Duke Energy Morro Bay, LLC

Comments on

Draft Appendix A: Morro Bay Power Plant Cooling Options Report

February 15, 2002

Duke Energy Morro Bay, LLC's Comments on Draft Appendix A: Morro Bay Power Plant Cooling Options Report

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1. Executive Summary

On January 8, 2002, the California Energy Commission (CEC) staff released a draft report entitled, "Draft Appendix A: Morro Bay Power Plant Cooling Options Report" (the Staff Draft Report) that was undertaken to provide "a site-specific CEQA analysis of feasible technology options"[1] (dry cooling, hybrid cooling, and the aquatic filter barrier) for use at the proposed modernization at the Morro Bay Power Plant (MBPP).[2]

Duke Energy Morro Bay LLC's (Duke) review of the Staff Draft Report has identified several critical flaws in the document's analytical framework, underlying feasibility assumptions, and conclusions that are not supported by facts or analysis in the document.

Perhaps the best example of the Staff Draft Report's shortcomings may be found in the critical issue of noise analysis. The staff's selection of a noise base case is critical because all other environmental impacts (visual, land use, cultural, terrestrial biology, etc.) appear to have been evaluated on the size (footprint and volume) of the staff's cooling fan configuration base case. However, the Staff Draft Report itself concludes that the chosen base case would fail to meet local noise standards and the CEC's own thresholds of significance standard. Instead of selecting a fan configuration that would unavoidably understate the environmental impacts in all other disciplines, the CEC staff should have chosen a cooling fan configuration that had more fans (and thus have a larger footprint) at a lower horsepower to help address the noise compliance issues. Then, the CEC staff could have carried out the evaluation of all other environmental impacts based on that larger, but more compliant, fan configuration. Had the CEC staff followed this logical and correct methodology, their conclusions with respect to other environmental impacts would have been significantly more negative for both the dry cooling and hybrid designs.[3]

Fundamental shortcomings of the Staff Draft Report include:

- Failure to acknowledge that from a CEQA perspective, and in accordance with the Committee's Order of August 22, 2001, Duke's Project will not have any impacts on marine biology because the future impacts from the Project will be less than the existing plant's conditions, as represented by actual water usage over the past five years.

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[1] Request for Review of the Energy Commission Staff's Draft Power Plant Cooling Options Report (Appendix to the Biological Resources Final Staff Assessment Part III) for the Morro Bay Power Plant Project. January 8, 2002. Page 1.

[2] For clarity's sake, Duke's responses to the CEC's analysis of the aquatic filter barrier have been grouped together and presented in Section 8 of this report.

[3] Duke Energy LLC submitted a letter on January 24, 2002 to the CEC summarizing preliminary issues with the report. This analysis supplements that initial letter (see Appendix A for a copy of the letter).

- Failure to accurately identify the true environmental impacts of all dry cooling and hybrid alternatives analyzed due to the CEC staff's inexplicable decision to select a cooling fan configuration (Option 1) that, by their own acknowledgement, fails to meet the City of Morro Bay's noise ordinance. The CEC staff should have instead evaluated the impacts using their Option 3 (which is quieter but requires 50% more fans and considerably larger space than their base case) because it is the only fan configuration that comes close to meeting the City of Morro Bay's noise ordinance requirements.[4]
- Failure to ensure that any alternative could meet the basic design criteria of Duke's Project: a power plant capable of producing a nominal 1200 MW across the Project's ambient temperature range of 35-85^{o}F. Designing to meet this fundamental Project criterion would increase the size of the cooling fan configuration by about 50%, which accordingly would increase the environmental impacts associated with each of the alternatives.
- Failure to recognize that Dry Cooling Alternative 2 and Hybrid Alternative 2 would have significant adverse impacts to terrestrial biology and cultural resource sites.[5]
- Failure to thoroughly evaluate and explain the number of local ordinances, regulations, and standards that would be inconsistent with either the dry cooling or hybrid alternatives. These alternatives appear to be inconsistent with at least 20 such local ordinances and regulations.
- Failure to acknowledge that because all dry and hybrid cooling options are inconsistent with at least 20 City ordinances and standards, they simply are not feasible alternatives pursuant to Public Resources Code sections 25523(d) and 25525. Section 25525 provides that the CEC "shall not certify any facility... when it finds, pursuant to subdivision (b) of Section 25523, that the facility does not conform with any applicable state, local, or regional standards, ordinances or laws, unless the commission determines that such facility is required for the public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity." Since Duke's proposed once-through seawater cooling method does comply with all City ordinances and standards, the CEC must conclude that the applicant's proposal is a more prudent and feasible mean of cooling than the dry cooling and hybrid options that do not conform with these applicable requirements. Accordingly, the standards for an override cannot be met. Therefore, neither dry cooling nor hybrid cooling can be certified by the CEC in this case.
- Failure to accurately describe and give adequate consideration to the City of Morro Bay's Resolution that opposes the use of dry cooling at this site if there were any negative environmental impacts.[6]

