity use are reduced to a less than significant level.

With implementation of these conditions, the staff believes the project will be carried out consistent with the LCP and the Coastal Act. The staff therefore recommends that the Commission **approve**, as conditioned, Coastal Development Permits A-5-HNB-10-225 and E-06-007.

California Regional Water Quality Control Board

Santa Ana Region

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ORDER NO. R8-2012-0007
 NPDES NO. CA8000403

WASTE DISCHARGE REQUIREMENTS FOR POSEIDON RESOURCES (SURFSIDE) L.L.C. HUNTINGTON BEACH DESALINATION FACILITY ORANGE COUNTY

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 1. Discharger Information

Discharger/Operator Name of Facility	Poseidon Resources (Surfside) L.L.C. Huntington Beach Desalination Facility
Facility Address	21730 Newland Street Huntington Beach, CA 92646 Orange County
This discharge is classified as a minor discharge.	

The discharge by the Poseidon Resources (Surfside) L.L.C. from the discharge points identified below is subject to waste discharge requirements as set forth in this Order:

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	RO effluent, filter backwash, RO subsequent rinse wastewater, stormwater runoff	33° 38' 36"	117° 58' 44"	Discharge to AES – HBGS ¹ discharge pipeline to the Pacific Ocean

Table 3. Administrative Information

This Order was adopted by the Regional Water Quality Control Board on:	February 10, 2012
This Order shall become effective on:	February 10, 2012
This Order shall expire on:	February 4, 2017
The Discharger shall file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than:	August 6, 2016

¹ AES (HBGS) – Aera Energy Services L.L.C. – Huntington Beach Generating Station Order

I. FACILITY INFORMATION

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 4. Facility Information

Discharger/Operator	Poseidon Resources (Surfside) L.L.C.
Name of Facility	Huntington Beach Desalination Facility
Facility Address	21730 Newland Street Huntington Beach, CA 92646 Orange County
Facility Contact, Title, and Phone	Josie McKinley, Director Project Development, (714) 596-7946
Mailing Address	501 W. Broadway, Suite 2020, San Diego, CA 92101
Type of Facility	Industrial
Facility Design Flow	56.59 MGD, 12-Month Average Flow 60.3 MGD Maximum Daily Flow

II. FINDINGS

The California Regional Water Quality Control Board, Santa Ana Region (hereinafter Regional Water Board), finds:

A. Background. Poseidon Resources (Surfside) L.L.C. (hereinafter Discharger) proposes to construct and operate the Huntington Beach Desalination Facility (hereinafter Facility) on a 12-acre parcel adjacent to the AES Huntington Beach Generating Station (HBGS). The Discharger has entered into a 55-year option agreement with AES, the owner and operator of the HBGS, for the desalination project site. The Discharger proposes to discharge a maximum of 60.3 million gallons per day (MGD) of wastewater (54 MGD of concentrated seawater and 6.3 MGD of filter backwash) to the Pacific Ocean.

On August 25, 2006, the Regional Water Board issued Order No. R8-2006-0034, NPDES No. CA80000403, which prescribed waste discharge requirements for discharges from the Facility. Order No. R8-2006-0034 expired on August 1, 2011. On February 2, 2010, the Discharger submitted a timely application for renewal of this permit. Therefore, pursuant to 40 CFR 122.6, Order No. R8-2006-0034, NPDES No. CA80000403, shall remain in effect until the effective date of the new permit.

Effluent limitations and mass emission limits established in this Order are at least as stringent as those established in Order No. R8-2006-0034. The permit is being modified to:

During initial start-up operations and temporary onsite maintenance operations, it may be necessary to temporarily return all or a portion of the filtered pretreated seawater (up to approximately 126.7 MGD) back into the HBGS discharge pipeline instead of routing the filtered seawater flow to the reverse osmosis units. Additionally, during such start-up periods or periods when it is not feasible to deliver product water to the regional potable water system, it may be necessary to temporarily discharge dechlorinated product water from the reverse osmosis process back into the HBGS discharge pipeline. During these temporary periods, the maximum allowable flows returned to the ocean would not exceed 126.7 MGD and the volume and salinity of the additional discharges would be identical to the volume and salinity of the intake water. As a result, no water quality changes would occur as a result of such temporary process water diversions.

