PROPOSED AMENDMENT TO THE WATER QUALITY CONTROL POLICY ON THE USE OF COASTAL AND ESTUARINE WATERS FOR POWER PLANT COOLING

FOR
DYNEGY MOSS LANDING, LLC

DRAFT STAFF REPORT

State Water Resources Control Board
2015

1. SUMMARY OF THE POLICY AMENDMENT

This Draft Staff Report supports a proposed amendment to the statewide Water Quality Control Policy on the Use of Coastal and Estuarine Water for Power Plant Cooling (Policy). The Policy establishes uniform, technology-based standards to implement Federal Clean Water Act (CWA) section 316(b) and reduce the harmful effects associated with cooling water intake structures on marine and estuarine life.

The State Water Resources Control Board (State Water Board) adopted the Policy on May 4, 2010, under Resolution No. 2010-0020, and was approved by the Office of Administrative Law on September 27, 2010. The Policy became effective on October 1, 2010 and was last amended on June 18, 2013.

The Policy applies to 19 existing power plants located along the California coast that withdraw coastal and estuarine waters for cooling purposes, using a single-pass system known as once-through cooling (OTC). Cooling water withdrawals cause adverse impacts when larger aquatic organisms, such as fish and mammals, are trapped against a facility's intake screens (impingement) and when smaller life forms, such as larvae and eggs, are killed by being drawn through the cooling system (entrainment).

The Policy is implemented through National Pollutant Discharge Elimination System (NPDES) permits. Section 3.A of the Policy required the owner or operator of an affected fossil-fueled power plant to submit an Implementation Plan to the State Water Board by April 1, 2011. The Implementation Plan must identify the selected compliance alternative, describe the general design, construction, or operational measures that will be undertaken to implement the alternative, and propose a realistic schedule (including any requested changes to the default final compliance dates identified in the Policy) for implementing these measures that is as short as possible.

Following adoption of the Policy in 2010, Dynegy and four other owners and operators of power plants affected by the Policy filed a petition for writ of mandate and complaint for declaratory and injunctive relief. After detailed discussions, a settlement agreement was signed in October of 2014. (Dynegy Settlement Agreement 2014)

The State Water Board has received Implementation Plans from all owners and/or operators as requested, including Implementation Plans for the three OTC power plants that are owned and operated by Dynegy, including Moss Landing Power Plant, Morro Bay Power Plant, and South Bay Power Plant. Dynegy submitted the Moss Landing Implementation Plan outlining on a unit-by-unit basis how they intend to achieve compliance with the Policy by their compliance deadline of December 31, 2017. (Dynegy 2011) The Implementation Plan documented that compliance with Track 1 was not feasible at the Moss Landing Power Plant.

An updated 2014 Implementation Plan (2014 Implementation Plan) was submitted following the settlement agreement, documenting how Dynegy plans to comply with the Policy pursuant to the agreements made in the settlement, which contains a proposal for a compliance deadline extension for the Moss Landing Power Plant from December 31, 2017 to December 31, 2020. (Dynegy 2014)

Based upon review of the updated Implementation Plan, the State Water Board proposes to amend the compliance deadline found in Table 1 of the Policy for Moss Landing from December 31, 2017 to December 31, 2020.

2. REGULATORY BACKGROUND

In 1972, Congress enacted the Federal CWA to restore and maintain the chemical, physical, and biological integrity of the nation's waters. CWA section 316(b) requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact.

In 2001, the U.S. Environmental Protection Agency (U.S. EPA) adopted regulations for new power plants (Phase I) that established a performance standard for cooling water intakes based on closed-cycle wet cooling. In 2004, U.S. EPA published the Phase II rule applicable to existing power plants with a design intake flow greater than or equal to 50 million gallons per day (MGD), which was remanded following legal challenge. On May 19, 2014, U.S. EPA finalized regulations covering existing facilities that each withdraw at least 2 MGD of cooling water. Facilities have options to select for meeting BTA requirements for reducing impingement. Facilities that withdraw at least 125 million gallons per day are required to conduct studies to investigate site-specific controls to reduce entrainment impacts. Finally, new units added to existing facilities are subject to similar requirements for new facilities. The new regulation was published in the Federal Register on August 15, 2014 and became effective on October 14, 2014. (U.S. EPA 2014)

The State Water Board is designated as the state water pollution control agency for all purposes under the CWA. The state Porter-Cologne Water Quality Control Act of 1969 authorizes the State Water Board to adopt statewide water quality control plans and policies, which are implemented through NPDES permits and waste discharge requirements. The Policy adopted by the State Water Board on May 4, 2010, under Resolution No. 2010-0020, established requirements for the implementation of section 316(b) for existing power plants in California, using Best Professional Judgment in determining BTA for cooling water intake structures. Best Technology Available was determined to be closed-cycle wet cooling, or equivalent. The Policy is implemented through NPDES permits, issued pursuant to CWA section 402, which authorizes the point source discharge of pollutants to navigable waters.

