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Mr. Philip Isorena
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State Water Resources Board
Division of Water Quality, 15th Floor
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**SUBJECT: CALIFORNIA 316(b) POLICY - IMPLEMENTATION PLAN
EL SEGUNDO GENERATING STATION
EL SEGUNDO POWER, LLC
NPDES PERMIT NO. CA0001147**

Dear Mr. Isorena,

On May 4, 2010 the State Water Resources Control Board (“State Water Board”) adopted a Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (“Policy”) which became effective on October 1, 2010. The intent of the Policy is “...to ensure that the beneficial uses of the State’s coastal and estuarine waters are protected while also ensuring that the electrical power needs essential for the welfare of the citizens of the State are met.” This Policy establishes uniform technology-based standards for the implementation of the federal Clean Water Act Section 316(b) (33 U.S.C. §1326 et seq.).

The State Water Board sent El Segundo Power, LLC (“ESP”) a letter dated November 30, 2010 to inform them of the Policy and the requirement to submit an Implementation Plan for the El Segundo Generating Station (“ESGS”) (Letter from Thomas Howard, Executive Director to George Piantka, NRG West). An attachment to the letter entitled, Implementation Plan and Report of Waste Discharge Requirements, described these requirements. El Segundo Power, LLC is the owner of ESGS.

Background

ESGS is located in the city of El Segundo, Los Angeles County and consists of four natural gas fired steam electric generating units. Units 1 and 2 were each rated at 175 megawatts (“MW”) and have been demolished. Units 3 and 4 are each rated at 335 MW. Units 3 and 4 employ the use of once through cooling and withdraw water from the Santa Monica Bay at a location approximately 2,000 feet offshore at a depth of approximately 20 feet. The offshore intake is equipped with a velocity cap. Water is drawn through an approximately 3 foot deep opening. This opening is covered by a series of

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1 ¼ inch diameter rods which are 14-inch on center. This leaves an opening between the rods of 12 ¾ inch.

Cooling water is transported from the offshore intake to the onshore portion of the intake structure through a buried pipe which is 12 feet in diameter. The onshore portion of the intake structure includes two vertical traveling screens for each of the two remaining operating units. There is one circulating water pump for each screen. Each pump is rated at 69,200 gallons per minute (“gpm”), for a total design offshore cooling water flow of 276,800 gpm. Discharge from the once through cooling system is via an outfall pipe, designated as 002. Discharge from retired Units 1 and 2 have ceased effective May 2010 in preparation for the demolition of those units.

On December 21, 2000, ESP filed an Application for Certification (“AFC”) seeking approval from the California Energy Commission (“CEC”) to repower the existing ESGS Units 1 and 2. Units 1 and 2 were shutdown in December 2002, and the air permit for those units has been relinquished. The CEC in February 2005 issued a Final Decision (i.e., license) approving the repowering project with conditions. On June 18, 2007, ESP filed a petition to amend (“PTA”) the license with the CEC. ESP subsequently filed an amendment with the CEC to change the owner and name of the “R2C2” project to El Segundo Energy Center LLC and El Segundo Energy Center (“ESEC”), respectively. The PTA proposed the replacement of Units 1 and 2 with two trains of fast start, highly efficient combined cycle generation, referred to as rapid response combined cycle, or “R2C2” (Units 5, 6, 7 and 8). Each train, when constructed will consist of one gas turbine generator, one heat recovery steam generator, and one steam turbine generator. The combustion turbines are referred to as Units 5 and 7, while the steam turbines are referred to as Units 6 and 8. The repowered units are expected to have a capacity of 560 MW. ESEC will utilize air cooled condensers which do not use cooling water from the ocean, equivalent to that of dry cooling towers. This type of rapid response technology is very compatible with California’s increased reliance on renewables in that when adequate renewable power is not available, ESEC can quickly come on line and provide replacement electricity.