The desalination process consists of the following:

- 1. Intake pumps** – To prevent microbiological growth in the intake systems and filter media, the intake water will be chlorinated intermittently, as necessary.
- 2. Coagulation** – To enhance the operation of the filters and to provide the required quality water to the reverse osmosis (RO) treatment units, coagulant (ferric chloride or ferric sulfate) and polymer will be added to the seawater ahead of the pretreatment filters.
- 3. Media or Membrane Filtration Pretreatment** – To prepare the water for the RO treatment, a media or a membrane filtration pretreatment system will be used. The final phase of pretreatment will involve the use of cartridge filtration. The filter cartridges will be standard polypropylene wound filters enclosed in a pressure vessel. The pressure vessels will be located in the RO feed water piping between the pretreatment and RO processes.
- 4. pH Adjustment and Dechlorination** – To reduce the potential for scale formation in the RO process, sulfuric acid may be added to the water after the media or membrane filtration pretreatment and before the cartridge filtration. The required dosage amount will be determined based on the bicarbonate concentration of the seawater and the Stiff Davis Index (SDI) needed in the RO concentrate. The acid also provides carbon dioxide in the RO permeate (product water), which is needed to react with the lime for product water stabilization in the permeate post-treatment step. Dechlorination using sodium bisulfite will also be done before the cartridge filtration to prevent damage to the RO membranes and to protect the RO systems.
- 5. RO Treatment Systems** - The RO process will use high-rejection seawater membranes. The system will be made up of 14 process trains, each train with a design capacity of approximately 4.2 MGD. The plant will be designed to produce an average of 50 MGD of potable water using only 13 of the 14 RO trains. The 14th RO train will be used for standby purposes when any of the other trains requires maintenance. This arrangement provides approximately 4 percent standby capacity, which is needed to ensure continuous potable water delivery while accommodating normal membrane wear and maintenance requirements.

1. Allow the Discharger to utilize the HBGS intake pumps in a temporary stand-alone mode when HBGS's operations do not provide sufficient flows (i.e., approximately 126.7 MGD);
2. Establish maximum daily discharge flow limits for the Facility to allow for the temporary maximum operation of all proposed reverse osmosis units (see Attachment F, Fact Sheet, Table F-2); and
3. Establish maximum daily discharge flow limits for the Facility to account for initial start-up operations and temporary on-site maintenance operations (approximately 126.7 MGD).

For the purposes of this Order, references to the "discharger" or "permittee" in applicable federal and State laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

B. Facility Description. The Discharger proposes to produce potable water for delivery into water distribution systems within Orange County. The Discharger will receive its source water from either the HBGS's condenser cooling water discharge or directly from the HBGS's intake system. The desalination process will consist of source water screening, coagulation, filtration, pH adjustment, chlorination, de-chlorination, reverse osmosis (RO) membrane separation, and product water chlorination and chemical conditioning. The RO system will use high-rejection seawater membranes. The Facility will produce a 12-month average of 50 MGD of potable water and 50 MGD of concentrated seawater. Approximately 6.3 MGD of filter backwash will be produced and will be mixed with the concentrated seawater. RO cleaning solutions and first-rinse wastewater will be directed to a neutralization tank and then discharged to the local sewer. All subsequent rinse wastewater (up to 0.29 MGD) will be conveyed to a 200,000-gallon washwater-equalization tank prior to being metered into the Facility's effluent outfall. The Discharger will utilize chlorine in the form of sodium hypochlorite to control and prevent microbial growth in the transmission pipelines and filter media. Chlorine may be injected before the influent to the filtration system. All chlorinated process water will be de-chlorinated if returned to discharge to the ocean. Chlorine will also be used to disinfect product water to meet California Department of Public Health water quality standards. The concentrated seawater with other process wastewater (on average 56.59 MGD) described above will be discharged to the ocean through the existing HBGS outfall structure. Attachment B provides a map of the Facility and surrounding area. Attachment C provides a flow schematic of the Facility.

HBGS facilities periodically engage in heat treatment as an antifouling measure. This heat treatment may occur every six to eight weeks, and may last approximately six to eight hours per occurrence. The Facility's treatment system will not operate when the HBGS is engaged in heat treatment. To make up for the periods of inactivity that are attributable to HBGS heat treatment or temporary onsite Facility maintenance, the

- s. In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition, or receiving water limitation of this Order, the Discharger shall notify the Regional Water Board by telephone (951) 782-4130 within 24 hours of having knowledge of such noncompliance, and shall confirm this notification in writing within five days, unless the Regional Water Board waives confirmation. The written notification shall state the nature, time, duration, and cause of noncompliance, and shall describe the measures being taken to remedy the current noncompliance and, prevent recurrence including, where applicable, a schedule of implementation. Other noncompliance requires written notification, as above, at the time of the normal monitoring report.

