

# Report of the Statewide Advisory Committee on Cooling Water Intake Structures

March 2014

## I. Introduction

The Statewide Advisory Committee on Cooling Water Intake Structures (SACCWIS)<sup>1</sup> prepared this report for the State Water Resources Control Board in connection with implementation plans submitted by non-nuclear power plant owners on April 1, 2011 and as contemplated by the State Water Board's Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (Once-Through Cooling [OTC] Policy).<sup>2</sup> The Statewide Policy requires SACCWIS to advise the State Water Board annually on whether the OTC Policy's compliance schedule takes into account the reliability of California's electricity supply, including local area reliability and statewide grid reliability, and permitting constraints. Section 3.B(4) of the OTC Policy provides that SACCWIS will report to the State Water Board with recommendations on modifications to the implementation schedule each year. This report focuses on generating facilities within the California Independent System Operator (CAISO) balancing authority area.<sup>3</sup> At this time, SACCWIS does not recommend a change to the final compliance schedule in the OTC Policy. However, some generating capacity additions are needed in the Los Angeles Basin and San Diego to replace some of the OTC facilities that will be retired in this area, especially in light of the closure of the San Onofre Nuclear Generating Station (SONGS).

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<sup>1</sup> SACCWIS includes representatives from the California Energy Commission (CEC), California Public Utilities Commission (CPUC), California Coastal Commission (CCC), California State Lands Commission (SLC), California Air Resources Board (ARB), the California Independent System Operator Corporation (ISO), and the State Water Resources Control Board (State Water Board).

<sup>2</sup> A copy of the Water Board's Statewide Policy, effective on October 1, 2010, is available at the following Web site:  
[http://www.waterboards.ca.gov/water\\_issues/programs/ocean/cwa316/docs/policy100110.pdf](http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/docs/policy100110.pdf)

<sup>3</sup> LADWP compliance dates were reviewed and modified by the Water Board in July 2011.

## **II. Operational Developments Relevant to the OTC Policy**

Since the last SACCWIS report issued in April 2013, several operational developments occurred in connection with generating units subject to the OTC Policy. Southern California Edison (SCE) announced the closure of SONGS on June 7, 2013. Under the OTC Policy, the generating units at SONGs have compliance dates of December 31, 2022. The closure represents a significant reduction in projected water use for power plant cooling.

NRG Energy's Contra Costa Power Plant Units 6 and 7 retired on May 1, 2013 in connection with NRG bringing its Marsh Landing Generating Station on line. These units now comply with the OTC Policy, well in advance of their final compliance date (December 31, 2017).

NRG's El Segundo Repowering Project – consisting of two combined cycle facilities that use dry air cooling, came online August 1, 2013. As part of that repowering, NRG retired Unit 3. This unit now complies with the OTC Policy in advance of its final compliance date (December 31, 2015).

Dynegy closed the Morro Bay Power Plant on February 5, 2014. The two steam boiler units at Morro Bay now comply with the OTC Policy in advance of their final compliance date (December 31, 2015).

## **III. The CPUC, ISO and CEC Continue to Assess Resource, Infrastructure and Reliability Needs**

The CPUC, ISO and CEC have been working together to study electric reliability issues associated with the compliance schedule under the OTC Policy. The CPUC has considered procurement authorizations for its jurisdictional load serving entities; the ISO has examined infrastructure upgrades and additions in its transmission planning process; and the CEC has issued and is examining applications for licenses to site new generation.