CEC approved the ESEC on June 30, 2010 and subsequently published the written decision on July 13, 2010. Demolition of Units 1 and 2 was completed January 2011 and construction is scheduled to commence June 1, 2011. Construction is scheduled to be completed by March 2013 and the new generation will subsequently be commissioned to be online by the summer of 2013.

Compliance Track

ESGS will comply with the requirements of the Policy under Track 1. Units 1 and 2 have been removed; construction will begin by June 2011 with the new generation being online by the summer of 2013. The repowered units will employ air cooled condensers which are the equivalent of dry cooling towers. The Policy states that, “The installation of closed cycle dry cooling systems meets the intent and minimum reduction requirements of this compliance alternative.” (Policy Section 2.A.(1). Pg. 4). Therefore, the new Units 5, 6, 7 and 8 will be in compliance with the Policy.

As required by the revised Title V Facility Permit, dated July 16, 2010 as issued by the South Coast Air Quality Management District (“SCAQMD”), Unit 3 will be permanently shut down within 90 days after Units 5, 6, 7 and 8 commence commercial operation (i.e., summer of 2013). The corresponding ocean intake flow to Unit 3 will cease within 6 months of shutdown of Unit 3. This will result in the reduction of the Unit 3 cooling water flow by 100% (199.3 MGD). ***Unit 3 will therefore be in compliance with the Policy 2 years in advance of the current Policy compliance date of December 31, 2015 for ESGS.***

ESEC currently intends to file with the CEC and other requisite agencies applications for the repowering of Unit 4 by 2012. Unit 4 is currently required to be in compliance with the policy by December 31, 2015. ***With this Implementation Plan we are requesting an extension to the current Policy compliance date to December 31, 2017.*** Unit 4 will comply via Track 1 by replacing the steam boiler with additional fast-start, air-cooled, combined cycle generation. The projected date of operation of the proposed new generation to replace Unit 4 is not known at this time, but irrespective of the permitting and commercial timelines for Unit 4 replacement, ESEC is committed to retire Unit 4 by December 31, 2017. Intake flow would cease by December 31, 2017. When modifications of the intake structure are complete, the retirement of Unit 4 will amount to the elimination of an additional 199.3 MGD of once-through cooling discharge.

ESGS Units 3 and 4 currently comply with the impingement mortality criteria in the Policy. Policy Section 2.A.(2)(c) states that technology-based improvements that are specifically designed to reduce impingement mortality that were implemented prior to October 1, 2010 may be counted towards meeting Track 2 requirements. El Segundo has a submerged offshore intake structure equipped with a velocity cap to reduce impingement mortality¹. Velocity caps are a proven technology for the reduction of impingement mortality. Early studies conducted at coastal California power plants, including El Segundo, originally demonstrated this. Weight (1958)² reported that the Huntington Beach Steam Station had an offshore intake structure which consisted of a conduit which extended approximately 0.5 mile from the beach. The conduit terminated in an upturned elliptical bowl rising 10 ft above the bottom. It was constructed with a velocity cap “to change the entry flow characteristics for the control of fish.” They report that earlier intake systems were constructed without velocity caps and experienced system operation problems due to schools of fish entering the system. It was hypothesized that fish were unable to sense the vertical currents resulting from the upward facing intake pipes. The installation of a steel plate redirected the velocity horizontally allowing the fish to sense the velocity and to avoid the flow. Weight reported test results, both with and without the velocity cap, resulting in a 95% reduction of fish in the intake.

¹ Details of the cooling water system are described in, El Segundo Power, LLC. 2008. Final Report El Segundo Generating Station Clean Water Act Section 316(b) Impingement Mortality And Entrainment Characterization Study. El Segundo, CA. 384p.