B. Monitoring and Reporting Program Requirements

The Discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order. This monitoring and reporting program may be modified by the Executive Officer at any time during the term of this Order, and may include an increase in the number of parameters to be monitored, the frequency of the monitoring or the number and size of samples to be collected. Any increase in the number of parameters to be monitored, the frequency of the monitoring or the number and size of samples to be collected may be reduced back to the levels specified in the original monitoring and reporting program at the discretion of the Executive Officer.

C. Special Provisions

1. Reopener Provisions

- a. This Order may be reopened to address any changes in State or federal adopted rules, policies or regulations that would affect the quality requirements for the discharges.
- b. This Order may be reopened for modification to include an effluent limitation if monitoring establishes that the discharge causes, has the reasonable potential to cause, or contributes to an excursion above an Ocean Plan Table B water quality objective.
- c. This Order may be reopened to include effluent limitations for pollutants determined to be present in the discharge in concentrations that pose a reasonable potential to cause or contribute to violations of water quality objectives.
- d. This Order may be reopened and modified in accordance with the requirements set forth at 40 CFR 122 and 124, to include the appropriate conditions or limits to address demonstrated effluent toxicity based on newly available information, or to implement any EPA-approved new State water quality standards applicable to effluent toxicity.

- e. This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination of this Order or a notification of planned changes or anticipated noncompliance does not stay any permit condition.
- f. This Order will be reopened to address physical or operational alterations to the permitted facility that would affect the requirements for discharges from the facility.

2. Special Studies, Technical Reports and Additional Monitoring Requirements -
N/A

3. Best Management Practices and Pollution Prevention

- a. The Discharger shall implement Best Management Practices to control the discharge of pollutants in stormwater discharges associated with industrial activities.
- b. Pollutant Minimization Program
Reporting protocols in the Monitoring and Reporting Program, Attachment E, Section X.B.4 describe sample results that are to be reported as Detected but Not Quantified (DNQ) or Not Detected (ND). Definitions for a reported Minimum Level (ML) and Method Detection Limit (MDL) are provided in Attachment A. These reporting protocols and definitions are used in determining the need to conduct a Pollution Minimization Program (PMP) as follows:

The Discharger shall be required to develop and conduct a PMP as further described below when there is evidence (e.g., sample results reported as DNQ when the effluent limitation is less than the MDL, sample results from analytical methods more sensitive than those methods required by this Order, presence of whole effluent toxicity, health advisories for fish consumption, results of benthic or aquatic organism tissue sampling) that a pollutant is present in the effluent above an effluent limitation and either:

- 1) The concentration of the pollutant is reported as DNQ and the effluent limitation is less than the reported ML; or
- 2) The concentration of the pollutant is reported as ND and the effluent limitation is less than the MDL.

The goal of the PMP shall be to reduce all potential sources of a pollutant through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the

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OBJECTIVE

To provide the City Council with information and analysis regarding an ocean water desalination facility in Huntington Beach being proposed by the Poseidon Resources Corporation, a private company. The analysis will present costs and benefits as the project relates to the City of Garden Grove (City).

BACKGROUND

The Poseidon ocean water desalination project located at the AES power plant in Huntington Beach will deliver a maximum of 53,000 acre feet (AF) of water per year. Poseidon began soliciting interest from local water agencies for commitments to purchase desalinated water from the Huntington Beach Plant several years ago. In fact, the City entered into a non-disclosure agreement with Poseidon in 2010 to receive information on the project. Over the last few years, the City participated in a working group with other agencies interested in the Huntington Beach project. The group met on a regular basis at the Municipal Water District of Orange County (MWDOC) to review project study results and to discuss the proposed attributes and costs of the proposed project. Garden Grove participated in this process for a couple of years and announced its resignation in 2012 due to the high costs of the water from the project. The working group ended in 2013 with limited interest among agencies to participate in the project. Since then, the Orange County Water District (OCWD) has been exploring the project and is now in contract discussions.

