DYNEGY

Dynegy Morro Bay, LLC

State Water Resources Control Board
Once-Through Cooling Water Policy

IMPLEMENTATION PLAN
for the
Morro Bay Power Plant

April 1, 2011

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I. Introduction

Dynegy Morro Bay, LLC (Dynegy) submits this Implementation Plan for the Morro Bay Power Plant pursuant to the "Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling" (Policy) and California Water Code section 13383. As requested by the State Water Resources Control Board (Board) November 30, 2010 letter regarding "Implementation Plans and Immediate and Interim Requirements for the Once–Through Cooling Water Policy" ("Implementation Plan Letter"), this submittal also includes a new application to renew the facility's National Pollutant Discharge Elimination System (NPDES) permit.

Executive Summary

Dynegy has selected Track 2 as its compliance option at Morro Bay. As demonstrated herein and as previously determined, in substantial part, by the California Energy Commission in the site certification proceeding for the Morro Bay Power Plant's modernization project, compliance with Track 1 using closed cycle cooling alternatives is not feasible for one or more of the following reasons: space constraints at the site; inability to obtain air permits due to insufficient emission reduction credits; conflicts with visual standards; conflicts with noise standards; conflicts with local land use rules; conflicts with federal flood control requirements; and significant impacts on terrestrial biology.

To achieve compliance with Track 2, Dynegy intends to evaluate impingement and entrainment control measures (i.e., technologies, operational measures, and combinations thereof) to determine whether any such measures will enable any of the Morro Bay Units to achieve compliance with Track 2 requirements. If Dynegy determines that any such control measures exist and are commercially viable, Dynegy anticipates implementing the selected control measures by no later than December 31, 2015, the currently applicable final compliance deadline. Unless the final compliance deadline is suspended or extended, if Dynegy determines in its sole discretion that no commercially viable control measures capable of achieving compliance with Track 2 exist for any of the Morro Bay Units (or in the event implementation is not completed by the compliance deadline), Dynegy anticipates that it will cease water intake flows to the Unit(s) by December 31, 2015 until either (i) that time as commercially viable control measures capable of meeting Track 2, if any, are implemented, or (ii) a decision is made to retire the Unit(s). In addition, if Dynegy determines that no commercially viable control measures exist for Morro Bay Units 3 and 4, Dynegy may consider repowering Units 3 and 4. Based on preliminary analysis and contingent on numerous currently unknown future variables, repowering, if commercially viable and if pursued, would be limited by air permitting emission reduction credit requirements to approximately a 164 MW (nominal) simple-cycle combustion turbine.

In accordance with the preliminary implementation schedule set forth herein, Dynegy anticipates making a final decision in early 2014 regarding which compliance measure(s) to pursue at Morro Bay, at which time we expect to submit an amended implementation plan. Prior impingement and entrainment studies at Morro Bay

accurately reflect current impingement and entrainment impacts; thus, additional baseline impingement and entrainment studies are not needed.

As its interim mitigation option in the event any of the Morro Bay Units operate beyond October 1, 2015 using once-through cooling without achieving final compliance and continuing until the Unit(s) achieves final compliance, Dynegy chooses to provide funding to the California Coastal Conservancy for purposes of working with the California Ocean Protection Council to fund an appropriate project that mitigates interim impingement and entrainment impacts.

* * * * *

This Implementation Plan and the information contained herein are subject to material change. As recognized by the Board, if an implementation plan or associated information changes after submittal, the facility may submit amendments at a later date. This Implementation Plan reflects information currently available and known to Dynegy and provides as much detail as is reasonably possible about future activities that are contingent on and affected by numerous currently unknown factors. Dynegy expressly reserves the right to, and intends to, amend this Implementation Plan as relevant information develops and circumstances warrant.

II. Implementation Plan

The information presented below generally follows the implementation plan requirements as set out in the "Implementation Plan and Report of Waste Discharge Requirements" attachment to the Board's Implementation Plan Letter. For clarity and simplicity, the enumerated requirements identified in the attachment to the Implementation Plan Letter are reproduced in the headings below in their entirety, except where otherwise noted.

1. Identifies the compliance alternative (Track 1, Track 2 or retirement) that you have selected. If Track 2 is selected, it must be accompanied by a demonstration that compliance with Track 1 is not feasible. If you decide to retire one or more units, please identify the specific closure date for each unit when power generation and water inflows will cease. If one or more units will be repowered or new units will be constructed as replacement, please identify a specific on-line date for each new or repowered unit.

Dynegy has selected the Track 2 compliance alternative for Morro Bay.

A. Track 1 is Not Feasible[1]

Compliance with Track 1 is not feasible at Morro Bay for one or more of several reasons.

To comply with Track 1 at any one of the Morro Bay Units (e.g., achieve a minimum 93 percent reduction in intake flow rate compared to design flow), Dynegy would have to convert the existing once-through cooling system to closed cycle cooling by installing a wet cooling tower(s), dry cooling towers, an air cooled condenser, hybrid wet/dry cooling, or spray cooling ponds. Alternatively, intake flows to each Unit would have to be reduced through operating restrictions. However, achieving a 93 percent reduction in intake flows solely through operating restrictions would equate to approximately only 51 hours per month in maximum plant output. Such a drastic limitation on generation output would provide very little support in terms of grid reliability and it would not be feasible to commercially maintain the Units with such limited capacity. Thus, from a commercial perspective, operating restrictions alone cannot be accomplished and, accordingly, are not feasible to comply with Track 1.

The California Energy Commission's (CEC) 2004 approval of the site certification for the Morro Bay modernization project demonstrates that Track 1 compliance using closed cycle cooling alternatives is not feasible at Morro Bay.[2] After extensive public

[1] The Policy (Section 5) defines "not feasible" to mean "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." Dynegy reserves the right to supplement and/or amend the demonstration that Track 1 is not feasible at Morro Bay.

[2] The CEC approved Morro Bay's Application for Certification on August 2, 2004 (Docket No. 00-AFC-12) and incorporated therein the Morro Bay Power Plant Project, 3rd Revised Presiding Member's Proposed

hearings involving testimony under oath and cross examination, the CEC approved a modernization project at Morro Bay that would replace existing Units 1-4 with two combined-cycle units, concluding that continued use of the plant's existing once-through cooling system in the modernization project would have no significant adverse environmental impact on aquatic biological resources.[3] In doing so, the CEC expressly analyzed and rejected three different closed cycle cooling options at Morro Bay as not feasible: 1) wet cooling towers, 2) hybrid wet/dry cooling system, and 3) dry cooling/air cooled condenser.

More specifically, the CEC rejected freshwater wet cooling towers as not feasible due to the limited amount of freshwater and treated water from the Morro Bay water treatment plant.[4] Sea water wet cooling towers were rejected largely due to the concern regarding salt air emissions in cooling tower drift, including insufficient air emission reduction credits in the Morro Bay area to allow issuance of an air permit.[5] The hybrid wet/dry cooling option was rejected as not feasible because it would violate local noise standards. The CEC resoundly rejected dry cooling as not feasible at Morro Bay for numerous reasons, including site space constraints /constructability issues, significant adverse visual impacts, noncompliance with local noise limitations, and conflict with zoning and local land use ordinances and standards.[6] Indeed, the CEC went so far as to state that even if cost was not a consideration, it would not recommend dry cooling at Morro Bay.[7]

Furthermore, during the CEC proceeding, the City of Morro Bay directly opposed closed cycle cooling options at the plant. For example, the Morro Bay City Council and Planning Commission concluded that that dry and hybrid closed cycle cooling options "would adversely affect the City's beauty and uniqueness, would cause or exacerbate adverse effects on visual, noise, air quality, health, socioeconomics, hazardous materials, traffic and transportation, and other local natural resources compared to the proposed project [using once-through cooling]."[8]

Decision (June 2004) ("Morro Bay 3rd RPMPD") (copy enclosed as Attachment A). The modernization project ultimately was not pursued.

[3] The CEC expressly found that dry cooling would cause greater overall environmental harm than continuing the use of once-through cooling. Morro Bay 3rd RPMPD at 353, Finding 27. The CEC's Conclusions of Law included: "1. Modernization of the Morro Bay Power Plant with reduced use of once-through cooling and the Conditions of Certification proposed herein *will not cause any significant, direct, indirect or cumulative adverse impacts* within the meaning of CEQA. 2. There is no need to consider alternatives to once-through ocean cooling pursuant to CEQA because *such cooling will not have a significant, adverse environmental impact* pursuant to CEQA." Id. at 354 (emphasis added).

[4] Morro Bay 3rd RPMPD at 349, Finding 3. For that same reason, freshwater wet cooling towers remain not feasible at Morro Bay today.