Because the Policy requirements are equivalent to, if not more stringent than those contained in applicable U.S. EPA regulations, it continues to govern those existing coastal power plants in California. The U.S. EPA rule explicitly states that it is within the States' authority to implement requirements that are more stringent than the federal requirements.

3. OVERVIEW OF DYNEGY'S COASTAL OTC POWER PLANTS

Morro Bay Power Plant:

The Morro Bay Power Plant was a natural gas-fired steam electric generating facility in San Luis Obispo County. The facility consisted of four conventional units with one cooling water intake structure to cool all four units. The facility had a cooling water capacity of 668 MGD, and had an average flow rate of 567 million gallons per day

(MGD). The surface water discharge is regulated by the NPDES permit CA0050610, implemented by the Central Coast Regional Water Quality Control Board (CCRWQCB) Order R3-2001-0014. (California Ocean Protection Council 2008) On November 7, 2013, Dynegy announced the closing of the Morro Bay Power Plant in 2014. (Flexon 2013) The Morro Bay Power Plant officially retired on Wednesday, February 5, 2014, about 2 years ahead of their Policy compliance schedule. (The Tribune 2014)

South Bay Power Plant:

The South Bay Power Plant in Chula Vista consisted of five generating units withdrawing an estimated 602 MGD. The surface water discharge was regulated by the NPDES permit CA0001368, implemented by the San Diego Regional Water Quality Control Board. Two of the four OTC units have been shut down since December 31, 2009, and the remaining two stayed online until the Policy compliance date of December 31, 2012, when they were no longer needed for grid reliability. The South Bay Replacement Project will replace the South Bay Power Plant. (California Ocean Protection Council 2008)

Moss Landing Power Plant:

The Moss Landing Power Plant is a natural gas-fired steam electric generating facility located in Monterey County. It originally consisted of seven generating units. Units 1 through 5 were built in the early 1950s and were retired in 1995. Units 6 and 7 were built in the late 1960s and are currently operating as peaking units, meaning that they serve power only when power is at its highest demand. In 2002, combined-cycle generating units 1 and 2 began operation and replaced units 1 through 5. The power plant operates two separate OTC intake structures to cool all four units. The surface water discharge is regulated by the NPDES permit CA0006254, implemented by the CCWQCB Order 00-041. (California Ocean Protection Council 2008)

4. RATIONALE FOR THE PROPOSED AMENDMENT TO THE POLICY

Settlement details and updated Implementation Plan:

Following adoption of the Policy in 2010, Dynegy and four other owners and operators of power plants affected by the Policy filed a petition for writ of mandate and complaint for declaratory and injunctive relief. After detailed discussions, a settlement agreement was signed in October of 2014. (Dynegy Settlement Agreement 2014) Pursuant to the agreement, State Water Board staff now proposes amending the final compliance date for Moss Landing from December 31, 2017 to December 31, 2020.

The proposed extension of the final compliance date for Moss Landing is the only settlement provision requiring Policy amendment. Other provisions not requiring this public process include agreements regarding methods of monitoring and calculating reductions necessary for compliance. As previously mentioned, the Morro Bay Power Plant, originally affected by the Policy and owned and operated by Dynegy, has permanently retired in advance of its final compliance date of December 31, 2015. The

remaining power plants involved in the litigation and settlement are Pittsburg Generating Station, Mandalay Generating Station and Ormond Beach Generating Station. As set forth in the settlement agreement with NRG Delta, LLC and NRG California South, LP, Pittsburg Generating Station will pursue Track 1 compliance by converting existing OTC units to utilize a closed-cycle wet cooling tower currently utilized by another unit scheduled for retirement. (NRG Settlement Agreement 2014) The agreement reflects that Mandalay Generating Station and Ormond Beach Generating Station may comply with the Policy by retiring their OTC units and pursuing a replacement project or, in the alternative, by pursuing Track 2.