The CPUC's 2012 long-term procurement plan proceeding (Rulemaking12-03-014), Track 1, examined the effect of potential retirements of units using once-through cooling in Ventura County and the remaining natural gas fueled units using once-through cooling in the Los Angeles Basin. At the same time, the CPUC examined the

reliability needs that could result from the retirement of the Encina power plant in San Diego County (Application 11-05-023). The ISO provided extensive reliability modeling testimony in support of these proceedings. Both proceedings authorized CPUC-jurisdictional load serving entities to enter into contracts to bring new resources on-line before the OTC Policy compliance dates for once-through cooled generation in these areas. With the retirement of the SONGS, the CPUC, CEC and ISO took appropriate steps to ensure reliability. After cooperatively establishing modeling assumptions, the ISO filed testimony in the 2012 long-term procurement plan proceeding, Track 4. The CPUC relied on this testimony, and that of other parties, in authorizing additional resources to be developed in the Los Angeles Basin and San Diego.

In addition to its work supporting the CPUC long term procurement plan proceeding, the ISO has expanded its transmission planning process to explore transmission alternatives for improving reliability. The ISO has identified several transmission upgrades and additions in its current transmission planning process to help address local reliability issues associated with the compliance schedule under the OTC Policy and the closure of SONGS. Once the ISO authorizes new projects in its transmission planning process in March 2014, and the CPUC has approved contracts for new resources, expected late 2014 or early 2015, the CPUC, ISO and CEC will need to evaluate the interaction of projected on-line dates, resource locations, and projected retirements under the Statewide Policy.

The CEC is the lead agency for licensing thermal power plants 50 megawatts (MW) and larger and has a regulatory certification process (certification process) under the California Environmental Quality Act.<sup>4</sup> Under this process, the CEC conducts an environmental analysis of each project's Application for Certification (application), including an analysis of alternatives and mitigation measures to minimize any significant adverse effect the project may have on the environment. These requirements do not,

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<sup>4</sup> Under this program, a project developer files an Application for Certification to initiate the siting process. The CEC Chairman then establishes a siting committee to preside over the process. Once the CEC determines the applicant has submitted adequate information to proceed (referred to as data adequate), the proceeding begins. The certification proceeding could take up to a year or longer. For example, the certification process for the Carlsbad Energy Center proceeding took almost five years.

however, apply to the repowering or replacement of an existing power plant wherein the net increase in capacity is less than 50 MW.

As of January 2014, the CEC received three applications for certification to replace some or all of the power production units at AES' Alamitos, Huntington Beach and Redondo Beach facilities.

- The Alamitos application review is now underway following CEC's March 12, 2014 determination that the application is data adequate.
- The Huntington Beach application is in review, and the CEC accepted the application as data adequate on August 9, 2013. CEC siting staff released the Preliminary Staff Analysis, Part A. on October 13, 2013. This is a milestone in the certification process. CEC staff received the Preliminary Determination of Compliance (PDOC) from the South Coast Air Quality Management District (SCAQMD) on January 27, 2014. The PDOC will enable staff to complete their analyses on air quality and public health. The CEC staff plans to publish the Preliminary Staff Analysis Part B in mid-March 2014, which will include air quality, public health, and alternatives.
- The Redondo Beach application is also under review, and the CEC accepted the application as data adequate on August 27, 2013. The Redondo Beach application is in the staff analysis and discovery phase. The CEC also received a Petition to Amend the El Segundo Energy Center license to replace Unit 4.

The CEC approved the application in May 2012 for NRG Energy's Carlsbad Energy Center, which will replace three of the units at Encina Power Station. Developments in January 2014 suggest that the Carlsbad Energy Center will be redesigned as peaking power plants, requiring an amendment to the permit for the Carlsbad Energy Center.<sup>5</sup> As of the date of this report, the CEC has not received a petition to amend the permit.

