



March 16, 2016

Attention: Engineering and Operations Committee

Report on Claude “Bud” Lewis Carlsbad Desalination Plant Intake System Modifications (Presentation)

Purpose

To provide preliminary information on the proposed intake system modifications for the Claude “Bud” Lewis Carlsbad Desalination Plant.

Background

The Claude “Bud” Lewis Carlsbad Desalination Plant (CDP) started commercial operations on December 23, 2015. The project is a 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. This agreement is the basis for the financing, construction and now the operation of the CDP. Under the WPA, the Water Authority agreed to purchase the entire output of the plant – a minimum of 48,000 acre-feet and up to 56,000 acre-feet of product water from the CDP annually. The Water Authority’s water purchase payments incorporate the cost of the risk transfer and 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.

The intake facilities for the CDP are currently permitted and configured to draw the plant’s seawater supply off of the existing Encina Power Station once-through cooling water system. **See Figure 1.** With the State Water Resources Control Board’s once-through cooling policy, adopted in 2010, effectively phasing out once-through cooling for power plants, this intake configuration was always viewed with the understanding that the Encina Power Station would ultimately shut down. NRG Energy (NRG), the owner of the Encina Power Station, has now notified Poseidon of the impending planned shutdown and decommissioning of the power plant. In January 2014, the City of Carlsbad, NRG and San Diego Gas and Electric entered into an agreement allowing NRG Energy to replace the Encina Power Station with a new power plant (the Carlsbad Energy Center Project), and requiring NRG to shut down the Encina Power Station by the end of 2017. Since the existing intake configuration and regulatory approvals for the CDP are predicated on operation of the power plant and its associated cooling water flows, the transition to a “stand-alone” operation of the desalination plant will require permit modifications and upgrades to the CDP intake system to be completed prior to the decommissioning of the power plant. **See Figure 2.** If necessary, it may be possible to extend the operation of the existing cooling water circulation pumps on a limited basis, while the new intake system is being constructed, even if the power plant’s electricity generation activities shut down. Staff is continuing to coordinate with Poseidon and NRG to ensure that the current desalination plant intake will continue to operate through the construction of the new intake system modifications.

Beyond the intake system modifications that are required due to the power plant shutdown in order to transition to stand-alone operation of the desalination plant, additional intake system improvements will be required in order to comply with the Ocean Plan Amendment adopted by the State Water Resources Control Board in May 2015 that covers ocean water desalination intakes and discharges. Poseidon is currently pursuing the renewal of the project's NPDES permit with the Regional Water Quality Control Board (Regional Board) based on the proposed intake modifications to address the transition to stand-alone operations and compliance with the Ocean Plan Amendment. A permit renewal application package was submitted by Poseidon in September 2015. The permitting process will require certification of a supplemental Environmental Impact Report (SEIR) covering the proposed intake system modifications. The Water Authority will serve as the lead agency under CEQA. A public hearing on the SEIR is tentatively planned for April 2016 with the Board being asked to certify the SEIR in May 2016.

The permit renewal and the SEIR also cover the potential for expanding the capacity of the CDP due to membrane efficiency improvements, as previously discussed with the Board, that allow approximately 10 percent of the CDP's membrane element capacity to go unused.

The remainder of this memo addresses the specific provisions in the WPA regarding intake modifications that are required for both the "stand-alone" operation of the desalination plant as well as the additional improvements that will be required to comply with the Ocean Plan Amendment. The memo describes the improvements to be constructed, provides preliminary cost estimates and concludes with a discussion on the water purchase price impacts, the Water Authority's financing options, WPA administration and a preliminary schedule for implementation.

Applicable WPA Provisions

A fundamental aspect of the WPA is the risk transfer to the private sector. Provided that water is produced by Poseidon, the Water Authority pays a cost of water that incorporates a "capital charge" component and an "operating charge" component reimbursing Poseidon's costs of constructing, financing, and operating the project. Risks associated with project permitting, project design and construction and now project operation belong to Poseidon as the owner/operator of the CDP.

The WPA treats certain future costs, including the cost of the intake system modification and the cost of complying with changes in law, as part of the cost of the project. Provided that water is produced, Poseidon is allowed to recover its cost of constructing, financing and operating the necessary capital improvements through an increased water unit price. Poseidon bears risks associated with permitting, project design and construction, and ongoing operations.