[5] Morro Bay 3rd RPMPD at 328 (citing Final Staff Assessment, App. A at 23).

[6] Morro Bay 3rd RPMPD at 339-348.

[7] Morro Bay 3rd RPMPD at 10 and 377 ("In fact, based on the evidence in our record, we firmly believe that *even if dry cooling were feasible and cost free*, it would not offer the environmental benefits to the Morro Bay Estuary that a successful [Habitat Enhancement Plan] will provide") (emphasis added). The CEC expressly found that impingement impacts from the modernized plant using once-through cooling were not significant. Id. at 319, Finding 9. While entrainment from the once through cooling system of the modernized plant would have a potential adverse impact, the CEC determined that such an impact was "environmentally protective … given the continued abundance of larvae in Morro Bay notwithstanding 50 years of plant operations." Id. at 321, Findings 30-31.

[8] Morro Bay 3rd RPMPD at 337 and 352 (Finding 22).

i. Space Constraints

Spray cooling ponds also are not feasible as a Track 1 compliance option due to space constraints at Morro Bay. Based on a preliminary engineering analysis performed in 2010, the total footprint required for cooling ponds for Units 3 and 4 alone is estimated at 250 feet x 3,400 feet (i.e., two 250 ft. x 850 ft. ponds per unit) or approximately 20 acres. The site only has approximately 15 acres of space available for spray cooling ponds, assuming demolition of the tanks.[9]

Space constraints at Morro Bay related to the size of dry cooling technologies may also render Track 1 dry closed cycle cooling alternatives not feasible. The CEC's evaluation of dry cooling for the Morro Bay modernization project addressed space constraints at the site. The CEC's findings recognized that necessary space may not be available on site to install dry cooling. A witness from GEA Systems, testifying on the facility owner's behalf, stated that the site was not large enough to accommodate any of the dry cooling alternatives presented, and that building air cooled condensers next to the operating PG&E high voltage switchyard would present "undue risk".[10] Recent preliminary engineering analysis indicates that there may be room on site near enough to the existing turbine building for one air cooler condenser, but that location would place the air cooled condenser in very close proximity to the adjacent PG&E switchyard, thus raising the risk concerns raised in the CEC proceeding. Site control was also an issue in the CEC proceeding because a portion of dry or hybrid cooling equipment would have had to encroach on the adjacent PG&E switchyard property.[11] It was, and still is, highly questionable whether Dynegy would be able to lease or purchase additional property from PG&E that is currently being used for PG&E's switchyard.

Moreover, space constraints render dry cooling not feasible for Track I compliance in that in the CEC proceeding for the proposed modernization project, the City of Morro Bay testified that it would not permit the Morro Bay facility's owner to have the site control (e.g., land easements, road access agreements) necessary for construction of a dry or hybrid-cooled plant.[12] Based on the space limitations and the City's concerns, the CEC concluded that "constructability issues alone indicate that dry cooling alternatives are not feasible."[13]

[9] See also Morro Bay Power Plant Modernization Project, 316(b) Resource Assessment, prepared for Duke Energy Morro Bay, LLC by Tenera Environmental Inc. (July 10, 2001), at 6-61 to 6-62 & 6-83 to 6-85 (copy enclosed as Attachment B) (rejecting a cooling pond for the Morro Bay modernization project as "not technically feasible ... because of its large land space requirement").
[10] Morro Bay 3rd RPMPD at 337.
[11] Morro Bay 3rd RPMPD at 337.
[12] Morro Bay 3rd RPMPD at 338.
[13] Morro Bay 3rd RPMPD at 339.

ii. Inability to Obtain Necessary Permits

a. Unacceptable Environmental Impacts

1. Insufficient PM_{10} Emission Reduction Credits

Based on a preliminary engineering analysis, wet cooling towers at Morro Bay for Units 3 and 4 would increase the facility's PM emissions by 204 tons per year (tpy) and PM_{10} emissions by 110 tpy, thus, 110 tons of PM_{10} offsets would need to be provided in the form of emission reduction credits (ERCs). However, Dynegy owns only about 19 tons of PM_{10} ERCs in the San Luis Obispo County Air Pollution Control District (SLOCAPCD) ERC registry, and the current total inventory of PM_{10} ERCs in the SLOCAPCD emissions registry is only 31 tons.[14] Thus, wet cooling at Morro Bay is not feasible because there are not sufficient PM_{10} ERCs in the SLOCAPCD to meet the air permit requirements needed to install and operate a wet cooling system.[15]

Other potential sources of offsets that were considered are (1) PM_{10} offsets created through control of other sources; (2) out-of-basin offsets; and (3) interpollutant offsets. First, the SLOCAPCD rules allow offsets to be created by applying emissions reductions beyond those required by District or federal requirements. However, these reductions must be real, permanent, surplus, and enforceable and must be deposited into the SLOCAPCD's ERC bank before the reductions can be used as offsets. Because the District is a nonattainment area for the state PM_{10} standard, even if new, uncontrolled sources of PM_{10} or PM_{10} precursors could be identified by Dynegy, it could be difficult to demonstrate that these reductions are surplus to those needed to bring the area into attainment with the state PM_{10} standards. Second, use of out-of-basin offsets is not allowed under SLOCAPCD rules.

Finally, under SLOCAPCD rules, if approved by the District, PM_{10} offsets may be provided in the form of NO_x and/or SO_x emissions reductions at ratios that are determined on a case-by-case basis. Dynegy owns approximately 31 tons of NO_x ERCs and 196 tons of SO_x ERCs. While Dynegy initially would appear to own adequate SO_x ERCs to offset the wet cooling tower PM_{10} at a SO_x to PM_{10} ratio of up to about 2 to 1, the interpollutant ratio and use of interpollutant ERCs must be approved by the SLOCAPCD on a case-by-case basis and it is not known what would be acceptable to the District at this time or in the future at the time of permitting. According to the SLOCAPCD ERC registry,[16] there are approximately 108 tons of NO_x ERCs and 304 tons of SO_x ERCs beyond those already owned by Dynegy. However, acquiring NO_x and/or SO_x ERCs from other entities would require the sellers to forego projects they intended to pursue. Therefore, it is unclear that Dynegy could be successful in acquiring sufficient interpollutant offsets to provide the required ERCs for wet cooling towers at Morro Bay.

[14] San Luis Obispo County APCD Emission Reduction Credits, received from the SLOCAPCD on Feb. 14, 2011 ("SLOCAPCD ERC Registry") (copy enclosed as Attachment C).
[15] The SLOCAPCD has not been designated a state or federal $PM_{2.5}$ nonattainment area. Therefore, $PM_{2.5}$ offsets would not be required. $PM_{2.5}$ permitting requirements are discussed further below.
[16] SLOCAPCD ERC Registry (see Attachment C).

Thus, barring SLOCAPCD approval of interpollutant ERCs, even if Dynegy were successful in purchasing all currently available PM_{10} ERCs (which would require the sellers to forego whatever projects they themselves intended to pursue with their ERCs), there would be insufficient PM_{10} ERCs to obtain the necessary air preconstruction permit for wet cooling towers, making them not feasible. Indeed, the CEC previously recognized that the Morro Bay area contains insufficient ERCs to compensate for particulates that would be emitted by salt water cooling towers.[17] That conclusion remains accurate today and, thus, Track I compliance using wet cooling towers is not feasible.

While there are no data available regarding PM_{10} emissions from spray cooling ponds, it is expected that such emissions would be comparable to, or somewhat less than, those associated with wet cooling towers for a comparable heat rejection load. Thus, the ERC constraints identified above are also expected to be present for the spray cooling pond compliance option.

2. Conflicts with Noise Standards

Track 1 compliance is not feasible at Morro Bay due to conflicts with local noise standards.

The City of Morro Bay has adopted specific noise performance standards for stationary sources in the Noise Element of the General Plan. The most stringent of these is a nighttime hourly standard of 45 dBA.[18] A first order analysis of alternative cooling options during the CEC proceeding showed increased noise at several sensitive receptors using "best case" modeling that incorporated all possible mitigation strategies. The CEC found that all variations of closed cycle-cooling would violate the noise ordinance standards.[19] The CEC also expressly concluded that "the hybrid option could not meet local noise standards and was therefore not feasible"[20] and expressly rejected dry cooling as not feasible at Morro Bay due, in part, to its "serious noise … impacts".[21] Fans associated with mechanical draft wet cooling towers are likely to similarly exceed local noise standards.