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<sup>5</sup> In January 2014, the Carlsbad City Council approved an agreement between and among the City of Carlsbad, the Carlsbad Municipal Water District, Cabrillo Power LLC, Carlsbad Energy Center LLC, and San Diego Gas and Electric addressing the City and Carlsbad Municipal Water District support for a

#### **IV. SCAQMD Rule 1304.1 and Rulemaking Activity**

In September 2013, SCAQMD adopted Rule 1304.1 – Electrical Generating Facility Fee for Use of Offset Exemption – to enable the imposition of fees for emission offsets provided from SCAQMD’s internal offset bank for repower projects. SCAQMD’s existing Rule 1304(a)(2) exempts from provision of offsets any steam generating boilers that are replaced by advanced generation technologies. Although the exemption removes the offset obligation from the power plant operator, SCAQMD itself must provide the offsets to satisfy federal New Source Review requirements. Importantly, such offsets have historically been provided from the District’s internal bank free of charge. With Rule 1304.1 in place, electrical generating facilities that use the Rule 1304(a)(2) offset exemption must now pay fees for access to this exemption. The fee proceeds will be invested in air pollution improvement projects consistent with SCAQMD’s Air Quality Management Plan. SCAQMD’s rule requires generator developers to make a payment on an annual basis or as a single payment - or a combination of both - at the election of the applicant. SACCWIS will continue to monitor whether this rule has an adverse impact on repowering projects.

Separately, on February 7, 2014, SCAQMD’s Governing Board authorized its staff to start work on a proposed rulemaking to allow power plants to access the SCAQMD internal offset bank to meet offset requirements by paying mitigation fees to address siting of new natural gas power capacities in the region, when deemed necessary by the state energy agencies for grid reliability. The proposed rule will incorporate limitations to prevent excess withdrawals from the internal bank, while encouraging preferred resources to be developed as envisioned in the report. For example, a power plant could undertake its permitting process to be ready for construction; however, offsets would not be granted until the project obtains a CEC

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change in the proposed technology of the approved Carlsbad Energy Center Project plant to peaking power plants and the submittal of a Petition to Amend application to the California Energy Commission for approval of this technology change, conditioned upon removal and remediation of the current Encina Power Station site, as well as other changes in Carlsbad Energy Center Project plant design, energy infrastructure and property considerations beneficial to the residents of Carlsbad.

[http://carlsbad.granicus.com/MediaPlayer.php?view\\_id=6&clip\\_id=734&meta\\_id=81021](http://carlsbad.granicus.com/MediaPlayer.php?view_id=6&clip_id=734&meta_id=81021)

license and the CPUC approves a long-term contract for the project. If adopted, this action could inform the compliance schedule under the OTC Policy as resources move through the permitting process.

#### **IV. Final Compliance Dates for Generating Units with Near-term Compliance Dates Remain a Concern for Electric Grid Reliability**

This section identifies specific issues associated with generating facilities in the ISO's balancing authority area that have compliance dates under the OTC Policy. These facilities include: El Segundo, Encina, Pittsburg, Moss Landing, Ormond Beach, Mandalay, Huntington Beach, Alamitos and Redondo Beach. Specifics for each power plant represent the aspirations of the owners of these facilities, which may not coincide with the regulatory decisions made by the CPUC, ISO and CEC affecting the amount and type or timing of resources to be procured.<sup>6</sup>

##### **El Segundo**

As described in Section II of this report, NRG completed a repowering project that consists of two combined cycle facilities that use dry air cooling. This project reached commercial operation in 2013. As part of that repowering, NRG retired Unit 3 (Units 1 and 2 retired previously). El Segundo Unit 4 uses once through cooling technology. The final compliance date for El Segundo Unit 4 under the OTC Policy is December 31, 2015. In its original April 1, 2011 implementation plan, NRG stated that it intended to repower El Segundo Unit 4 and wanted an extension of its compliance date to 2017 to enable NRG to pursue repowering without the loss of operating capacity at the El Segundo facility. In a letter submitted to the State Water Board dated January 30, 2013, NRG stated it will retire unit 4 no later than December 31, 2015. At this time, NRG does not have a power purchase agreement with a load serving entity to support repowering Unit 4. NRG submitted an application for certification to the CEC to repower Unit 4. The ISO intends to model Unit 4 as offline starting in 2015 as part of its

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<sup>6</sup> For example, in Decisison12-04-046, Ordering Paragraph #3, the CPUC has limited the ability of jurisdictional investor owned utilities to enter into contracts with facilities using once through cooling beyond their compliance date sin the Statewide Policy. This decision influences the sequence of steps and therefore the timing of any potential extension of compliance dates under the Statewide Policy.

planning studies. At this time, SACCWIS does not recommend a change in compliance dates for El Segundo Unit 4.