Dynegy submitted an Implementation Plan for Moss Landing Power Plant on April 2011, determining that Track 1 of the Policy is not feasible due to space constraints, inability to obtain necessary permits, and based upon previous decisions made by the California Energy Commission and the CCRWQCB that installation of cooling towers were not feasible at the Moss Landing Power Plant. As a result, Dynegy stated its intention to pursue Track 2. (Dynegy 2011) The determination of declaring Track 1 as not feasible is consistent with the "not feasible" definition contained within the Policy:

> *"Cannot be accomplished because of space constraints or the inability to obtain necessary permits due to public safety considerations, unacceptable environmental impact, local ordinances, regulations, etc. Cost is not factor to be considered when determining feasibility under Track 1."*

In November 2014, Dynegy submitted the 2014 Implementation Plan for the Moss Landing Power Plant, which reflects the settlement agreement and release. (Dynegy 2014) Dynegy elected to pursue Track 2 and achieve compliance under the Policy section 2.A.(2)(a)(ii) to address impingement mortality and section 2.A.(2)(b)(ii) for entrainment. Track 2 implementation of the Policy requires the Moss Landing Power Plant to reduce impingement mortality and entrainment of marine life to a "comparative level" to that which would be achieved under Track 1. A "comparable level" in the Policy is defined as a level that achieves 90 percent of the reductions required under Track 1. Track 1 compliance requires the owner or operator to reduce intake flow rate, at a minimum of 93 percent. Therefore, Track 2 impingement mortality and entrainment reductions must achieve at least an 83.7 percent reduction (i.e. 90 percent of 93 percent).

Reduction credit, use of operational controls to reduce flow, and additional reductions in impingement and entrainment through the installation of technology controls will be used to achieve compliance with Track 2 under sections 2.A.(2)(a)(ii) and 2.A.(2)(b)(ii). For Units 1 and 2, previous flow reduction credit will be considered in achieving Track 2 percent intake reductions. Reduction credit applies under the Policy section 2.A.(2)(d) for owners or operators of existing power plants with combined cycle power generating units installed prior to the effective date of the Policy. 224 MGD reduction credits were achieved by the replacement of units 1 through 5 with combined cycle generation units 1 and 2. Installation and operation of variable speed drive controls on circulating water pumps will be installed no later than December 16, 2016 in order to reduce intake flow. No later than December 31, 2020, Dynegy will install supplemental control technologies in order to further reduce impingement mortality and entrainment and achieve compliance with Track 2. The 2014 Implementation Plan specifies in more detail how Dynegy intends to move forward with compliance with the Policy.

Dynegy will need to spend at least 24 months conducting their baseline studies prior to submitting the study design proposal for assessing technology controls. The operational control requirement will be achieved by December 16, 2016 per the installation and operation of the variable speed drive controls on circulating water pumps. Extension of the current compliance deadline of December 31, 2017 will allow for the assessment of the technology controls, including the following activities: (1) design pilot-studies for each technology, (2) receive approvals from the State Water Board, (3) test pilot studies, and (4) confirm that installation of such technologies will achieve the desired percent intake reduction.

Pursuant to the agreement between the State Water Board and Dynegy, State Water Board staff have prepared a draft amendment to the Policy proposing a compliance date extension for the Moss Landing Power Plant from December 31, 2017 to December 31, 2020. The settlement agreement anticipates Dynegy installing and beginning operation of variable frequency drives at the Moss Landing facility a year before the existing 2017 Track 2 compliance deadline. Modeling data indicate that the variable frequency drives, when operated to account for the presence of larvae near the intake, may reduce entrainment to a level comparable to the required Track 2 reductions. As a result, there may be a net environmental benefit associated with implementation of the settlement. However, in order to provide time for Dynegy to comply fully with all aspects of the policy, accounting for the newly installed variable frequency pumps, the extension of the final compliance deadline will allow (1) implementation of operational controls; (2) assessment of the facility with the newly configured pumps; and (3) time for the installation of additional technology controls. This alternative will extend the deadline by 3 years, but also fully resolves litigation challenging the existing policy provisions.

5. REQUIREMENTS WHEN AMENDING THE POLICY

The State Water Board must comply with all state and federal public participation requirements and state laws governing environmental and peer review when amending the Policy.