² Weight, R. H. 1958. Ocean cooling water system for 800 MW power station. Journal of the Power Division; Proceedings of the American Society of Civil Engineers. Proc Paper 1888. pp 1888-1 through 1888-22

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A recent study has been performed at the Scattergood Generating Station offshore cooling water intake structure (Los Angeles Department of Water and Power 2007)³. The study was performed during the period October 11, 2006 through January 2, 2007. The study measured impingement alternating between cooling water withdrawn through the velocity cap intake structure for two weeks and through the discharge structure⁴ for two weeks. In addition, hydroacoustic monitoring of fish abundances was performed at the two locations were used to verify that there were no differences in fish abundances between locations that could have affected the results (no statistically significant differences were found between the two locations).

The Scattergood Velocity Cap Study calculated that the reduction in the impingement rate on all fishes was 97.56 percent based on abundance and 95.30 percent based on biomass. The difference was statistically significant for abundance; however, the results for biomass were not statistically significant. This was possibly due to the impingement of relatively low numbers of high-biomass species, such as Pacific electric ray and thornback, during one of the test periods. The authors found these results to be higher than those calculated in prior studies. This may be due to higher Pacific sardine abundance during this study as compared to the earlier studies.

These studies clearly demonstrate that offshore velocity caps reduce impingement rates well in excess of the comparable level of wet cooling (i.e., 90% of 93% reduction commensurate with wet cooling) required by the Policy under Track 2. Therefore, El Segundo is and will continue to be in compliance with the impingement criteria required by the Policy during its operation.

El Segundo must also comply with the entrainment reductions in the Policy. Total El Segundo withdrawal rates per the NPDES permit equaled 607 MGD. The repowering of Units 1 and 2 with a system that will employ air cooled condensers has resulted in the elimination of the use of up to 207.4 MGD of ocean water for cooling. As stated earlier, the use of an additional 199.3 MGD will cease with the shutdown of Unit 3. The repowering of Units 1 and 2 and the shutdown of Unit 3 equates to 406.7 MGD of seawater for cooling no longer being withdrawn. This represents a 67% reduction in the withdrawal of seawater for cooling, which will occur no later than December 31, 2013. As currently planned, the repowering of Unit 4 will also employ air cooled condensers resulting in the reduction of an additional 199.3 MGD of ocean water for cooling. This would result in a 100% reduction of 607 MGD of seawater cooling withdrawal and the elimination of once-through cooling at the site by December 31, 2017 – the requested compliance extension date for ESGS.

The Policy also requires that existing power plants “shall install large organism exclusion devices having a distance between exclusion bars no greater than nine inches, or install other exclusion devices, deemed equivalent by the State Water Board” and “implement measures to mitigate the

³ Los Angeles Department of Water and Power. 2007. Final Report Scattergood Generating Station; Clean Water Act Section 316(b) Velocity Cap Effectiveness Study. 212p

⁴ The discharge pipe terminates in a 2.3 m (7.5 ft) diameter vertical riser, without a velocity cap, located 122 m (400 ft) away from the intake velocity cap.

interim impingement and entrainment impacts resulting from the cooling water intake structure(s), commencing October 1, 2015 and continuing up to and until the owner or operator achieves final compliance. The owner or operator must include in the implementation plan, described in Section 3.A, the specific measures that will be undertaken to comply with this requirement.”

As stated earlier, ESGS has an offshore velocity cap intake structure. Cooling water is withdrawn through a velocity cap inlet located approximately 2,600 ft from the onshore seawall. The bottom of the cooling water inlet is located at a depth of approximately 10 ft above the bottom of the Santa Monica Bay. The top of the velocity cap is located at a depth of approximately 16 ft below MLLW. Water is drawn through an approximately 3 foot deep opening. This opening is covered by a series of 1 ¼ in diameter rods on 14 in centers. This leaves an opening between the rods of 12 ¾ in. The intake will therefore require retrofit with bars with a minimum of 9 inch spacing, as stated in the Policy by October 1, 2011.