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[4] The CEC staff analysis for cooling water alternatives for the Potrero plant similarly evaluated all environmental impacts based on a cooling fan equipment configuration (Option 1) that also, by the staff's acknowledgement in that document, did not comply with the San Francisco Noise Element.

[5] The cultural resources section of Duke's response is being submitted as a separate confidential document.

[6] Morro Bay Planning Commission Resolution No. 01-01 dated August 9, 2001 and City of Morro Bay City Council Resolution No. 57-01, dated August 27, 2001 (see Appendix B).

- Failure to recognize the conclusions of the US Environmental Protection Agency's evaluation of once-through cooling alternatives in new power plants[7].
- Failure to inform the reader that even using the Staff Draft Report's understated assumption of roughly a 1% reduction in the efficient use of natural resources is not trivial. Duke estimates it would represent up to $37 million in additional operating costs for the life of the Project. This is a significant sum as it represents 80 to 90% of the Staff Draft Report's estimated capital cost for either the dry or hybrid cooling alternatives.
- Failure to acknowledge that site control must be used by the CEC staff as the most important limiting factor in evaluating the feasibility of any alternative.
- Failure to consider the cost implications of relocating buildings and equipment required for the proposed Project in both Dry Cooling Alternative 1 and Hybrid Alternative 1.
- Failure to consider the consequences of either a longer construction schedule (12 months) for Dry Cooling Alternatives 1 and 2 and Hybrid Alternatives 1 and 2, or an increased workforce (100-125 people) for Dry Cooling Alternative 2 or Hybrid Alternative 2.
- Failure to acknowledge the infeasibility of all the alternatives due to their non-compliance with Federal flood control requirements.
- Failure to present a factual basis for dismissing the non-air cooling options, such as the EPA-approved options of habitat enhancement and the Aquatic Filter Barrier (AFB), in favor of an apparent bias towards air cooling options.
- Failure to consistently evaluate and judge the impacts of the staff proposed alternatives against the applicant's proposed Project, not just against the existing plant as required by CEQA.

Discipline by discipline, Duke's proposed Project is environmentally superior to all of the dry and hybrid cooling alternatives analyzed in the Staff Draft Report. The table below compares key environmental impacts of the CEC staff's alternative cooling options to the corresponding impacts of Duke's proposed Project.

[7] National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities, 66 Fed Reg. 65256 (2001) (codified at 40 CFR Parts 9, 122, 123, 124, and 125) (see Appendix C).

Table 1: Environmental Impacts of the CEC's Alternative Cooling Options Compared to Duke's Proposed Project in the AFC

	Proposed Project	Dry Cooling Alternative 1	Dry Cooling Alternative 2	Hybrid Alternative 1	Hybrid Alternative 2
Visual Resources	No Impacts	Significant Adverse Unmitigable Impacts	Significant Adverse Unmitigable Impacts	Significant Adverse Unmitigable Impacts	Significant Adverse Unmitigable Impacts
Noise	No Impacts	Significant Adverse Impacts	Significant Adverse Impacts	Significant Adverse Impacts	Significant Adverse Impacts
Flood Control	No Impacts	Substantial Impacts	Substantial Impacts	Substantial Impacts	Substantial Impacts
Terrestrial Biology	Minor Impacts	Same as Proposed Project	Significant Adverse Impacts	Same as Proposed Project	Significant Adverse Impacts
Land Use	Complete LORS Compliance	Numerous Inconsistencies; No Override by CEC	Numerous Inconsistencies; No Override by CEC	Numerous Inconsistencies; No Override by CEC	Numerous Inconsistencies; No Override by CEC

With respect to marine biology issues, from a CEQA perspective, and in accordance with the Committee's Order of August 22, 2001, Duke's Project will not have any impacts on marine biology because the future impacts from the Project are less than the existing plant conditions, as represented by actual water usage over the past five years. Under other statutes, the Central Coast Regional Water Quality Control Board (CCRWQCB) will also consider how the plant's water demand will affect marine biology. Their analysis is separate from the CEC's and will proceed on a parallel track.