At the time of the execution of the WPA, both the Water Authority and Poseidon anticipated the future closure of the Encina Power Station (EPS). As such, the Water Purchase Agreement treats the anticipated intake system modifications related to the closure of the EPS as a specific future occurrence to which Poseidon is entitled to cost relief. The Water Purchase Agreement allows Poseidon to pass through these costs, subject to a fixed cap amount. This cost pass-through will be initiated once the intake modifications are on-line. The index-linked capped amount,

established in the WPA for the intake system modifications associated with the shutdown of the EPS, is \$21,331,214.

Additional intake system improvements, beyond those required by the closure of the EPS, will be required in order to comply with the Ocean Plan Amendment adopted by the State Water Resources Control Board in May 2015. The WPA accounts for changes in regulation after agreement execution, applicable to all desalination plants, such as the Ocean Plan Amendment, and similarly allows Poseidon to pass-through the costs for these additional improvements. This cost pass-through will also be initiated once the intake modifications are on-line.

Water Authority Obligation to Pay. The WPA obligates the Water Authority to pay, through adjustments to the Unit Price, for Poseidon’s capital and operating costs associated with the shutdown of the EPS and compliance with the Ocean Plan Amendment.

Power Plant Closure Related Costs. The WPA sets forth provisions for financing the intake system modifications resulting from the planned shutdown of the EPS, and for adjusting the water unit price. Key provisions include the following:

- Cost Substantiation. Poseidon is required to substantiate all costs for which it claims compensation. Substantiation procedures include negotiation of expected costs with the Water Authority, a requirement for competitive procurement for costs in excess of \$50,000, and the obligation of Poseidon to provide evidence of costs incurred.
- Poseidon Financing. The WPA generally provides that Poseidon will finance the capital costs through issuance of additional Poseidon debt and equity, subject to Water Authority oversight and approval.
- Adjustment of Water Unit Price for Capital Costs. Poseidon’s cost of financing will be passed through to the Water Authority in accordance with specific provisions for adjusting the Debt Service Charge and the Equity Return Charge.
- Adjustment of Water Unit Price for Operating Costs. Poseidon’s costs of operating the intake system modification will be passed through to the Water Authority through adjustments in the Operating Charges and the Electricity Charges.
- WPA Cost Cap. The power plant closure related capital costs and operating costs eligible for pass-through to the Water Authority are capped at the index-linked amounts set forth in the following table.

Cap on Pass-Through Costs - Index-Linked Amounts

	<u>WPA Value</u>	<u>FY2016</u>	<u>FY2017*</u>	<u>FY2018*</u>
Capital Costs	\$21,331,214	\$22,443,855	\$22,725,376	\$23,023,284
Operating Costs	\$2,663,900	\$2,802,850	\$2,838,007	\$2,875,210

*Estimate

Ocean Plan Amendment Compliance Costs. The WPA sets forth additional provisions which would take into account additional intake system modification costs resulting from compliance with the Ocean Plan Amendment. These “Change in Law” provisions are generally similar to the provisions for the power plant closure related costs, except that these “Change in Law” costs are not subject to the above-described caps.

Cumulative Cap for Both Power Plant Closure and Ocean Plan Amendment Related Costs. Both the Power Plant closure and Ocean Plan Amendment related costs eligible for pass-through to the Water Authority are further limited to the extent the cumulative costs must be less than the general WPA cap on increases in the Water Unit Price of 10% in any year or 30% cumulative. However, these general caps, related to increases in the Water Unit Price, are not expected to apply.

Option for Lump Sum Payment. As an alternative to Poseidon financing the power plant closure and the Ocean Plan Amendment compliance costs, the WPA provides the option for the Water Authority to pay the capital costs itself through an up-front lump sum payment to Poseidon, financed either through internally-generated funds or through a Water Authority bond issue. However, if the lump sum payment is determined to be taxable income to Poseidon, it must be grossed up so that Poseidon receives the same net amount.

Preliminary Costs

Power Plant Closure Related Costs. Poseidon has provided estimated costs to construct, operate, and maintain a new intake system that would be required to address the impending closure of the EPS. **See Figure 3.** This configuration envisions conventional pumps and a 9.5-mm screen mesh, which allows the use of a notably smaller footprint for the structure. Poseidon’s cost estimate for power plant closure related costs is based on the regulations and permits in place at the time the WPA was executed.