Earlier this month the OCWD approved a non binding term sheet that establishes the framework of a contract that is due by December 31, 2016. The term sheet provides sufficient information to determine the financial impact to the City.

DISCUSSION

Desalination

The desalting or desalination process separates saline water into two streams: fresh water and water containing concentrated salts, or brine. Although there are many technologies that can be considered for desalination, the two most widely used desalting technologies are thermal (distillation) processes and membrane (filtration) processes, such as reverse osmosis (RO). Poseidon uses RO.

RO is a process where pressure is used to force water through a semi-permeable membrane that filters and removes up to 99% of the solids in the seawater, including the salts. Of all the available technologies, RO is considered the best available technology for desalination, due to high salt removal rate, lower waste stream volume, and lower energy consumption and capital costs. Following desalination treatment, the product water requires further post-treatment (pH

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stabilization and disinfection) to meet potable water standards and to be non-corrosive.

There are many applications of RO, including treatment of brackish and waste water and the costs for producing water from these sources is equal or below the cost for water from traditional sources. Advances in RO membrane and energy recovery system technologies have significantly reduced the capital and operating costs of seawater desalination projects over the past 30 years. However, the costs of desalting seawater remain significantly higher than more traditional water sources. Because of its high costs, large scale ocean desalination has only been used in areas where water supplies are extremely limited and expensive to procure. Continued dramatic cost reductions for RO treatment are not expected to continue because it appears that the most significant technological advances have already occurred in the membrane industry.

The following is a list of similar seawater reverse osmosis (SWRO) desalination projects that are currently in operation, under construction, or are being considered/proposed in the United States during the last decade:

- Marina Coast Water District, CA - 0.3 million gallons per day (MGD) in operation.
- Tampa Bay, FL - 25 MGD in operation.
- Cambria Community Services District, CA - 0.5 MGD in design, on hold
- Marin Municipal Water District, CA - considered 5 to 10 MGD, halted due to the voter approval requirement.
- Honolulu Board of Water Supply, HI - proposed 5 MGD, on hold due to conservation efforts.
- Long Beach, CA - proposed 9 MGD, determine not be cost effective.
- Carlsbad, CA – construction is nearing completion of 50 MGD. This is a Poseidon project.

City Water Program

The City is reliant on two primary sources of water, pumped and imported. On average, we are pumping 70% of our water from 13 City owned wells and we purchase import water for the remaining 30% from the Municipal Water District of Orange County (MWDOC). Our wells draw water from a basin that is under the management of the Orange County Water District (OCWD) and they are responsible for setting the pumping percentage, which is why we pump about 70%. The City wells are capable of delivering 100% of our water supply for limited periods of time, and we are one of two agencies that can pump all of our needs.

The City currently pays **\$294** per AF to OCWD for pumped water and we pay MWDOC **\$923** per AF for imported water. If the City were to pump over the set

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percentage we will have to pay **\$614** per AF from OCWD on the extra water making it equal to the cost of MWDOC imported water.

The Orange County Basin contains about 38 million AF of water. The OCWD has determined that the maximum dry storage (empty volume) of the basin should be limited to 500,000 AF. OCWD's goal is to operate the basin with 200,000 AF of dry storage which is within the safe operating range of 100,000 to 434,000 AF of available dry storage. Currently, the basin has 380,000 AF of dry storage available.

Last year the City used approximately **25,100** AF of water, which is down from a peak of **30,000** AF in 2005. The reason the City's usage has dropped lies in two recent pieces of legislation. Senate Bill x7-7 for water conservation, seeks to achieve a 20% statewide reduction in urban per capita water use by December 31, 2020, and an interim 10% goal by 2015. Additionally, Governor Brown has issued an emergency mandate for the City to reduce our water use by 28% of our 2013 water usage. Therefore, the City needs to reduce our usage by just over **7,000** AF by February of 2016. Consequently, the most pressing need for the City's water program at this time is the implementation of water conservation measures to achieve this goal and avoid any state fines for non-compliance.

