



September 18, 2019

Attention: Water Planning and Environmental Committee

Report on Claude “Bud” Lewis Carlsbad Desalination Plant Operations for Fiscal Year 2019 (Presentation)

Purpose

To provide a summary of Contract Year 2018/2019 operational performance for the Claude “Bud” Lewis Carlsbad Desalination Plant.

Executive Summary

- At the end of each contract year (July 1st through June 30th), staff provides an annual update to the Water Authority Board regarding operational performance for the Claude “Bud” Lewis Carlsbad Desalination Plant.
- Poseidon delivered 45,038 acre-feet in contract year 2018/2019 as compared to 40,892 acre-feet the previous contract year.
- The actual unit cost of Carlsbad Desalination Plant product water in Contract Year 2018/2019 was \$2,685 per acre-foot (including conveyance pipeline debt service, Poseidon Management Fee, and Temporary Standalone Operations Period charges).

Background

The Claude “Bud” Lewis Carlsbad Desalination Plant (CDP) started commercial operations on December 23, 2015. The project is the result of a long-term Water Purchase Agreement (WPA) executed between the Water Authority and Poseidon that was approved by the Water Authority Board on November 29, 2012. Under the WPA, the Water Authority agreed to purchase the entire output of the CDP – a minimum of 48,000 acre-feet and up to 56,000 acre-feet of product water annually. The Water Authority’s water purchase payments compensate Poseidon for the fixed and variable costs of the CDP including debt and equity payments, as well as fixed and variable plant costs for electricity and operations and maintenance. All fixed costs are paid for through the purchase of the initial 48,000 acre-feet. Annual product water deliveries beyond 48,000 acre-feet up to 56,000 acre-feet are purchased at a price that includes just the variable costs of production.

Discussion

For purposes of this report, CDP performance is evaluated in the following categories: 1) water delivery; 2) water quality; 3) regulatory compliance; 4) project company performance; and 5) cost. Each of these categories is discussed below.

Water Delivery

Prior to the end of each contract year, and as required per the terms of the WPA, Poseidon and the Water Authority agree to monthly supply and demand commitments for the upcoming contract year. These commitments represent the maximum monthly supply availability guaranteed by Poseidon totaling 56,000 acre-feet for the year and the minimum monthly water order guaranteed by the Water Authority totaling 48,000 acre-feet per year. The Water Authority met its minimum demand commitment in 11 of the 12 months ordering a total of 50,109 acre-feet over the year. The “take or pay” provisions of the WPA were avoided because the demand shortfall (377 AF in May) was excused and designated in a tracking account to be made up later.

Poseidon delivered 45,038 acre-feet to the Water Authority, inclusive of Vallecitos Water District and Carlsbad Municipal Water District contract deliveries. Reduced regional water demands associated with above normal local rainfall this past winter and spring limited the opportunities to make up this shortfall (below 48,000 acre-feet) during the second half of the contract year. Since Poseidon was unable to meet the Water Authority’s demand orders, Poseidon is responsible for an annual supply commitment true-up payment to the Water Authority for not meeting this supply obligation.

Poseidon was unable to deliver 5,071 acre-feet (50,109 AF – 45,038 AF) of requested water for Contract Year 2018/2019. The WPA accounts for this undelivered supply under different defined categories.

- Excused Supply Shortfall (estimated 1,261 acre-feet due to Train 5 mechanical failure and an NRG power plant shutdown): For undelivered water classified as Excused Supply Shortfall, Poseidon can supply this amount of water in the future, under certain conditions governed by the WPA. However, the Water Authority does not pay for the water until the water is delivered.
- Unexcused Supply Shortfall (estimated 1,092 acre-feet): For undelivered water classified as Unexcused Supply Shortfall, the Water Authority does not pay for this water and Poseidon has no opportunity to supply this water in the future. Unexcused supply shortfalls occurred during the months of July (50 AF) and June (1,042 AF).
- Unscheduled Outage Units (1,630 acre-feet): For certain documented, unplanned outages at the plant, up to 1,630 acre-feet can be designated by Poseidon as Unscheduled Outage Units. Under the terms of the WPA, the Water Authority pays the fixed costs on this water.

In the case of CDP operations for Contract Year 2018/2019, the primary cause of the supply shortfalls indicated above was a mechanical failure on the plant’s reverse osmosis high-pressure feed piping. While the mechanical failure on the high-pressure feed piping associated with Train 5 of the reverse osmosis system occurred during the previous contract year, Train 5 did not resume full operational status until February 21, 2019. (The reverse osmosis system contains 14 separate trains that can be isolated from one another.) The plant can operate at full capacity with 13 reverse osmosis trains, but the loss of redundancy with Train 5 out of service caused periodic reductions in overall plant output capacity through the course of normal maintenance operations of the reverse osmosis system.

Other causes of supply shortfall were associated with fluctuations in feed water quality, warranty inspections and repairs, regulatory permit operating constraints¹, equipment and operational challenges, and SDG&E power outages. Because the WPA transfers operational risk to Poseidon, Poseidon has not requested, nor is it entitled to, performance relief for these issues. Additionally, costs associated with correcting any membrane fouling issues are not the responsibility of the Water Authority.

Water Quality

The WPA sets parameters for raw seawater that the CDP is required to process and product water quality guarantees that must be met. Product water and raw seawater quality for Contract Year 2018/2019 is summarized below.