## **Encina**

The Encina facility consists of five steam boiler generating units using once-through cooling with an aggregate capacity of 950 MW. In its original April 1, 2011 implementation plan, NRG proposed different approaches for the five units. For Units 1-3 (an aggregate of 318 MW capacity), NRG proposed repowering with a new flexible combined cycle facility, the Carlsbad Energy Center, consisting of two combined cycle units with an aggregate capacity of 550 MW. NRG received a permit from the CEC for such a facility in June 2012. For Units 4-5 (an aggregate of 632 MW), NRG proposed retrofitting these units pursuant to the Track 2 option to reduce environmental impacts. Last year, NRG informed the State Water Board that it still plans to replace Units 1-3 with the Carlsbad Energy Center but it no longer intends to pursue Track 2 compliance options and will retire Units 4 and 5 no later than the final compliance date for Encina of December 31, 2017. NRG has announced that it will seek to redesign the Carlsbad Energy Center as a set of peaking units, pursuant to an agreement reached among the company, the City of Carlsbad and San Diego Gas & Electric Company. This effort will require an amendment to the permit that NRG obtained from the CEC to construct the original Carlsbad Energy Center and CPUC approval of a power purchase agreement between NRG and SDG&E.

In its most recent transmission studies, the ISO modeled Encina as offline at the end of 2017, which creates a need for new resources to satisfy regional reliability requirements for summer 2018. The ISO studies identified a local capacity need in the San Diego local reliability area. While the ISO studies identified several transmission system upgrades in the vicinity of SONGS that may reduce some of this need, uncertainty remains about the schedule for developing these transmission upgrades or their impact on satisfying local and regional requirements. SACCWIS will continue to monitor the circumstances affecting the Encina compliance date and bring forward any recommended change based on more complete information.

## **Pittsburg**

NRG's Pittsburg Units 5 and 6 are 312 MW and 317 MW steam boilers, respectively. Both units use once-through cooling. Pittsburg Unit 7 is a 682 MW steam boiler unit that has water-cooled cooling towers. Unit 7 is interconnected to Units 5 and 6 and cannot operate independent of them. To start Pittsburg Unit 7, NRG must start either Unit 5 or 6 first. The final compliance date for Pittsburg under the OTC Policy is December 31, 2017. In its implementation plan filed April 1, 2011, NRG proposed to sever the existing cooling towers from Unit 7, connect them to Units 5 and 6, and then retire Unit 7. This sequence of steps would eliminate once through cooling at Units 5 and 6 but also would result in the loss of capacity from Unit 7. To finance and construct this new configuration, NRG asserts it needs a multi-year contract from a load serving entity.

The ISO's 2015-2019 local capacity study preliminary results show that the Pittsburg subarea requirements drop to zero once four transmission system upgrades become operational.<sup>7</sup> Based on updated information from the ISO, SACCWIS understands these upgrades will be completed in time to allow the Pittsburg units to comply with the OTC Policy on schedule. SACCWIS does not recommend a change in compliance dates for the units at the Pittsburg facility.

## **Moss Landing**

Dynegy's Moss Landing facility consists of two types of units – older steam boiler units and new combined cycle units. Units 6 and 7 are steam boilers with a capacity of roughly 750 MW each for a total of 1510 MW. Power blocks 1 and 2 refer to two combined cycle facilities; each 510 MW power block consists of two combustion turbines and a heat recovery steam generator. The final compliance date for Moss Landing under the OTC Policy is December 31, 2017. In its April 1, 2011 implementation plan, Dynegy proposed a 2032 compliance date for power blocks 1 and 2, and to implement Track 2 retrofit measures by 2017 for Units 6 and 7. In its

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<sup>7</sup> The ISO's 2015-2019 local capacity study preliminary results released March 3, 2014 show that the Pittsburg subarea requirements drop to zero with the completion of the Moraga #2 230/115 kV transformer replacement, Tesla-Pittsburg 230 kV lines reconductoring, Contra Costa-Moraga 230 kV reconductoring, and the Vaca Dixon – Lakeville 230 kV reconductoring project.