Ocean Plan Amendment Compliance Costs. Poseidon has also provided estimated costs related to compliance with the Ocean Plan Amendment. Compliance with the Ocean Plan Amendment will require modifications to the intake system, beyond those improvements related to the closure of the EPS. These additional modifications and enhancements required by the Ocean Plan Amendment include the use of much finer screens (1.0 millimeter opening) requiring a larger screen area, more screens and a larger structure to enclose them as well as “fish-friendly” low impact pumps to convey water that is used to dilute the brine discharge. **See Figure 4.**

While the costs provided by Poseidon are preliminary and currently under review, staff’s initial assessment of the costs is that they appear to be reasonable. The WPA requires Poseidon to competitively procure the services to construct the new intake system. As such, until completion of a competitive procurement process, the actual, final qualified costs to design and construct the new intake system will not be known.

Table 1 below shows a comparison of the intake improvement costs related to just the closure of the EPS, subject to the WPA cost cap, and the additional costs attributable to compliance with the Ocean Plan Amendment.

Table 1 Poseidon’s Preliminary Intake Modification Cost Estimates

Project Costs	Power plant closure related costs (millions \$)	Ocean Plant Amendment Compliance Additional Costs (millions \$)	Power plant closure costs + Ocean Plan Amendment Compliance Costs (millions \$)
Permitting	1.3	1.9	3.2
Intake Modifications Design & Construction	21.0	9.2	30.2
Construction Management / Insurance	2.1	0.9	3.0
Post Construction Entrainment Study	0.0	1.2	1.2
TOTAL Costs	\$24.4	\$13.2	\$37.6

Financing Options

As noted above, the WPA provides two options to finance the proposed improvements: A Poseidon financing similar to the original CDP financing or a lump sum payment by the Water Authority.

Poseidon financing: The WPA sets provisions for Poseidon to issue debt and equity to finance the capital costs, with corresponding increases in the capital charge components of the Water Unit Price, to pass these costs through to the Water Authority. Approximately 85 percent of the cost would be financed through the issuance of Private Activity Bonds (A project finance, non-recourse to the Water Authority) with the remaining 15 percent of the cost funded through equity from Poseidon and its investors. Under this financing option, the risk transfer is identical to the original financing in that the risks associated with permitting, design and construction and operation belong are borne by Poseidon.

Lump Sum Payment Option. The WPA includes an option for the Water Authority to provide a lump sum payment to Poseidon in-lieu of Poseidon financing the cost of the improvements. Staff has been examining the lump sum payment option and exploring lump sum payment

approaches that could potentially reduce the present value cost of the intake system modification versus Poseidon financing.

A lump sum payment by the Water Authority would substantially increase the Water Authority's risk regarding future performance of the Carlsbad Desalination Plant, deviating from the risk transfer model that serves as the basis of the WPA. Most notably, unlike the current risk transfer where the Water Authority's payment obligation is tied to performance, the Water Authority's payment obligation under a lump sum payment option would be de-linked from the performance of the intake system modifications or the desalination plant as a whole.

Poseidon has also indicated that the lump sum payment is likely to be reportable by Poseidon as taxable income and thereby subject to a substantial tax gross up. The magnitude of the tax gross up makes the lump sum payment significantly more expensive than Poseidon financing and less attractive to the Water Authority than Poseidon financing.

Water Purchase Price Impacts

For the purpose of estimating the impact from the preliminary capital and operating cost estimates for the intake system modifications related to both the closure of the power plant and compliance with the Ocean Plan Amendment, a Poseidon financing was assumed. Key factors and assumptions supporting this analysis include the following:

- Regional Board permit conditions that align with Poseidon's submitted permit renewal package
- Estimated power plant closure-related intake system modification capital costs of \$24,400,000 of which the estimated FY2017 cap amount of \$22,725,376 is assumed to be eligible for pass-through (see WPA cost cap above).
- Estimated capital costs related to Ocean Plan Amendment compliance of \$13,200,000.
- Poseidon financing in accordance with the provisions of the WPA, at assumed interest rates and under assumed market conditions. This financing would be substantially similar to the previous financing for the CDP.
- Estimated intake system modification operating costs (power plant closure related) of \$2,951,750 of which the estimated FY2018 cap amount of \$2,875,210 is assumed to be eligible for pass-through (see WPA cost cap above).
- Estimated operating costs related to Ocean Plan Amendment compliance of \$688,200.
- Water Authority minimum purchase commitment of 48,000 acre-feet annually

Estimated CDP Unit Price Impacts: Based on these preliminary costs and financing assumptions, and a potential purchase range of 48,000 acre-feet to 56,000 acre-feet annually, the Unit Price is expected to increase by about 6.5 percent. As a reference, the current

average purchase price for water produced at the CDP is \$2,307 per acre-foot, based on a minimum purchase commitment of 48,000 acre-feet annually.