Moreover, during the CEC's consideration of the proposed modernization project, the City of Morro Bay Planning Commission adopted a resolution that opposed dry cooling due to its adverse impacts including noise.[22]

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[17] Morro Bay 3rd RPMPD at 328.
[18] California Energy Commission, Morro Bay Power Plant Project, Final Staff Assessment Part 1, at 3.3-4 (Nov. 2001).
[19] Morro Bay 3rd RPMPD at 351 (Finding 14) (identifying two "possible" exceptions -- a smaller noise mitigated design and an undersized hybrid design that were exactly at the 45-dB limit -- however, the noise estimates for those designs were not commercially guaranteed and once constructed, if the noise limit was exceeded, no additional noise reduction was possible, resulting in a risk of non-compliance with the applicable noise standards).
[20] Morro Bay 3rd RPMPD at 328.
[21] Morro Bay 3rd RPMPD at 328.
[22] Morro Bay 3rd RPMPD at 343, n.95 (Planning Commission Resolution No. 01-01 finding that dry cooling could cause unnecessary noise).

Based on these CEC analyses, closed cycle cooling alternatives at Morro Bay are not feasible due to conflicts with the City of Morro Bay's noise standards. These conflicts would preclude obtaining needed permits and approvals, rendering Track 1 compliance using closed cycle cooling alternatives infeasible.

b. Conflicts with Visual Standards

Conflicts with visual standards render Track 1 compliance options at Morro Bay not feasible.

The City of Morro Bay has scenic views from and towards Morro Rock and is located along a State Designated Scenic Highway. The Coastal Act, as well as local land use policies, requires protection of the visual corridors in and around Morro Bay. For example, Section 30251 of the Coastal Act states:

> The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas to minimize alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

Additionally, there are numerous local laws, ordinances, regulations and standards (LORS) that must be complied with, including the City of Morro Bay's Local Coastal Plan Policy. For example, the City of Morro Bay's Local Coastal Plan Policy 5.01 states: "Power Plant expansion shall be limited to small facilities whose location would not further effect the views of Morro Rock from State Highway One and high use visitor-serving areas, consistent with Policy 12.11." Similarly, the City of Morro Bay's Local Coastal Plan Policy 12.01 requires that permitted development protect the scenic and visual qualities of coastal areas and that new development in highly scenic areas, such as that around the Morro Bay Power Plant, be subordinate to the character of the setting.

The CEC's analysis concluded that dry cooling alternatives for the replacement plant (the alternatives considered were 110 to 115 feet tall and would cover more than two football fields) would impose a significant visual impact on the City of Morro Bay and views of the coast and Morro Rock from Highway 101[23] and that dry cooling structures would significantly degrade the viewshed.[24] The CEC staff also analyzed two hybrid cooling options that would consist of both a wet cooling tower and a dry cooling section

[23] Morro Bay 3rd RPMPD at 340.
[24] Morro Bay 3rd RPMPD at 341, and 350 at Finding 8.

(air cooled condenser or "ACC").[25] The original hybrid cooling system configuration was assumed to consist of an ACC that would be approximately 260 feet long by 87 feet wide, and approximately 30 feet high to the fan deck and 82 feet to the top of the steam header. The wet cooling towers would be 84 feet long by 42 feet wide, and approximately 57 feet high per tower.[26] The second hybrid cooling option included a noise-mitigated ACC, which was larger (265 feet long) and taller (100 feet to the top of the steam header) than the original configuration.[27]

Wet or dry cooling towers, particularly natural draft cooling towers, are considerably taller than an ACC structure analyzed by the CEC, and would have even more adverse impacts on the viewshed.

Further, the CEC staff plume modeling analysis for the hybrid cooling option determined that:

> …the use of conventional cooling towers at this location would result in the formation of substantial steam plumes approximately 92% of daylight hours. The 10% frequency plume during daylight hours would be approximately 718 feet long x 645 feet high x 126 feet wide. These plumes would be visually dominant and would cause significant view blockage. The resulting visual impact would be adverse and significant.[28]

Because of the potential for significant visual impacts from the cooling tower plumes, the staff recommended that only plume-abated wet cooling towers be considered. However, as discussed above, even if the visible plume impacts could be mitigated, the hybrid option was determined not to be feasible because of noise impacts.

The City of Morro Bay also has adopted several resolutions directly opposing dry and hybrid cooling systems at the Morro Bay Power Plant based on their massive unsightly visual impacts. Specifically, the City Council of Morro Bay passed Resolution No. 57-01, which opposed alternative cooling methods that would "would adversely affect the City's beauty and uniqueness, would cause or exacerbate adverse effects on visual … and other local natural resources compared to the proposed project [using once-through cooling]."[29] City Council Resolution No. 72-01 further found that the closed cycle cooling methods analyzed by the CEC would adversely affect the City's beauty and uniqueness, and would cause or exacerbate adverse effects on visual, as well as other local natural resources. Similarly, Planning Commission Resolution No. 01-01 found that dry cooling could cause an unsightly and unnecessary visual blight on

[25] California Energy Commission, Morro Bay Power Plant Project, Final Staff Assessment Part 3, Aquatic Biological Resources Appendix A at 32 (April 2002) ("Morro Bay FSA Part 3"). A 100 percent wet cooling option was not evaluated in the cooling options assessment because the assessment was intended to evaluate alternatives to seawater cooling and the staff determined that there are not sufficient sources of fresh water in the area.
[26] Morro Bay FSA Part 3 at 33-34.
[27] The CEC found that the cooling options analyzed by the staff were undersized for the project as designed. Morro Bay 3rd RPMPD at 330. Therefore, properly designed alternative cooling structures would be expected to be even larger than those described here.
[28] Morro Bay FSA Part 3 at 103.
[29] Morro Bay 3rd RPMPD at 337, 339-348.

the community. And City Council Resolution No. 20-20 found that alternative cooling would adversely affect the City's beauty and uniqueness.[30]

In short, Track I compliance using closed cycle cooling alternatives at Morro Bay is not feasible due to conflicts with visual standards and installation of alternatives would create a significant un-mitigatable impact.

c. Conflicts with Local Land Use Regulations

Track 1 compliance is not feasible at Morro Bay due to conflicts with local land use regulations. The CEC found that dry and hybrid (wet/dry) cooling conflicted with the City of Morro Bay's zoning policies and plans.[31] In fact, the City of Morro Bay testified that dry cooling and hybrid cooling were inconsistent with the City's Ordinances and standards.[32] Wet cooling would similarly conflict with these local land use regulations.

Program LU-39.1 in the City of Morro Bay General Plan and Policy 12.06 in the Coastal Land Use Plan (CLUP) requires that the plant site be designated for coastal-dependent use. Accordingly, the Morro Bay site is zoned M-2, coastal–dependent industrial. The CLUP defines "coastal–dependent industrial" as an area for uses that must be "located on or adjacent to the sea in order to function." The elimination of once-through cooling with dry cooling or an air cooled condenser would put the plant in violation of its zoning designation. In the CEC proceeding for the proposed modernization project, the City of Morro Bay specifically concluded that a dry-cooled facility would not be coastal dependent and would therefore violate the City of Morro Bay's zoning ordinance.[33]

In addition to conflicts with zoning requirements, the use of closed cycle cooling at Morro Bay would, as previously determined by the CEC, violate many other local land use policies of the City of Morro Bay.[34] For example, the CEC's analysis of closed cycle cooling identified the following conflicts with the City of Morro Bay's local land use policies:[35]

- the height and size of the closed cycle cooling structures conflicts with Morro Bay General Plan Policy LU-15, which requires that the present human scale and leisurely, low-density appearance of Morro Bay should be maintained through careful regulation of building height, location and mass;

- closed cycle cooling structures would conflict with Policy LU-38, which requires encouragement of small high-quality non polluting industrial development;

- closed cycle cooling structures would conflict with Policy LU-30, which requires that power plant expansion be limited to small facilities;

[30] Morro Bay 3rd RPMPD at 343 n.95.
[31] Morro Bay 3rd RPMPD at 339-348.
[32] Morro Bay 3rd RPMPD at 342.
[33] Morro Bay 3rd RPMPD at 351 (Finding 15).
[34] Morro Bay 3rd RPMPD at 345.
[35] Morro Bay 3rd RPMPD at 345.

- the elevated noise from closed cycle cooling structures would likely conflict with several objectives of the City's General Plan noise element;

- the visual impact of closed cycle cooling structures would cause land use inconsistencies; and

- one closed cycle cooling alternative evaluated would have been located in an environmentally sensitive habitat area in violation of numerous City land use policies and would have created cultural resource impacts that violated other land use policies.