November 25, 2013 letter to the State Water Board, Dynegy stated its intent to implement Track 2 for Units 1 and 2 as well as Units 6 and 7.

Last year, Dynegy announced it had secured a contract for the next three years for the output from Units 6 and 7. While Moss Landing is not located within an ISO local reliability area, power blocks 1 and 2 are newer dispatchable combined cycle facilities. Current ISO operating procedures assume that Moss Landing capacity is operated under high peak load conditions for the Greater Bay Area. The ISO intends to model power blocks 1 and 2 as offline after 2017 and will provide the results of those studies to SACCWIS. At this time, SACCWIS does not recommend a change in compliance dates for the units at the Moss Landing facility.

### **Ormond Beach**

NRG's Ormond Beach Generating Station consists of two steam boiler units using once through cooling with a combined capacity of 1486 MW. The final compliance date for the Ormond Beach facility under the OTC Policy is December 31, 2020. The CPUC authorized procurement of between 215MW and up to 290 MW in the Moorpark sub-area of the Big Creek/Ventura local reliability area where Ormond Beach is located. NRG is evaluating a replacement project at the Ormond Beach facility and reports it is on track to comply with the OTC Policy by December 31, 2020. In its next planning cycle, the ISO intends to model Ormond Beach as offline after 2020 and will provide the results of those studies to SACCWIS. At this time, SACCWIS does not recommend a change in compliance dates for the Ormond Beach facility.

### **Mandalay**

NRG's Mandalay Generating Station consists of 3 units. Units 1 and 2 use once-through cooling and have a capacity of 215 MW each. Unit 3 is a combustion turbine with an air quality permit allowing only a very limited number of operating hours each year. The final compliance date for the Mandalay facility under the OTC Policy is December 31, 2020. NRG is evaluating a replacement project at the Mandalay facility and reports it is on track to comply with the OTC Policy by December 31, 2020. The CPUC authorized procurement of between 215 MW and up to 290 MW in the Moorpark

sub-area of the Big Creek/Ventura local reliability area where Mandalay is located. In its next planning cycle, the ISO intends to model 290 MW of proxy resources to replace Mandalay Units 1 and 2 will provide the results of those studies to SACCWIS. At this time, SACCWIS does not recommend a change in compliance dates for the Mandalay facility.

### **Huntington Beach**

AES' Huntington Beach Generating Station consists of four units. Units 3 and 4 retired on October 31, 2012 and were converted to synchronous condensers in 2013. Units 1 and 2 use once-through cooling and each has a capacity of 226 MW. The final compliance date for the Huntington Beach facility under the OTC Policy is December 31, 2020.

In its implementation plan update of March 31, 2013, AES proposed to use the OTC Policy's Track 1 compliance alternative for Units 1 and 2 through a repowering project that impacts both its Huntington Beach and Redondo Beach facilities. AES plans to retire Redondo Beach Units 6 and 8 to enable the repowering of the first power block (470 MW), which is expected to be on line during the 4th quarter of 2018. AES assumed that the synchronous condensers will run through December 2017 at the latest, at which time they will be retired and demolished to enable the construction of the second power block (469 MW). Huntington Beach Units 1 and 2 are expected to retire in the fourth quarter of 2020, and the second power block is expected to be on line in first quarter of 2021. In a November 8, 2013 update to its implementation plan, AES revised its schedule and is asking for an extension to December 31, 2022. AES stated that it believes that the synchronous condensers will be needed in 2018, and a delay in retirement and demolition of the synchronous condensers will delay their schedule of the construction of the second power block and the retirement of Huntington Beach Units 1 and 2. AES states it will take 24 months to demolish Units 3 and 4 and about 30 months to construct the second power block. AES' implementation plan presumes that the Huntington Beach Generating Station should maintain maximum generating capacity and/or voltage support for reliability needs throughout project development, which would require Units 1 and 2 to remain online through December 31, 2022.