In summary, had the CEC staff sized the dry cooling and hybrid alternatives to serve the Project that Duke has proposed in the AFC (1200 MW nominally) and followed their own conclusions for a larger equipment configuration in the noise section of the document (and subsequently based the balance of the environmental analysis on those conclusions), the resultant environmental and other impacts would have led the reader to the inevitable conclusion that:

- Neither dry nor hybrid cooling alternatives would be feasible at this site for a 1200MW plant.
- All alternatives analyzed by the CEC staff would fail to meet the local noise standards. The environmental impacts from the larger, but quieter, equipment configuration that could have met the standards were never analyzed.
- All alternatives would have significant impacts on visual resources, and Alternative 2 for both the dry cooling and hybrid designs would have significant cultural and biological impacts.

- Both Dry Cooling Alternative 1 and Hybrid Alternative 1 are premised on Duke constructing cooling equipment on land it does not own and has no reason to believe it will own.
- Both Hybrid Alternatives 1 and 2 are premised on the unfounded assumption that the City of Morro Bay would be willing to make changes to its wastewater treatment plant and to dedicate available water to Duke for the next 30 years.
- Even if the City were to commit the use of wastewater to Duke, without an additional reliable back-up water source, neither of the hybrid cooling alternatives could be considered feasible.
- All the alternatives are inefficient and prohibitively costly relative to the benefits, as supported by EPA's conclusions on dry cooling.
- All the alternatives would not be feasible because the standards for a CEC override of local LORS could not be met.

The Staff Draft Report is fundamentally flawed in its analytical methodology (noise, steam flow rate, etc.). Accordingly, its current conclusions are not supported by facts and cannot be relied on in either the CEC or RWQCB proceedings.

2. Introduction

The Staff Draft Report was intended to be "a site-specific CEQA analysis of feasible technology options."[8] Duke believes the premise for the report is flawed and its conclusions are neither accurate nor well founded. The premise is flawed because the proposed Project's water use will be below the existing plant's actual average water usage over the past five years. Accordingly, consistent with the guidance of the Committee issued on August 22, 2001, there would be no CEQA-related impacts, nor need for any mitigation such as dry or hybrid cooling pursuant to CEQA. As important, properly sized dry and hybrid cooling options, when applied to the site specific conditions of the MBPP site, are not feasible for a variety of reasons including unmitigable negative environmental impacts, failure to comply with LORS, insufficient land in control of the applicant, etc.

Duke's analysis in this document follows the outline of issues as presented in the CEC Staff Draft Report, with the following exceptions: 1) the initial discussion of how the CEC staff's alternative designs do not meet the Project design, and 2) the discussion of the AFB technology is presented separately in Section 8. Duke has also provided a separate appendix evaluating the CCRWQCB's "Evaluation of Cooling System Alternatives Proposed Morro Bay Power Plant" (December 26, 2001) prepared by Tetra Tech, to ensure that decision makers have a consistent and thorough understanding of Duke's view of both draft reports (see Appendix D).

Furthermore, Duke has already submitted to the CEC on January 7, 2002 a comprehensive analysis of potential dry and hybrid alternatives capable of serving Duke's proposed 1200 MW Project at the MBPP site, entitled "Updated Analysis of Alternative Cooling Systems For the Morro Bay Modernization Project" (Duke January 7th Report). A summary of the conclusions of that report is presented in Appendix E.

The assumptions used in Duke's January 7th analysis (which were updated from those in Duke's 316(b) analysis) have been used by Duke in comparing, contrasting, and critiquing the Staff Draft Report.

In this report, Duke uses the following abbreviations when discussing various designs analyzed by the Staff Draft Report:

[8] Request for Review of the Energy Commission Staff's Draft Power Plant Cooling Options Report (appendix to the Biological Resources Final Staff Assessment Part III) for the Morro Bay Power Plant Project, January 8. 2002. Page 1.