An analysis by Duke Energy during the CEC licensing process for the Morro Bay modernization project identified numerous conflicts with existing land use regulations and ordinances stemming from the construction of alternative cooling technologies at the site. An updated analysis of those conflicts with LORS is enclosed as Attachment D. These LORS conflicts render Track 1 compliance not feasible at Morro Bay.

d. Conflict with Federal Flood Control Requirements

Analysis of alternative cooling technologies for the Morro Bay modernization project indicated that alternative cooling technologies, including dry cooling and hybrid cooling, would have to be located in or near the flood overflow path identified in the Morro Creek Flood Hazard Evaluation (June 12, 2001).[36] The cooling equipment would be subject to flooding. Moving the berms further east to protect the cooling equipment would locate the berms in and could impede or block the flood overflow pathway. Moving the berms also would require the Federal Emergency Management Agency (FEMA) map to be changed and therefore FEMA approval, as well. In turn, flooding could be exacerbated elsewhere during a base flood event. Consequently, construction of alternative cooling equipment may be prohibited due to regulatory constraints and subject Dynegy to unacceptable risk of liability.

e. Significant Impacts on Terrestrial Biology

Analysis of alternative cooling technologies for the Morro Bay modernization project found that construction of alternative cooling technologies on property adjacent to the Morro Bay Power Plant would significantly impact terrestrial species.[37] Morro Bay is within an Environmental Sensitive Habitat Area (ESHA) of riparian woodland. Alternative cooling technologies would result in a direct, permanent impact of approximately 1.18 – 1.33 acres of riparian ESHA habitat.

[36] The CEC's decision noted that a portion of the Morro Bay project site and surrounding areas are located in a 100-year floodplain. See Morro Bay 3rd RPMPD at 403. Duke Energy's analysis of alternatives to once-through cooling found that the location of alternative cooling facilities would be in the 100-year floodplain.

[37] Morro Bay 3rd RPMPD at 345.

B. Retirement and/or Repowering as Potential Compliance Options

Dynegy currently does not have any definitive plans to retire or repower any of the Morro Bay Units. However, unless the Policy's December 31, 2015 final compliance deadline for Morro Bay is suspended or otherwise extended, if Dynegy determines in its sole discretion that no commercially viable impingement and entrainment control measures capable of achieving compliance with Track 2 exist for any of the Morro Bay Units, Dynegy anticipates ceasing water intake flows to the Morro Bay Unit(s) by December 31, 2015 until either (i) that time after the final compliance deadline as commercially viable control measures meeting Track 2, if any, can be implemented, or (ii) a decision is made to retire the Unit(s).

In addition, unless the final compliance deadline is suspended or otherwise extended, in the event no commercially viable impingement and entrainment control measures capable of achieving compliance with Track 2 are identified, Dynegy may consider repowering Morro Bay Units 3 and 4, contingent on certain key factors, including determination of permitted technologies, energy market conditions, and other issues affecting commercial viability, such as securing a suitable long-term power sales/ power purchase agreement(s) for the output of the repowered units or other sources of capital. A specific on-line date for a repowered unit is not currently knowable given the many variable contingencies and current unknown factors that would affect a repowering schedule, if repowering is pursued. Additional conceptual information regarding a potential repowering project involving Morro Bay Units 3 and 4 is provided below in response to Item 5.

2. Describes the general design, construction, or operational measures to be undertaken to implement your selected alternative.

a. If Track 1 is selected, will the units be re-powered, or retrofitted, and will closed-cycle wet cooling or dry cooling be employed?

Not applicable. Track 1 is not the selected compliance alternative at Morro Bay.

b. If Track 2 is selected, what combination of impingement and entrainment control measures has been or will be employed on each unit at your facility? For example, such control measures may include, but are not limited to, closed-cycle cooling (wet or dry), reductions in velocity at the intake, movement of the intake structure, application of screens on the intake structure, reductions in flow, either operationally or mechanically (e.g., variable frequency drive pumps), installation of fish return systems, etc.

Morro Bay currently utilizes bar racks (3/8 inch bars spaced three inches apart) followed by 3/8 inch mesh vertical traveling water screens to reduce impingement and entrainment.

At this time, Dynegy has not made a final decision regarding what, if any, impingement and entrainment control measure(s) (or, alternatively, repowering) may be employed on each Unit at Morro Bay to meet Track 2. It is currently uncertain which, if

any, control measure(s) (i.e., impingement and entrainment reduction technologies, operational practices, or some combination of both) will enable any one of Morro Bay Units 1-4 to comply with Track 2.

Dynegy's Implementation Plan for Morro Bay will proceed in two phases. In the first phase, Dynegy intends to continue to investigate the viability of various impingement and entrainment control measures, independently and in combination with one another, that may enable the Morro Bay Units to meet Track 2 requirements. In the second phase, based on the results of the investigations in the first phase, Dynegy will in its sole discretion determine whether any impingement and entrainment control measures, individually or in combination, are commercially viable to achieve Track 2 compliance at any of the Morro Bay Units and decide on which control measure(s), including the possibility of repowering or retirement, to pursue. The control measures(s) that Dynegy ultimately selects for any one of the four Morro Bay Units may be different than the measure(s) selected for the other Units. Dynegy will then submit an updated Implementation Plan for Morro Bay and, upon receipt of approval from the Board (and receipt of any other necessary permits from other regulatory authorities), proceed to implement such measures.

In the first phase of its Implementation Plan for Morro Bay, Dynegy intends to study select control measures, either independently and/or by participating with other California coastal power plant owners and operators in pilot studies and/or support studies of certain impingement/entrainment reduction technologies.[38] The pilot studies generally would be aimed at identifying the potential biological performance of selected technologies. The support studies would provide data necessary for thorough evaluation of the potential biological performance of the technologies or potential operations and maintenance issues with the technologies. Before a final decision is made to pursue any particular control measure(s) at Morro Bay, additional site-specific engineering or other evaluations may be needed.

Dynegy has not yet made a final decision regarding which studies, if any, it may pursue in the first phase of its Implementation Plan for Morro Bay. Studies that Dynegy is currently considering include, but are not limited to, the following:[39]

- Cylindrical Wedgewire Screens

This pilot study would be conducted at the West Basin Municipal Water District (WBMWD) pilot desalination facility in Santa Monica Bay. As currently envisioned, the study would address the effectiveness of different slot size wedgewire screens in excluding larval forms, the effectiveness of wedgewire screens in reducing impingement, and the clogging and fouling rates of the wedgewire screens modules.

[38] As currently envisioned, Tenera Environmental Inc. and MBC Applied Environmental Sciences would perform the studies involving the participation of other California coastal power plants.

[39] Other studies may be pursued. For example, based on preliminarily analysis, Dynegy does not currently intend to study dual flow (double entry-single exit) screens as a potential control measure for meeting Track 2, but we may revisit this compliance option again in the future.

- Fine Mesh Traveling Screens

This study would evaluate fine mesh screen efficacy to minimize mortality of both impingeable and entrainable life stages. As currently envisioned, the first phase of the study would involve flume trials of fine mesh screen impingement and return system mortality. The second phase would involve a full traveling screen trial to provide real-world proof regarding the reduction of larval mortality using fine mesh screens.

- Hydrodynamic Studies of Wedgewire Screen Intakes

These studies would provide hydrodynamics data and information to assess the effectiveness of different wedgewire screen intake designs. The results of these studies would supplement previous modeling work performed for the WBMWD desalination project. As currently envisioned, the studies would include an evaluation of the entrainment reduction efficiency of the screens as a function of sweeping flows.

- Cooling Water Intake Structure Survival Assessment

Larval mortality as a result of passage through once-through cooling water systems is less than 100 percent for some species, and survival may actually be high for some organisms. This may be especially true for facilities, like Morro Bay, that do not have offshore intakes with long conduits, since predation in long conduits can be a significant source of larval mortality. The potential for even low levels of survival may help Morro Bay achieve compliance with Track 2. As currently envisioned, this assessment would involve laboratory tests of factors that contribute to entrainment mortality (e.g., pressure and temperature changes, physical impacts and turbulence, macrofouling predation) to provide guidance on the feasibility of pursuing site-specific field studies of through-plant survival.

- Orientation of Wedgewire Screen Intakes

This study would evaluate the entrainment reduction performance effects of changing the orientation/direction of wedgewire screens. Tenera Environmental Inc. would perform the pilot study at the Santa Cruz desalination plant in conjunction with the City of Santa Cruz Water Department.