Fiscal Analysis

The total fiscal impact to Garden Grove's rate payers is difficult to assess at this time because of the following unresolved issues:

- The cost to distribute water - injected into the basin or distributed in upsized pipes to retailers. This cost is borne by the OCWD in the term sheet.
- Final disposition of MWDOC Local Resources Program (LRP) - a subsidy that will be passed to Posiedon thus lowering the cost to OCWD, thus lowering the cost to OCWD for the early years of the 50 year commitment.
 - Three options are available for payment. Currently Poseidon is leaning towards the largest that covers the first fifteen year of the project operation.
 - MWDOC could require a reduction in demand which in effect would cause OCWD to exchange high cost Posiedon water with MWDOC import.
- Additional costs that may be required for environmental mitigation, such as a new underground intake system.
- Financing for the project is not in place.

These preceding issues are important and have the ability to significantly increase the proposed cost of water detailed on the Posiedon term sheet. OCWD's independent financial analysis of the Poseidon estimates that groundwater pumping costs will increase 32.7% to cover the cost of the project. Using our existing

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pumping amounts and the additional amount of desalinated water available to use, we can determine that Garden Grove can expect to add between just over \$1M to just under \$2M per year in water costs. This will increase the average residential rate payer bill by \$6 to \$12 or from 6% -12%.

Alternatives

There are a few alternatives being suggested at this time. The following are possible fiscal impacts of Poseidon and of the recharging option being proposed by the Irvine Ranch Water District (IRWD):

- Purchase MWDOC water during “good times” and recharge the basin with 280,000 acre feet of water (equals Poseidon output for about 5 years and 3 months). These “good times” in the past included all but two years during nearly the last thirty years. This IRWD option would have provided a full basin at the beginning of this year at a ten year cost of over \$500 Million less than the Poseidon project and is environmentally friendly.
- Expand OCWD’s Ground Water Replenishment System (GWRS) again or construct a new facility. The successful ground water recharge system using treated sewage is already expanding and will be online by the end of 2015. The \$142.7 million project will create an additional 30 million gallons per day of new water supplies as compared to the Poseidon project that may produce 50 million gallons per day at an estimated cost of \$1 billion.
- Conservation and the price and impact to the environment are negligible and this option is immediately available to us with state and regional funds available to implement. It should be noted that this option will also assist the City in meeting our mandatory reduction mandate from the State.
- Construct additional measures within and adjacent to the local storm channel that will infiltrate storm water into the basin.
- Expand the recycled water system. This is the “purple line” that uses partially treated sewage to provide non-potable water for uses like irrigation. This option will also help the City meet our mandatory reduction goals.

Summary of Findings

Due to high capital and operational costs, and currently a non-existent need for additional water, desalination is not an option for immediate City water supply needs. Desalination may play a part in long-range planning (2025 -2035 timeframe), but probably under the circumstance that the project can obtain significant state and federal funding assistance. The proposed site is likely to remain available into the future.

The following are the advantages and disadvantages of a desalination program as compared to other options, such as a GWRS program.

Desalination – a White Paper on the Garden Grove Perspective

Advantages of a Desalination Facility:

- Less significant distribution pipeline system required when compared to non-potable water sources
- Desalination is a new source of potable water, which increases the City's flexibility for using this supply for any potable, irrigation or industrial use

Disadvantages of a Desalination Facility:

- Extensive environmental review process (full EIR) and permits still required with uncertain mitigations.
- Potential additional treatment for certain emerging contaminants due to the mixing of desalinated water with existing imported and groundwater supplies.
- Increased brine discharges to the ocean.
- Very high capital and operating costs and financial risk in the event of default, if OCWD finances the distribution system.
- Significant timeline for implementation (5-7 years from initiation).

OCWD already has implemented a recycled water and water conservation program. While the effectiveness of the conservation program is yet to be determined, the GWRS is recognized as an industry leading example.

SUMMARY

The City was hopeful when we entered into the 2010 agreement with Poseidon for a desalination water supply that could provide increased reliability to the City, especially during times of a drought. Unfortunately, the original promise of a new water supply at the same cost as imported water has been replaced with a project that will provide water at double the cost of imported water. The cost escalation is similar to the Poseidon project in San Diego. When compared to other options, a desalination facility is a relatively expensive option for a new potable water supply for the City of Garden Grove and will not immediately resolve the City water's conservation mandate.

However, the City should continue to be open to new sources of water and new ideas and urges OCWD to fully explore less expensive options currently available before proceeding with ocean desalination. In time, a project such as Poseidon may become economically viable and environmentally sound and it is unlikely that a decision to forego its implementation at this time will preclude its future use.