SACCWIS notes that at least two outstanding issues exist with the AES' implementation plan. First, are the synchronous condensers at Huntington Beach Units 3 and 4 needed in 2018? Second, does the electric grid need the maximum generating capacity and/or voltage support at Huntington Beach? The ISO plans to review these questions in its next transmission planning cycle and will share the results with SACCWIS. At this time, however, SACCWIS does not recommend a change in compliance date for the Huntington Beach facility.

### **Alamitos**

AES' Alamitos Generating Station consists of six units using once-through cooling. Total capacity of these units is approximately 2000 MW. The final compliance date for the Alamitos facility under the Statewide Policy is December 31, 2020. AES is proposing to repower the Alamitos facility in order to comply with the Statewide Policy. The proposed repowering project consists of natural-gas fired, combined-cycle, air-cooled electrical generating facility with a net generating capacity of 1,936 MW. This plan is dependent on AES obtaining a permit as well as a long term power purchase agreement. AES' Application for Certification to construct a repowering project is now underway following a CEC decision on March 12 decision that it is data adequate. In its next planning cycle, the ISO intends to model Alamitos offline after 2020 and will provide the results of those studies to SACCWIS. At this time, however, SACCWIS does not recommend a change in compliance date for the Alamitos facility.

### **Redondo Beach**

AES' Redondo Beach Generating Station consists of four units using once-through cooling. Total capacity of these units is approximately 1300 MW. The final compliance date for the Redondo Beach facility under the OTC Policy is December 31, 2020. As noted above in the discussion of Huntington Beach, AES is proposing to shut down Units 6 and 8 by 2018 in order to utilize the exemptions from offsets of SCAQMD Rule 1304(a)(2) to bring the first phase of Huntington Beach repowering online in 2018. AES is proposing to repower the Redondo Beach facility in order to comply with the OTC Policy. The proposed repowering project is a natural-gas fired, combined-cycle,

air-cooled electrical generating facility with a net generating capacity of 496 MW. In effect, AES is proposing to shrink Redondo Beach to enable Huntington Beach to return to its original size. This plan is dependent on AES obtaining a permit as well as a long term power purchase agreement. The CEC is currently conducting analysis and discovery regarding AES's application. In its next planning cycle, the ISO intends to model Redondo Beach offline after 2020 and will provide the results of those studies to SACCWIS. At this time, however, SACCWIS does not recommend a change in compliance date for the Redondo Beach facility.

## **VI. Conclusion**

SACCWIS members are continuing to assess the reliability impacts to the electric grid in connection with implementation of the OTC Policy. Some owners of facilities using once-through cooling are retiring them in advance of the compliance dates established by the OTC Policy. Others are pursuing infrastructure replacement plans to comply with the policy. Some of these plans may not be consistent with the planning studies conducted by the ISO to establish local capacity requirements and resource development needs, or policy decisions by all of the state agencies about strategies to satisfy those needs.

Existing facilities using once-through cooling technology may still require an extension under the OTC Policy's compliance schedule if one or more uncertainties combine to threaten local or system reliability or if replacement infrastructure is not developed on a schedule that matches with the existing OTC compliance dates. At this time, however, SACCWIS does not recommend an extension of the final compliance schedule in the OTC Policy for any facility. In the future, SACCWIS plans to provide additional information to the State Water Board concerning new infrastructure development in the ISO's local capacity areas and system to advance implementation of the OTC Policy.