- AquaSweep^{tm} Technology

AquaSweep^{tm}, a non-screening technology based on the principle of inertial separation, is an emerging impingement and entrainment reduction technology being developed by C-Water Technologies, Inc. Computational fluid dynamic modeling has successfully demonstrated that AquaSweep^{tm} effectively excludes fish eggs and larvae while allowing water to pass into the power plant intake. In the next phase of AquaSweep^{tm} development, a scaled proof-of-concept model will be built and tested. Additional information regarding AquaSweep^{tm}, including a description of the technology and a timeline for its commercialization, is provided in Attachment E.

- Operational Control Measures

This study would evaluate various operational scenarios for reducing entrainment that can be optimized around seasonal and diel variation in larval concentrations at Morro Bay. The scope of this work would primarily involve the development of an entrainment data modeling tool for use in evaluating different operational scenarios involving different technological control measures that will allow calculation of estimated entrainment based on various reductions in intake water flow on a monthly or daily basis. The modeling data may also have applicability to impingement compliance strategies.

c. If closed-cycle wet cooling is selected as a compliance alternative, the plan must address whether recycled water of suitable quality is available for use as makeup water.

Not applicable. Closed-cycle wet cooling is not selected as a compliance alternative at Morro Bay.

3. Proposes a realistic schedule for implementing these measures that is as short as possible. In proposing a schedule, identify specific milestones and associated dates for measure implementation, including: procurement cycles for entities to which plant output is sold, any necessary permits, demolition of existing facilities, and construction of new components.

After evaluating the results of any impingement and entrainment control measures studies that it may pursue, Dynegy will determine in its sole discretion which option(s), if any, are commercially viable for achieving Track 2 compliance at Morro Bay. Once Dynegy has made a final decision regarding which control measure(s), if any, will be pursued, Dynegy will submit an amended Implementation Plan with a revised implementation schedule that provides more definitive timeframes and/or approximate dates.

Pending a final decision selecting a control option(s) to pursue, and based on the limited information currently known and available, Dynegy provides the following initial preliminary implementation schedule with estimated approximate timeframes/dates. The initial preliminary schedule covers any potential impingement and entrainment technologies that may be studied. The tasks and estimated approximate dates in this initial preliminary schedule are subject to material change as relevant information develops and future events occur.

Task	**Estimated Approximate Timeframe/Date(s)**
Studies of Control Measures	4/1/11 - 4/1/13
Determine Commercial Viability of and Select Compliance Option, Secure Power Purchase Agreement & Submit Amended Implementation Plan	1/1/14

SWRCB Approval of Amended Implementation Plan and Issuance of Necessary Permits by Other Agencies[40]	10/31/14
Engineering & Procurement/Equipment Manufacturing	11/1/14 -5/31/15
Construction and Commissioning	6/1/15 - 12/1/15
Outages:[41, 42]	
Unit 3	6/8/15 - 8/14/15
Unit 4	9/15/15 - 11/23/15
Final Compliance (All Units)	12/1/15

Securing a commercially acceptable power purchase agreement is a critical path task, as are Board approval of the amended implementation plan and obtaining any necessary permits from other regulatory agencies. If these critical path tasks are not successfully completed or are delayed, implementation of the remaining tasks would be terminated or delayed.

4. Identifies the time period, if any, when generating power is infeasible and describes measures taken to coordinate this activity through the appropriate electrical system balancing authority's maintenance scheduling process and/or infrastructure planning process. For each period when power generation is infeasible, describe the reason for this constraint.

Given that Dynegy has not yet made a final decision on which control measure(s) will be pursued to meet Track 2, we cannot identify with certainty the time period, if any, when generating unit outages must be taken due to installation of the selected control measure(s). A preliminary estimate of approximate outage dates under any potential technology installation scenario is identified in the response to Item II.3 above and, with respect to a potential repowering scenario, if pursued, in Item II.5 below. Planned maintenance outages during which generating power is infeasible are addressed in the response to Item III.2 below. Once Dynegy decides which impingement and entrainment control measure(s) will be pursued, an amended Implementation Plan will be submitted to identify more definitively the time periods, if any, when generating unit outages will be taken. Dynegy will submit and coordinate all necessary scheduled generating unit outages with the California Independent System Operator Corporation (CAISO) in accordance with the outage coordination requirements set forth in the CAISO tariff, to which Morro Bay is bound through its Participating Generator Agreement with the CAISO.

[40] If California Environmental Quality Act (CEQA) review is required for any necessary permits or any necessary permits are contested, the schedule for remaining tasks may be materially delayed.
[41] Outages, if any, taken for purpose of compliance with the Policy would be subject to future applicable energy purchase and sales agreements in effect at the time.
[42] Given the current non-operating status of Units 1 and 2, outages for Units 1 and 2 are not identified.

5. If implementation plans include re-powering of existing units, please provide as much detail as possible on the new generating units, as specified below.

Dynegy currently does not have any definitive plans to repower any of the Morro Bay Units. However, based on studies of impingement and entrainment control measures that it may pursue, if Dynegy determines that no control measures are commercially viable for Units 3 and 4 to achieve compliance with Track 2, Dynegy may consider repowering Units 3 and 4.[43] Any decision to repower Units 3 and 4 would be contingent on certain key factors and currently unknown future variables, including determination of permitted technologies, energy market conditions, and other issues affecting commercial viability, such as first securing a commercially acceptable long-term power sales/power purchase agreement(s) for the output of the repowered units or other sources of capital. The following discussion of a possible repowering scenario is for conceptual purposes only, is based on a preliminary analysis, and is subject to material change. In the event Dynegy decides to pursue repowering of Units 3 and 4, Dynegy will submit an amended Implementation Plan with appropriate details.

a) The size (in Mega Watt) of the re-powered generating units

If repowering is pursued using fossil fuel technologies, based on preliminary analysis, the approximate size of the repowered unit(s) would be up to 164 MW (nominal). A key factor limiting the size of a potential repowering project involving Morro Bay is the availability of emission reduction credits (ERCs), particularly for nitrogen oxides (NO_x).

b) Technology of the re-powered units (i.e., combined-cycle, single gas turbines, etc.)

If repowering is pursued using fossil fuel technologies, based on a preliminary analysis, the repowered unit would be a natural gas-fired simple-cycle turbine(s). Smaller units, including the possibility of natural gas-fired reciprocating engines, or a slightly larger repowered unit may be feasible from an ERC/air permitting perspective if additional ERCs become available or if use of interpollutant ERCs is permitted by the San Luis Obispo County Air Pollution Control District (SLOCAPCD).

c) The amount of power that would still be generated during repowering process, and the ultimate generating output once the repowered process has been completed

If repowering is pursued using fossil fuel technologies and assuming, based on a preliminary analysis, that a 164 MW repowering unit can be permitted from an ERC perspective, approximately 486 MW of available power generation to the grid would be lost by the replacement of Units 3 and 4 (i.e., 650 MW, the rated net capacity of existing Units 3 and 4, less 164 MW from the repowered unit = 486 MW lost). Because Dynegy has not yet made a final decision to pursue repowering and, if so,

[43] Based on a preliminary analysis, Dynegy does not believe that Units 1 and 2 are viable candidates for repowering because the retirement of those Units would not be expected to generate ERCs. If other sufficient ERCs in the SLOCAPCD could be acquired, repowering Units 1 and 2 may be feasible.

how repowering would be physically implemented on site, it is presently unknown whether power would still be generated by Units 3 and 4 during any repowering process.

d) Timetable for the above repowering process

A timetable for a repowering option, if pursued, is not available due to the many variable contingencies and currently unknown factors that would affect any such timetable. In very general terms, based upon the results of the studies of impingement and entrainment control measures that may be pursued, if Dynegy determines that no control measures are commercially viable for Units 3 and 4 to achieve compliance with Track 2, we estimate that a repowering option, if pursued, would take approximately 36 to 42 months to implement, with major milestones to include, but not limited to, securing a commercially acceptable power purchase agreement, design engineering, permitting, construction, and startup commissioning.

e) Electrical characteristics of the new repowered generating units if available when implementation plans are submitted

Electrical characteristics of a repowered generating unit(s), if pursued, are not available at this time.

f) Available information on obtaining required air permits and required offsets

If repowering is determined to be commercially viable and if it is pursued, Dynegy would need to obtain an air permit from the SLOCAPCD prior to commencing construction on the repowering unit(s). We estimate that the air permitting process could take 12 to 18 months or more, depending on whether a Prevention of Significant Deterioration (PSD) permit is required, once a complete permit application is filed. Based on preliminary analysis, we believe that repowering with an approximate 164 or 100 MW unit, or two 50 MW units, would trigger PSD permitting for at least one pollutant (i.e., GHGs). Because the SLOCAPCD does not implement its own PSD permitting program, a project that required a PSD permit would have to obtain that permit from USEPA, a process that can take several years.[44] Further, once the PSD permit is issued it can be appealed to the USEPA Environmental Appeals Board (EAB). An appeal to the EAB automatically stays the effectiveness of the PSD permit until the appeal is resolved, which generally requires a minimum of six months.