The State Water Board is the lead agency for this project under the California Environmental Quality Act (CEQA) and is responsible for preparing environmental documentation for the proposed amendment. The California Secretary of Resources has certified the State Water Board's water quality planning process as exempt from certain CEQA requirements when adopting plans, policies, and guidelines, including preparation of an Initial Study, Negative Declaration, and Environmental Impact Report.

The California Code of Regulations, title 23, section 3777(a) provides that a Staff Report consists of a written report containing an environmental analysis of the project, an Environmental Checklist, and other documentation. Section 3777(b) directs that the environmental analysis must include a brief description of the proposed project; identification of any significant or potentially significant adverse environmental impacts of the proposed project; an analysis of reasonable alternatives to the project and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts; and an environmental analysis of the reasonably foreseeable methods of compliance.

In addition, CEQA imposes specific obligations on the State Water Board when it establishes performance standards. Public Resources Code section 21159 requires that an environmental analysis of the reasonably foreseeable methods of compliance be conducted. The environmental analysis must address the reasonably foreseeable environmental impacts of the methods of compliance and reasonably foreseeable alternatives and mitigation measures. In order to comply with CEQA, an addendum to the May 4, 2010 Final Substitute Environmental Document (SED) has been prepared and is further described below.

The Health and Safety Code section 57004 requires external scientific peer review of the scientific basis for any rule proposed by any board, office, or department within the California Environmental Protection Agency. However, because this amendment is not based on any scientific data, peer review requirements do not apply.

6. PROJECT DESCRIPTION

The amendment language is shown in Appendix A of this document, and consists of changes to the "Implementation Schedule" in Table 1 in Section 3.E of the Policy.

The facility affected by the amendment is the Moss Landing Power Plant, which currently has a compliance deadline of December 31, 2017. The deadline in Table 1 (Section 3.E of the Policy) would provide a 3 year extension for the Moss Landing Power Plant, changing the compliance deadline from December 31, 2017 to December 31, 2020.

7. ENVIRONMENTAL SETTING

The Moss Landing Power Plant is located on the eastern shoreline of Moss Landing Harbor within the Monterey Bay. Please see the "Environmental Setting" Section 2.1.3, the Central Coast (Region 3) setting, of the 2010 Final SED which is applicable to the setting for the Moss Landing Power Plant. (SWRCB 2010)

8. ANALYSIS OF ALTERNATIVES

The Policy to implement CWA section 316(b) has been adopted and approved, but not yet implemented through NPDES permits for all the individual facilities, including Moss Landing Power Plant. The environmental baseline for this amendment is therefore the same for all remaining OTC Power Plants as described in the 2010 Final SED for the Policy.

Alternatives and Discussion:

Alternative 1: No Action.
The State Water Board would not adopt the proposed amendment to the Policy. Under this alternative, the compliance deadline for Dynegy's Moss Landing facility would remain as currently stated in the Policy.

This alternative should not be selected because it would not reflect the agreement made between Dynegy and the State Water Board in the settlement. Moreover, the existing deadline does not allow adequate time for Dynegy to implement the necessary measures to come into compliance with Track 2 of the Policy.

Alternative 2: Adopt the Proposed Amendment as described.
The State Water Board would adopt the Proposed Amendment by changing Moss Landing Power Plant's compliance deadline from December 31, 2017 to December 31, 2020. Under this alternative, the compliance deadline for the Moss Landing Facility would be extended by 3 years, providing additional time for Track 2 compliance.

On March 31, 2011, Dynegy submitted the Moss Landing Implementation Plan outlining on a unit-by-unit basis how they intend to achieve compliance with the Policy by their compliance deadline of December 31, 2017. The Implementation Plan documented that compliance with Track 1 was not feasible at the Moss Landing Power Plant.

The 2014 Implementation Plan states that the Moss Landing Power Plant will achieve compliance via Track 2 under Sections 2.A.(2)(a)(ii) and 2.A.(2)(b)(ii) of the Policy. Compliance with Track 2 constitutes an 83.7 percent or greater reduction in impingement mortality and entrainment of marine life for the facility. In achieving the 83.7 percent intake reductions, operational and/or structural controls will be required. As allowed in Policy Section 2.A.(2)(c), technology-based improvements designed to reduce impingement mortality and entrainment and implemented prior to the effective date of the Policy will be counted as credit towards meeting Track 2 requirements. Generating units 1 through 5 were replaced with combined cycle generation units 1 and 2 prior to the adoption of the Policy. Per the calculation outlined in the 2014 Implementation Plan, 224 MGD reduction credits will be used towards achieving the 83.7 percent intake reductions.