The State Water Board has identified the preferred mitigation method as providing funding to the California Coastal Conservancy that will ultimately be used “for mitigation projects directed toward increases in marine life associated with the State’s Marine Protected Areas in the geographic region of the facility.” The California Coastal Conservancy has identified several restoration projects in the South Coast region that, when implemented, would provide increases in habitat and production of marine life.

The CEC in its original decision, dated February 2005, required El Segundo to fund up to \$5 million Bay-wide study and enhancement activities which should assist the Los Angeles Regional Water Quality Control Board in its performance of its 316(b) responsibilities, not only for the ESGS project but also for other future projects around the Bay (CEC 2005, Conditions of Certification BIO-1 at 66)⁵. This was based on the project description using once through cooling contained in the original CEC application. As part of the requirement of the CEC decision and prior to the submission of the amended application, El Segundo paid \$1 million to the Santa Monica Bay Restoration Commission (SMBRC).

These payments were spent on completed projects or encumbered in projects that are near completion to the following SMBRC projects:

- Economic valuation study of non-consumptive uses of the bay;
- Rocky Reef Assessment;
- County-wide funding feasibility study;
- Support for SMBRC Marine Technical Advisory Committee;
- Bight '08 rocky reef survey; and

⁵ California Energy Commission. 2005. El Segundo Power Redevelopment Project: Commission Decision. CEC-800-2005-001-CMF.

- Dolphin study.

The CEC subsequently rescinded that requirement in their approval of the amended ESEC⁶ (BIO 1 at 36) stating:

2. The revised Conditions of Certification set forth below are appropriate and will ensure that the project is designed and constructed both in accordance with applicable law and in a manner that protects environmental quality and public health and safety and to ensure compliance with all applicable LORS.
3. The Biological Resources aspects of the amended project do not create significant direct or cumulative environmental effects.

Based on the projects funded and since these payments are no longer a requirement, ESP requests that this prior mitigation payment to be considered a prepayment against the interim mitigation requirement and therefore does not propose additional interim mitigation at this time.

Proposed Compliance Schedule

Below is the proposed schedule for ESGS to comply with the Policy:

- May 2010 – Compliance achieved for Unit 1 and 2 with ceasing of intake flows
- April 1, 2011 - Submit Implementation Plan to outline Track 1 and/or Track 2 compliance with impingement and entrainment.
- October 1, 2011 – Verify Policy requirement that no greater than nine inch spacing between bars for the intake structure is in compliance with the large organism exclusion devices. This requirement will be satisfied with the retrofitting of the bars to a minimum spacing distance of nine inches.
- October 31, 2011 – Potential State Water Board approval of the Implementation Plan.
- Summer 2013 – Unit 3 will be shutdown and retired.
- December 31, 2013 – Unit 3 intake flow will cease.
- October 1, 2015 – December 31, 2017 – El Segundo Power proposes the \$1 million paid to the Santa Monica Bay Restoration Commission (“SMBRC”) be considered a prepayment against the interim mitigation requirement satisfying the interim mitigation fee for this time period.
- December 31, 2017 – Unit 4 will be shutdown and retired. Intake flows associated with Unit 4 will cease at this time.

⁶ California Energy Commission. 2010. El Segundo Power Redevelopment Project: Commission Decision to the Amendment. CEC-800-2010-015.

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ESP believes a reasonable approach to meeting the compliance requirements of the Policy has been presented in this Implementation Plan. This approach balances the need for the protection of the marine resources and the need for cost effective electric power in the Los Angeles Basin. We would be happy to review and discuss any part of this Implementation Plan.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person and persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. "I am aware that there are significant penalties for submitting false information, including the possibility, of a fine and imprisonment for knowing violations."

If you should have any questions concerning this report please contact George Piantka at (760) 710-2156.

Sincerely,

El Segundo Power, LLC
By: NRG El Segundo Operations Inc.,
Its Authorized Agent

By: 
Ken H. Riesz, Sr.
Plant Manager

Attachments

cc: Mr. Jonathan Bishop
Ms. Marleigh Wood
Ms. Joanna Jensen