At this time, based on preliminary analysis, Dynegy believes that a maximum of approximately 164 MW in repowering could be installed at Morro Bay without additional ERCs beyond those generated by the shutdown/repowering of Units 3 and 4 and Dynegy's current ERC holdings in the SLOCAPCD. The potential retirement of Units 3 and 4 by itself would only create sufficient contemporaneous ERCs to allow a repowering project of approximately 50 MW. The limiting pollutant generally

[44] The previous effort to obtain a PSD permit for the Morro Bay modernization project that would have replaced the existing Units required seven years.

is NO_x. If the SLOCAPCD were to allow use of interpollutant offsets, such as VOC for NO_x, and/or if NO_x or PM_{10} ERCs could be acquired from other sources, multiple smaller units or a slightly larger repowered unit may be feasible from an ERC/air permitting perspective. However, while NO_x and PM_{10} ERCs have been banked in the SLOCAPCD,[45] it is unknown if Dynegy could acquire any of these ERCs (and, if so, how many) because it would require the current owners of those ERCs to forego whatever projects they themselves may intend to pursue with their ERCs. As a result, any repowered unit at Morro Bay may be effectively limited to the contemporaneous emission reductions generated by the shutdown/repowering of the existing Units and Dynegy's ERC holdings in the SLOCAPCD.

Importantly, in addition to an air preconstruction permit, other environmental permits or approvals may be needed before repowering of Units 3 and 4 could be pursued (e.g., CEC certification, California Coastal Commission). The permitting process to obtain any one of these required permits could significantly delay the timetable for a potential repowering process and the inability to obtain such a required permit would preclude the project.

6. Identifies the transmission configuration around the units, and specifies planned upgrades and known contingencies related to these transmission facilities, so as to document awareness of transmission improvements as part of the generation planning process.

Morro Bay is located in the Los Padres planning area. Dynegy, as an independent power producer, and not a transmission owning or operating utility, does not have the knowledge needed to provide a detailed response to this question. Information regarding the CAISO's transmission planning process can be found at http://www.caiso .com/1f42 /1f42d6e628ce0.html. The CAISO's 2010/2011 statewide conceptual transmission plan can be found at http://www.caiso.com/2b0a/2b0aec5d58d70.pdf. The CAISO's most recent reliability assessment, which sets forth the CAISO's proposed mitigation for several contingencies involving transmission lines terminating at Morro Bay, is available at http://www.caiso.com/280d/280dc32b51b0.pdf.

As currently envisioned, any repowering project involving Morro Bay, if pursued, would result in fewer MW at Morro Bay than is currently located there. Consequently, Dynegy does not believe any transmission modifications or upgrades would be required solely to accommodate repowering, if pursued, at Morro Bay. Likewise, we do not believe that any transmission modifications or upgrades would be necessary if only impingement and entrainment control measures are installed for any Morro Bay Units to meet Track 2. Again, apart from information made available through the CAISO transmission planning process, Dynegy does not have information regarding PG&E's plans for transmission modifications in the Los Padres planning area.

[45] SLOCAPCD ERC Registry (see Attachment C). The current total inventory of NO_x and PM_{10} ERCs in the SLOCAPCD is approximately 139 tons and 31 tons, respectively.

7. In addition to the implementation plan, please provide any prior studies that accurately reflect current impingement or entrainment impacts. Prior impingement studies must accurately characterize the species currently impinged and their seasonal abundance. Prior entrainment studies must account for seasonal variation in oceanographic conditions and larval abundance and behavior such that abundance estimates are reasonably accurate and must have used a mesh size of 333 or 335 microns for entrained larvae sampling.

The Morro Bay Power Plant Modernization Project 316(b) Resource Assessment (July 10, 2001) ("MBPP 316(b) Resource Assessment"),[46] a copy of which is enclosed as Attachment B, accurately reflects current impingement and entrainment impacts of the existing Morro Bay Power Plant (MBPP) intakes.

The MBPP 316(b) Resource Assessment contains the study plan, description of field and analytical methods, detailed results, and evaluation of alternative intake technologies. These most recent entrainment and impingement studies were designed in collaborative effort by scientists representing Federal and State resource and regulatory agencies and academic institutions. The Technical Working Group (TWG) scientists routinely attended meetings for the specific purpose of designing sampling plans that would accurately describe the species composition, abundance and behavior of larval fishes and shellfishes that were entrained and also living in the facility's source water and at risk to entrainment. The statistical design of the studies also took into account the need to identify spatial and seasonal variation in these populations, particularly as might be influenced by oceanographic conditions during the course of the study. A rigorous quality assurance and control program[47] exercised throughout the study audited the field, laboratory and analytical methods employed during the studies. Study results were routinely shared with TWG members to enable real-time review and opportunity for study plan modification. This adaptive management process facilitated the high degree of accuracy that was achieved in both the entrainment and impingement studies' results.

The benefit of entrainment reduction is not evaluated as a simple percent reduction in the number of larval entrained, but instead it is the ratio of the number of larvae entrained to the number of an individual species' larvae at risk to entrainment. Considering just the number of larvae entrained does not provide any information on the potential impact to the entrained species' population or its sustainability. However considering the ratio of the number of species' larvae entrained to the number at risk to entrainment is a true measure of impact and potential risk to the population. It is also a statistic that is immune to seasonal and annual changes (variations) in a species' larval abundances.

[46] Morro Bay Power Plant Modernization Project 316(b) Resource Assessment, prepared for Duke Energy Morro Bay LLC by Tenera Environmental Inc. (July 10, 2001).

[47] A laboratory quality control (QC) program for all levels of laboratory sorting and taxonomic identification was applied to all samples. The QC program also incorporated the use of outside taxonomic experts to provide taxonomic QC and resolve taxonomic uncertainties.

The entrainment study design adopted by the TWG scientists employed a method of assessing entrainment impacts that essentially eliminated traditional statistical concerns of interannual variation in larval abundance. The sampling and analytical methodology, as recognized by its acronym "ETM" (Empirical Transport Model) and described in a CEC publication,[48] has been widely applied throughout the State by Regional Water Quality Control Boards, the CEC, the California Department of Fish and Game (CDFG), the California Coastal Commission, and other State and Federal resource and regulatory agencies to assess entrainment impacts. The steady oversight of the TWG scientists throughout the course of the MBPP 316(b) Resource Assessment from study design to final report along with the project's QC program assured the assessment's thorough, accurate, and purposeful findings.

Weekly entrainment sampling began June 21, 1999 and continued through August 10, 1999 (Table 3-1). A species initially identified as tidewater goby *Eucyclogobius newberryi*, a federally listed endangered species, was collected during Survey 2 (June 28, 1999). This species was identified and confirmed by taxonomists in early August 1999.[49] The U.S. Fish and Wildlife Service (USFWS) and the CDFG were immediately notified regarding the collection of tidewater goby and all plankton sampling was suspended pending filing of a USFWS Endangered Species Recovery Permit Application to allow for the collection of the tidewater goby. The permit was received on December 2, 1999 and weekly sampling resumed December 14, 1999 and continued through December 29, 2000.

Samples were collected in front of the MBPP intake structures (Station 2; Figure 3-1) by towing a bongo frame with 0.71 m (2.3 ft) diameter openings and equipped with two 335 µm white mesh plankton nets. Samples were collected over a continuous 24-hour period; each period was divided into six 4-hour sampling cycles. Two tows were conducted during each cycle. Sample collection methods were similar to those developed and used by the California Cooperative Oceanic and Fisheries Investigation (CalCOFI) in their larval fish studies (Smith and Richardson 1977).

The findings of the MBPP 316(b) Resource Assessment are as relevant today for the purpose of assessing potential entrainment and impingement effects as when reported in 2001. By the analytical design discussed above, entrainment impacts were assessed using methodology immune from change over time, if there are no changes in the location, capacity or operation of the intake or in the source water biological and hydrodynamic characteristics. The location and capacity of the MBPP intakes have not changed since 2001, nor has the permitted intake flow been modified, even though operation of the intake has declined nearly 90 percent over the intervening 10 years. Additionally, there have been no significant alterations of the source water hydrodynamics, other than minor infilling and dredging of Morro Bay. Therefore, the ratio of permitted intake flow withdrawal to source water flow has remained unchanged. Moreover, there is no reason to believe that there has been significant change in the

[48] Steinbeck, J., J. Hedgepeth, P. Raimondi, G. Cailliet, and D. Mayer, Assessing Power Plant Cooling Water Intake System Entrainment Impacts, California Energy Commission Consultant Report, CEC-700-2007-010 (2007). The authors of this peer-reviewed paper were also members of the TWG, along with other agency scientists.