Product Water Quality

All product water distributed by the Water Authority to member agencies met contractual water quality requirements, including federal and state drinking water standards for the contract year. In the course of the contract year, there were two occasions when water delivery was automatically stopped due to high turbidity water entering the product water tank and one instance when the hypochlorite dosing to final product delivery failed. Additionally, on one occasion the product water pipeline was partially drained as a precautionary measure due to low pH. The plant operator, IDE, continues to work with the Water Authority to improve communications and to timely notify the Water Authority and regulatory agencies of potential water quality issues.

Raw Seawater Quality

Raw seawater characteristics feeding the CDP were within contractual limits for the contract year except for short periods of time where either temperature or turbidity was outside of contractual parameters. These issues led to temporary reductions to plant capacity.

Regulatory Compliance

The primary permits that regulate product water quality and plant discharges include the National Pollutant Discharge Elimination System issued by the San Diego Regional Water Quality Control Board (RWB), the Wastewater Discharge Permit issued by the Encina Wastewater Authority, and the Domestic Water Supply Permit issued by the Division of Drinking Water (DDW). Regulatory compliance is the responsibility of Poseidon along with any enforcement action associated with permit violations. The Water Authority receives copies of all compliance correspondence and may coordinate with Poseidon on issue resolution, as necessary. Over the last year of operation, Poseidon received five notices requesting corrective action associated with permit compliance. These notices are summarized in Table 3 below.

¹ The RWB permit includes a monthly maximum ocean discharge flow limit that can, under certain conditions, artificially constrain the amount of water that can be produced and delivered to the Water Authority each month. A revised permit was approved by the RWB on May 8, 2019 and this matter is now closed.

Table 3. Notice of Violations for Contract Year 2018/2019

No.	Enforcement Agency	Date	Violation	Corrective Action
1	Division of Drinking Water	Jul-18	High turbidity effluent to product water tank	IDE changed and updated O&M manual in order to prevent reoccurrence of the event
2	Division of Drinking Water	Sep-18	Missed 1,2,3 Trichloropropane sample	IDE collected a makeup sample as the corrective action
3	Regional Water Quality Control Board	Jan-19	Staff enforcement letter identifying a failure to maintain certification of in-house lab	Environmental Laboratory Accreditation Program Certification renewed
4	Regional Water Quality Control Board	May-19	Staff Enforcement letter identifying the following: a) Discoloration of discharge waters beyond the discharge channel b) TDS (Salinity) limits exceeding daily average limitation on two occasions	a) IDE has Locked-out Tagged-out dissolved air floatation system valves and updated O&M manual in order to prevent reoccurrence of the event. b) IDE developed protocol with contract laboratory to notify CDP of preliminary results exceeding effluent salinity measurements. TDS moved to being monitored in-house.
5	Regional Water Quality Control Board	Jul-19*	Staff Enforcement letter identifying the following: a) Chronic toxicity test exceeded the maximum daily limit of 16.5 TUC b) TDS limits (Salinity) exceeding daily average limitation on one occasion	a) Accelerated toxicity monitoring was conducted with all toxicity results staying within the regulatory limits. b) IDE developed protocol with contract laboratory to notify CDP of preliminary results exceeding effluent salinity measurements. TDS moved to being monitored in-house.

**Event occurred in April 2019, but the notice was not received until July*

Poseidon/IDE took corrective steps that were appropriate to resolve each action request and no outstanding issues remain open from the list above.

Project Company Performance

At the end of each contract year, Poseidon is due a Management Fee reflecting staff's evaluation of Poseidon's service and performance. The Management Fee is the product of the volume of

water delivered and an index-linked multiplier that considers specific factors described in the WPA. This year, Poseidon was recognized for its performance related to plant safety, public and stakeholder outreach, improvements in the daily ordering process and general communications, support on pipeline refinancing effort that resulted in significant savings to the Water Authority, and leadership in pursuit of a federal loan to support the intake infrastructure improvements under the Water Infrastructure Finance and Innovation Act administered by the U.S. Environmental Protection Agency.

Cost

Contract Year 2018/2019 saw the first price adjustments resulting from a phased transition to stand-alone operations. At the April 25, 2019 meeting, the Board authorized the Acting General Manager to approve a unit cost adjustment in the amount of \$135/AF to support Temporary Stand-Alone Operations (TSOP) of the intake and discharge facilities at the CDP.

Total water purchase cost paid to Poseidon for Contract Year 2018/2019 was \$113,817,367. Considering the payments from Poseidon to the Water Authority for not meeting its supply obligations (estimated at \$1,965,989), the average unit cost for the year including conveyance pipeline costs was \$2,685 per acre-foot. These costs are shown in Table 4 below.

Table 4. Costs for Contract Year 2018/2019

	Contract Year 2018/2019
Total Water Purchase Cost*	\$113,817,367
Desal Conveyance Pipeline Cost	9,071,781
SUBTOTAL	\$122,889,148
Poseidon Penalties (Monthly and Annual)	(\$1,965,989)
TOTAL	\$120,923,160

* Includes debt service, equity return, fixed electricity and operating, variable electricity and operating, unscheduled outage allowance charges, TSOP cost adjustment, and annual Management Fee.

Staff is currently working with Poseidon on the annual reconciliation of the monthly invoices and will finalize all payments for Contract Year 2018/2019 by October 2019. The projected unit cost for Contract Year 2019/2020 is estimated at \$2,817 per acre-foot. This includes conveyance pipeline debt service, the TSOP cost adjustment, and an estimate for the annual Management Fee.

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