WPA Administration

In order to execute the required intake system modifications, the Board would be asked to approve a WPA Contract Administration Memorandum (CAM "A") between the Water Authority and Poseidon. This CAM will summarize the relevant procedural requirements of the WPA; how the parties intend to proceed with developing and executing the plan for competitive procurement and financing of the modifications and improvements; the estimated capital and operating costs of the modifications and improvements; the anticipated adjustments to the water purchase payments; and a schedule for implementation. After the procurement and financing processes are finalized, the Board would be asked to consider approval of a second CAM (CAM "B") summarizing the steps that have been taken; acknowledging that the requirements of the WPA have been satisfied; and attaching a formal amendment to the WPA reflecting the technical specifications for the work, the acceptance tests and performance guarantees, the guaranteed completion date, and the final Unit Price adjustment for actual capital and operating costs. It is expected that CAM "B", including the amendment to the WPA, will be executed concurrently with the procurement documents and the close of financing.

Next Steps/Schedule

The implementation of the intake system modifications (required for both the power plant closure and compliance with the Ocean Plan Amendment) includes environmental/permitting activities, financing activities as well as the design and construction of the facility itself. A tentative schedule, based on a Poseidon financing, showing Board interaction and decision dates is shown below:

April 2016:	Tentative schedule for Water Planning Committee Public Hearing on SEIR
May/June 2016:	Board to consider certification of SEIR and approval of CAM "A"
June-December 2016:	Secure Permits; Secure financing; Conduct competitive Bid process
January 2017:	Board to consider approval of CAM "B"
January 2017 – July 2018:	Complete design and construct intake system modifications

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Figure 1 - CDP Existing Intake / Discharge Flow Schematic

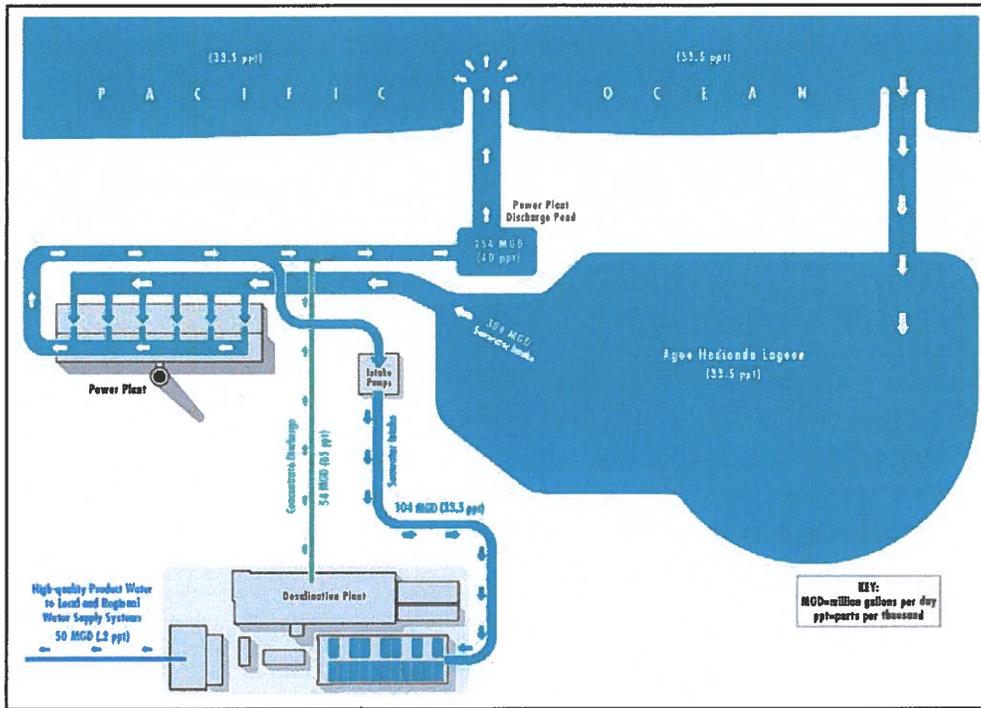


Figure 2 - Proposed Intake Modifications - Stand Alone Operation