[49] DNA analysis later disproved the initial meristic identification of the specimen as a tidewater goby.

species composition of source water or the species composition of entrained organisms.

Source water for the MBPP is withdrawn from tidal flows that ebb and flood past the plant's shoreline intake located inside the Bay. The majority of the facility's source water originates from inside the Bay with smaller amounts coming from outside the Bay during high tides. However, even this incoming ocean source water is a mixture of recently ebbed bay water and ocean water that has been strongly influenced by its tidal residence in Morro Bay.

The species composition of larval fishes collected in the MBPP 316(b) Resource Assessment entrainment samples was mostly bay species. The Bay's larval fish fauna is dominated by three species of gobies that occupy mud burrows throughout the Bay's extensive intertidal and subtidal areas of shallow, soft-bottom habitat. These same species of gobies are ubiquitous in their distribution and occur in large numbers in most California bays and lagoons. Studies of their adult populations have shown in many instances the gobies appear to have completely saturated their available habitat. The ability of the two-inch fish to reproduce itself, laying a thousand eggs or more several times a year, guarantees a nearly continuous abundance of larval and juvenile gobies seeking available habitat. A fundamental flaw in the Policy is that the vast majority (up to 85 percent) of fish larvae that will be saved by reducing entrainment losses are goby larvae that need more coastal bay and lagoon habitat, not more unentrained larvae. While sound scientific evidence exists that restoration of California coastal habitat effectively mitigates entrainment losses of gobies (in addition to creating benefit in perpetuity for myriads of unentrained marine species), there is virtually no scientific evidence of such benefit from a Policy to reduce or eliminate once-through cooling entrainment losses. A corollary of this fact is that the Policy's focus on reducing once-through cooling entrainment will have no measurable benefit, particularly in bay and lagoon settings. This is also why it is reasonable to conclude that because there has been no significant change in the amount of available goby habitat in Morro Bay since the MBPP 316(b) Resource Assessment in 2001, the study's reported entrainment results and impact assessment remain accurate and valid at the present time.

Impingement study results reported in the MBPP 316(b) Resource Assessment remain accurate and valid at the present time by reason of lack of significant difference in species composition and relative abundance of an impingement study completed over 20 years earlier (1978-1979). This comparison of impingement results, as shown in Table 5-41 (p. 528) of the MBPP 316(b) Resource Assessment, provides strong reasonable assurance that given the observed general lack of change in species composition and relative abundances of juvenile and adult fishes impinged over 20 years ago, the 2001 impingement findings accurately represent impingement at the present time. The increase in the rank abundance of anchovy in impingement samples from 13th in 1978-1979 to the most abundant fish impinged in the 1999–2000 impingement study reflects a coastwide increase in anchovy populations that are centered hundreds of miles offshore. Otherwise the list of species and their rank abundance are remarkably little changed over the intervening 20 years between impingement studies.

In short, prior impingement and entrainment studies at Morro Bay accurately reflect current impingement and entrainment impacts of the existing cooling water intakes, thus, additional baseline impingement and entrainment studies are not needed.

III. Immediate and Interim Requirements in Section 2.C of the Policy

1. No later than October 1, 2011, an existing power plant with an offshore intake shall install large organism exclusion devices having a distance between exclusion bars of no greater than nine inches, or install other exclusion devices, deemed equivalent by the State Water Board. [remainder omitted]

Not applicable. Morro Bay does not have an offshore intake. The intake structures for Units 1-4 are located at the shoreline.[50]

2. No later than October 1, 2011, an existing power plant that includes a unit that is not directly engaging in power-generating activities or critical system maintenance must cease intake flows, unless you demonstrate to the State Water Board that a reduced minimum flow is necessary for operations. Therefore, by April 1, 2011, you must provide information regarding when it is likely that each unit in your facility may not be generating power, or when you are performing critical system maintenance that would result in the cessation of intake flows. This information may be provided in terms of likely months when there will be no intake flow, with the understanding that if a need for power arises, that intake flows will re-start, as long as appropriate documentation is later provided regarding that unexpected power demand. If a reduced minimum flow is necessary for operations during the period when power is not typically generated, then you must define specifically why that is the case and provide an estimate of minimum flows as compared to historic flows during corresponding months 2000-2005 when power is not typically generated.

A. Necessary Minimum Flow When Not Directly Engaged in Power Generating Activities/Critical System Maintenance

Morro Bay Units 1-4 are each equipped with two circulating water pumps. The total maximum cooling water intake flow, as permitted by the facility's NPDES permit, is 725 million gallons per day (MGD). The design flow rate of each of the Unit 1 and Unit 2 circulating water pumps is approximately 50,000 gallons per minute (GPM). The design flow rate of each of the Unit 3 and Unit 4 circulating water pumps is approximately 75,000 GPM. Each pump is limited to no-flow or full flow operation and each pump supplies one half of a Unit's steam condenser. When a Unit is in service directly engaging in power generating activities (i.e., paralleled to the grid), the normal mode of operation is for both circulating water pumps associated with the particular Unit to remain in service.

[50] There are two separate shoreline intake structures, one for Units 1 and 2, and one for Units 3 and 4. Each shoreline intake structure has initial bar racks with 3 inch openings between bars that exclude, among other things, large organisms.

As part of its once-through cooling system, Morro Bay also has four auxiliary salt water pumps and five screen wash pumps. The auxiliary salt water pumps each have a design flow of 1,400 GPM and operate to cool auxiliary plant equipment (e.g., bearing cooling water heat exchangers, air compressors, etc.) that operates whether or not the main Units are generating electricity. One of the four auxiliary salt water pumps operates continuously regardless of Unit operation, resulting in approximately 2 MGD in flows.[51] The screen wash pumps, each with capacity of 1,800 GPM, clean the traveling water mesh screens. Two lube water pumps, each rated at 125 GPM, are also used to ensure proper operation of the screen wash system.

Units 1 and 2 were removed from daily dispatch service to the grid in November 2003 and their main circulating water pumps have not operated since that time. In the event Units 1 and/or 2 are returned to service, we expect that when either of those Units is not engaging in power generating activities, intake flows would be ceased except as described in the scenarios described below for Units 3 and 4 (the flow rates would be adjusted per the lower design flow of the Unit 1 and 2 circulating water pumps) in which the reduced minimum flow is necessary for operations and critical system maintenance.

In accordance with Morro Bay's station operating policies that have been in effect for several years, when Unit 3 or 4 is not directly engaging in power generating activities, intake flows are ceased except as described in the following scenarios in which reduced minimum flow is necessary for operations and critical system maintenance (i.e., flow cannot be postponed until the Unit is generating electricity):

1. <u>When Unit 3 or 4 is out of service and not in start up or shut down mode:</u> Once Unit 3 or 4 has been shutdown for greater than 48 hours and the shutdown is expected to continue for more than several days, the two circulating water pumps on one Unit are placed in service every week for approximately 2 hours to prevent the sea life present in the tunnels from dying and subsequently releasing hydrogen sulfide gas as part of the decaying sea life process. This critical system maintenance activity typically alternates between Units 3 and 4, e.g., in week one the two pumps on Unit 3 (but not Unit 4) are run; in week two, the two pumps on Unit 4 (but not Unit 3) are run. This minimum flow is a critical system maintenance activity needed to ensure worker safety and to prevent damage to the equipment (e.g., minimize corrosion). Based on the design flow rate of the circulating water pumps, water flow during this critical system maintenance activity is up to approximately 18 million gallons (2 pumps x 120 minutes x 75,000 GPM) per Unit.[52]

[51] The Morro Bay cooling water intake system has dual side-by-side inlet structures (one inlet for Units 1 and 2 and one inlet for Units 3 and 4). The Unit 3 and 4 inlet structure was built as an extension to the Unit 1 and 2 inlet structure, such that the four auxiliary salt water pumps are physically located on and draw water through the Unit 1 and 2 inlet structure.

[52] Item III.2 requests "an estimate of minimum flows as compared to historic flows during corresponding months 2000-2005 when power is not typically generated". Such historic information is not provided because it is not a valid comparison given the changes in plant operating practices since 2000-2005. Based on information reported in facility's NPDES permit-required Discharge Monitoring Reports (DMRs), the average flow of a weekly run of two pumps on one Unit for purposes of this critical system maintenance activity (i.e., preventing/reducing the formation/accumulation of hydrogen sulfide gas) is 77 million gallons per month.