By December 16, 2016, Dynegy will install and operate variable speed drive controls on circulating water pumps serving units 1 and 2. This and other operational control measures will be used to reduce pump usage during startup and shutdown. This operational change will assist in reducing overall intake flow and achieving the 83.7 percent intake reductions.

No later than December 31, 2020, Dynegy will install supplemental control technologies in order to achieve compliance pursuant to Track 2. As described in the 2014 Implementation Plan for Moss Landing, Dynegy has not yet finalized plans for which technologies it will pursue. The impingement and entrainment technology controls for Units 1 and 2 will likely involve modification of the existing screens and/or the intake structure in order to reduce the through-screen velocity to less than 0.5 feet per second and/or installation of a fish return system to increase the survival of the organisms impinged at the intake screens. Once Dynegy decides which technology controls will be pursued for Moss Landing units 1 and 2, an amended Implementation Plan will be submitted to the State Water Board. For units 6 and 7, the 2014 Implementation Plan describes in detail the different technologies that may be pursued including: wedgewire screen modules or barrier curtains, fine mesh traveling screens, fish return systems, and deep water nearshore intake technologies. Dynegy will seek approval from the State Water Board for the proposed pilot study designs prior to testing the technologies in its effectiveness in achieving percent intake reductions.

Track 2 reductions will be monitored using a Compliance Tracking System to estimate the levels of impingement and entrainment. The estimates of impingement mortality and entrainment reductions will be compared to baseline estimates from the initial design flow.

As required in Policy Section 4 Track 2 Monitoring Provisions, baseline studies shall be performed at the Moss Landing Power Plant to demonstrate the percent intake reductions after the operational and technology controls are installed and implemented. The baseline studies will require a study period of 36 months. However, per the Policy, if prior studies accurately reflect current impacts, they may be used for baseline assessments. Subject to approval by the State Water Board, Dynegy plans to use previous data on entrainment and impingement as 12 of the required 36 months.

For units 6 and 7, Dynegy will use biological baseline studies as a foundation for assessing implementation strategies to meet the impingement mortality and entrainment reduction requirements. Dynegy plans to pursue operational and/or control technologies to meet the reduction requirements. An updated Implementation Plan will be submitted to provide specifics on operational and technological controls. In the case where Track 2 reductions cannot be met by December 31, 2020, operation of the units 6 and 7 will cease until compliance is achieved.

Staff Recommendation: Alternative 2

The 2011 and 2014 Implementation Plans for the Moss Landing Power Plant demonstrated that Track 1 was not feasible within the means of the Policy. The compliance extension will allow for Dynegy to adequately comply with all necessary requirements of Track 2 of the Policy at the Moss Landing Power Plant.

9. ADDENDUM TO THE FINAL SED ADOPTED MAY 4, 2010

The California Code of Regulations, title 23, sections 3720-3782 requires the State Water Board to evaluate potential environmental impacts that may be caused by complying with the proposed amendment with one or more of the reasonably foreseeable compliance methods. The 2010 Final SED for the Policy describes various technologies to minimize impingement mortality and/or entrainment at the affected facilities in order to comply with Track 2 of the Policy. The 2010 Final SED for the Policy also describes and evaluates potential environmental impacts associated with these technologies, and potential mitigation measures for these impacts.

The proposed amendment would not affect the identified reasonably foreseeable means of compliance with the Policy. Nor would the amendment in itself cause any additional environmental impacts beyond what was identified in the 2010 Final SED adopted with the Policy. Continued operation of the Moss Landing Power Plant under its current operational configuration does not constitute an increase in impacts relative to the baseline identified in the 2010 Final SED. Further, there is a reduction in impacts resulting from the early shut down of Morro Bay Power Plant, whose compliance deadline is December 31, 2015, but came into compliance by officially retiring on February 5, 2014. In addition, the installation and operation of the variable speed drive controls on circulating water pumps by December 16, 2016 will assist in reducing overall intake flow ahead of time, likely reducing entrainment to a level comparable with Track 2 requirements. The extension will not result in additional significant or potentially significant environmental impacts.

10. ECONOMIC ANALYSIS

The 2010 Final SED for the OTC Policy provides information on the costs of compliance with the Policy. The costs for the proposed amendment are consistent with those costs in the 2010 Final SED for the Policy. (SWRCB 2010)

11. REFERENCES

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