twb Environmental Research and Consulting

Case Study:
Carlsbad Desalination Plant Wedgewire Screen Pilot Study

CLIENT: Poseidon Resources, Channelside, LP

FACILITY: Carlsbad Seawater Desalination Plant

BACKGROUND: The Carlsbad Desalination Plant (CDP) was designed, constructed, and commissioned in a co-located arrangement with the Encina Power Station (EPS). When the EPS ceased operation in late 2018, Poseidon Resources (Channelside) LP (Channelside) was required to comply with the Ocean Plan Amendment (OPA) which required that desalination intakes use 1-mm mesh screens designed for through-screen velocities of 0.5 ft/sec or less. Channelside evaluated 21 intake alternatives, before the permitting authorities agreed that cylindrical wedgewire screens (WWS) were the best option at the time. Due to the operational risk of biofouling on narrow-slot WWS in seawater, TWB recommended a pilot study to evaluate different WWS technologies and to verify reliable operation. Although the pilot study was deemed a success, an unforeseen significant increase in marine growth in the existing CDP intake pipeline led to Channelside proposing further modifications to the new intake. The final design was a shored-based screening structure that did not use cylindrical wedgewire screens.

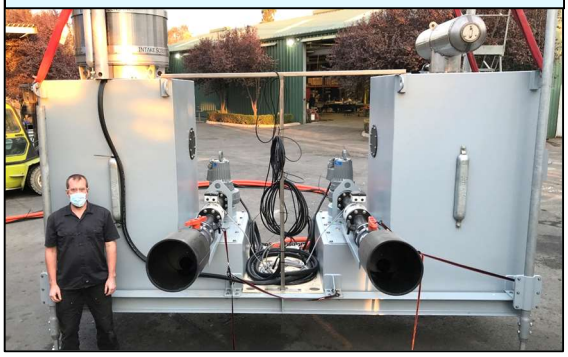
CHALLENGE: The use of narrow-slot (1-mm) WWS in the marine environment is uncommon and had only been attempted for very small intake flow rates. Additionally, since regulators were uncomfortable with the use of copper nickel material (due to potential risk of copper leaching into the environment), the WWS had to be fabricated of super duplex stainless steel.

APPROACH: TWB developed the initial pilot project concept to evaluate the performance of two different types of WWS: a passive WWS with an airburst system and an active, self-cleaning WWS that rotated the screen cylinder against fixed brushes.

TWB assisted Poseidon with permitting and the Owner's Engineer and screen fabricators on the design of the pilot skid. TWB developed the study plan, standard operating procedures, and emergency management plan. TWB oversaw the installation and commissioning of the pilot equipment and was the project lead for the 12-month O&M phase of the pilot project which included four subcontractors.

SOLUTION: The condition of each screen was monitored both quantitatively (differential pressure, flow rate, pump amperage) and qualitatively (monthly dive inspections and submerged, real time video). A data acquisition system collected and transmitted data in real time via a web-based interface. The pilot project generated critical data on the performance of each screen type and revealed that the active self-cleaning WWS would be the most reliable and least costly to operate and maintain for a full-scale installation.

WWS pilot project test skid



Passive WWS during operation (being air bursted)

Active WWS during operation

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