2. When Unit 3 or 4 is in shut down mode: When Unit 3 or 4 is shutdown (i.e., separated from the grid), the Unit's two circulating water pumps are left in service for up to 48 hours after the Unit stops generating power. Typically, one pump is removed from service shortly after the Unit stops generating power and the second pump continues to run for approximately 24 hours; however, one or both pumps may run for up to 48 hours after the Unit is separated from the grid depending on several factors related to how long it takes to get pressure off the boiler, including when the Unit is shutdown, ambient conditions, and the shutdown mode used. The flow during this period is the minimum necessary to ensure adequate, safe cooling of the condensing equipment and auxiliary systems. Without this minimum flow, the equipment would be damaged and rendered inoperable. Based on the design flow rate of the pumps, water flow during this 48-hour period is up to approximately 432 million gallons (2 pumps x 2880 minutes x 75,000 GPM) per Unit.

3. When Unit 3 or 4 is in start up mode: The circulating water pumps on a Unit being placed in service are both started approximately six hours prior to the Unit going into service (i.e., paralleled to the grid). This approximate 6-hour period of flow is the minimum necessary to provide condenser cooling and cooling for auxiliary systems being placed in service as unit start up activities progress. Without this minimum flow, the Unit cannot start up, i.e. the equipment would be damaged and rendered inoperable. Based on the design flow rate of the pumps, water flow during this approximate 6-hour period is up to approximately 54 million gallons (2 pumps x 360 minutes x 75,000 GPM) per Unit.

4. Auxiliary Salt Water Pumps: One auxiliary salt water pump operates continuously (24 hours per day, 365 days per year) to circulate water from the intake structure to the outfall structure. Continuous operation of one auxiliary salt water pump is a critical system maintenance activity because these pumps provide needed cooling water to auxiliary plant equipment, such as bearing cooling water heat exchangers, air compressors, and other equipment, that operates whether the main Unit is generating electricity or not. Without continuous operation of one auxiliary salt water pump, auxiliary plant equipment would be damaged and rendered inoperable. Based on information reported in the facility's NPDES-permit required DMRs, the average flow associated with continuous operation of one auxiliary pump is 2 MGD.

5. Screen Wash Pumps: The screen wash pumps operate periodically when the Units are not generating power to rotate and clean the intake structure screens. Operation of the screen wash pumps is a critical system maintenance activity need to ensure the screens are operable and free from fouling organisms or debris in order to reliably supply cooling water to the Units when operating. As identified in the facility's NPDES permit, the average flow for the screen wash pumps is 1.2 MGD.

6. Lube Water Pumps: One of the two lube water pumps operates periodically to provide lube water to the screen house operating equipment (i.e., the screen wash pumps) when the Units are not generating power. Operation of the lube water pumps is a critical system maintenance activity needed to ensure proper operation of the screen

wash system, which in turn is needed to ensure reliable operation of the Units. The lube water pumps are rated at 125 GPM each.

7. Environmental Testing and Other Circumstances: As a matter of routine station operating practice, Morro Bay attempts to schedule and perform all required testing (flow velocity testing, pollutant sampling, etc.) that is dependent on operation of the circulating water pumps when the pumps are otherwise operating (e.g., during power generation, during biweekly pump operation to prevent/reduce hydrogen sulfide gas accumulation when the Units are not operating, etc.) Nevertheless, the plant will in certain infrequent circumstances operate the circulating water pumps for the sole purpose of performing required testing or meeting other demands. For example, when mandatory NPDES permit intake velocity testing cannot be scheduled during periods when the pumps are otherwise operating, the pumps are run as needed to perform the required testing. The plant also runs the pumps prior to workers entering the intake tunnels to perform necessary maintenance. Furthermore, in the past the plant has run the pumps to accommodate training by the state emergency crew "swift water rescue" team. In each such instance, operation of the circulating water pumps is minimized to the duration necessary to accomplish the intended purpose of the activity.[53]

B. Likely Periods When the Units May Not Be Generating Power

i. Demand for Power

Units 1 and 2 were removed from daily dispatch service to the grid in November 2003 and have not generated power since that time. Depending on conditions in the electricity market, Units 1 and 2 may or may not be returned to service.

Units 3 and 4 typically operate during periods of high demand during the months of July, August and September. However, the Units have been called by the CAISO to run in other months of the year and the Units are contractually obligated to be available to run throughout the year. Thus, if the demand for power arises at any point during the year, the Units may be started up (and, accordingly, intake flows will occur) to directly engage in power generating activities. It is also possible that these Units could be started and operated to support local area transmission system maintenance.

ii. Planned Outages

Maintenance outages involving shutdown of the Morro Bay Units would result in the cessation of water intake flows, except as identified above for critical system maintenance. The maintenance outage schedule for Morro Bay varies based on

[53] In addition, while not part of the once-through cooling system, the plant's fire protection system is designed so that sea water can be pumped into the fire system, if water is not available from the either of the plant's two fire water tanks (tank capacity of 500,000 gallons and 1,000,000 gallons, respectively). To the best of Dynegy's knowledge, sea water has never been pumped into the fire system. However, operation of the fire protection system and this redundant sea water capability is a critical system maintenance activity. The fire water pump is rated at 1,000 GPM. This fire protection system operates (pressurized and maintained at 150 psig) continuously whether the Units are generating electricity or not.

numerous factors, such as turbine inspection findings and data provided by the steam turbine manufacturer. Typically, Morro Bay schedules a two week maintenance outage for each Unit (Units 3 and 4) per year. The outages are generally scheduled for February, March or April.

In accordance with the outage coordination requirements set forth in the CAISO tariff, by October 15th of each year, Dynegy provides the CAISO with a proposed schedule of maintenance outages for each unit at Morro Bay, including start and finish times/dates, for the following calendar year. Quarterly updates of the proposed maintenance outage schedule, including any additional outages anticipated in the next 12 months from the time of the report, are also submitted to the CAISO as part of the CAISO's long range outage planning process. Pursuant to the CAISO tariff, an individual generator's outage program is considered confidential information.[54] Access to Morro Bay's current proposed outage schedule for approximately the next 12 months, as filed with the CAISO, should be coordinated with the CAISO through the Statewide Advisory Committee on Cooling Water Intake Structures (SACCWIS).

3. For those facilities that have not achieved final compliance by October 1, 2015, the owner or operator must implement measures to mitigate the interim impingement and entrainment impacts resulting from the cooling water intake structure(s), and continuing up to and until the facility achieves final compliance with the requirements of the Policy. If you do not plan to achieve final compliance by October 1, 2015, you must include in your implementation plan to be submitted no later than April 1, 2011, the specific measures that will be undertaken to comply with this additional requirement. The options you may choose from include [Options a. and c. are not chosen and, thus, omitted here]**:**

b. A demonstration that the interim impacts will be compensated for by providing funding to the California Coastal Conservancy, which will work with the California Ocean Protection Council to fund an appropriate mitigation project. It is the preference of the State Water Board that this option be selected.

For the period of time that any one of the Morro Bay Units operates beyond October 1, 2015 using once-through cooling without achieving final compliance and continuing until the Unit(s) achieves final compliance, Dynegy chooses to provide funding to the California Coastal Conservancy for purposes of working with the California Ocean Protection Council to fund an appropriate mitigation project that mitigates the interim impingement and entrainment impacts. The amount of the mitigation funding would be determined in the future, consistent with the Board's action on other implementation plans. Dynegy proposes that the amount of mitigation funding be based on the actual cooling water intake flow of each Unit, as determined from Discharge Monitoring Report (DMR) data submitted to the Central Coast Regional Water Quality Control Board. Dynegy proposes to submit payment of the appropriate funds to the California Coastal Conservancy by March 1, 2016 for actual flows during the interim period October 1, 2015 through December 31, 2015.

[54] CAISO Tariff § 20.2(e).

In the context of interim mitigation, intake flows are an appropriate basis for determining mitigation funding. By basing mitigation funding on actual cooling water intake flow as determined by the facility's otherwise reported DMR data, the proposed approach avoids the uncertainties that are associated with the implementation of any mitigation project and the difficulties in determining the appropriate level of funding for projects that might continue to require funding and provide benefits well beyond the date when final compliance is achieved.

IV. New Application for Renewal of NPDES Permit/New Report of Waste Discharge

As requested in the Board's Implementation Plan Letter, Dynegy hereby submits a new application to renew Morro Bay's NPDES permit.[55] The application is enclosed as Attachment F.

[55] The prior renewal application for Morro Bay's NPDES permit was timely submitted to the Central Coast Regional Water Quality Control Board on January 1, 2000. That prior renewal application is incorporated herein by reference in its entirety.