Table 2: Alternative Descriptions Used in this Document

Alternatives	Where Discussed in CEC Draft Staff Report	Description Used in this Document
Dry Cooling One	Plate 1	Dry Cooling Alternative 1
Dry Cooling Two	Plate 3	Dry Cooling Alternative 2
Hybrid Cooling One	Plate 5	Hybrid Alternative 1
Hybrid Cooling Two	Plate 7	Hybrid Alternative 2

The following table summarizes key documents where alternative cooling options have been discussed by all parties as part of the CEC and RWQCB proceedings:

Table 3: Alternative Cooling Discussions in Part of the MBPP Modernization Proceedings

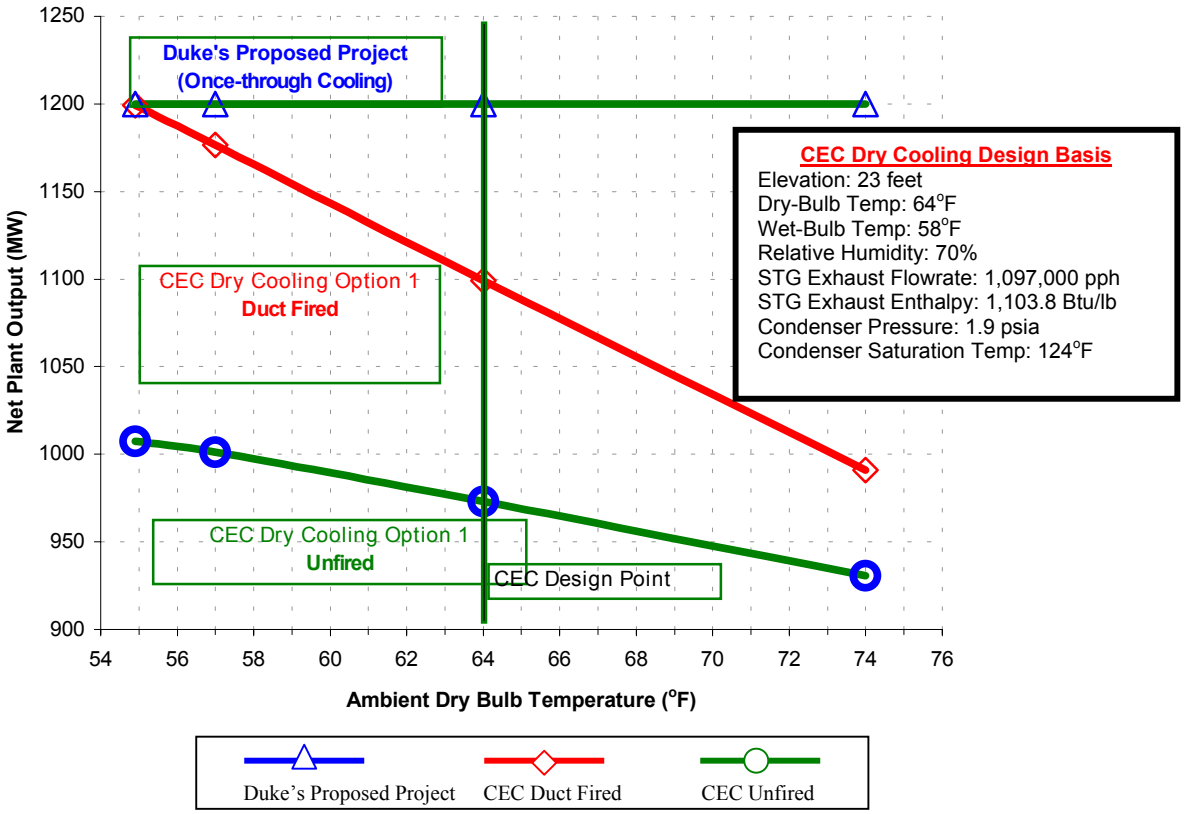
Report/Scenario	Date	Analysis Conducted By	Description
316(b) Resource Assessment Report	July 10, 2001	Duke	Report filling the statutory requirements of the Clean Water Act Section 316(b).
Duke January 7th Report	January 7, 2002	Duke	Analyzes appropriately sized dry cooling and hybrid alternatives.
Draft CEC Staff Report 1. Dry Cooling 1 2. Dry Cooling 2 3. Hybrid Alternative 1 4. Hybrid Alternative 2	January 8, 2002	CEC staff and consultants	Analyzes incorrectly sized dry cooling and hybrid alternatives, thus incorrectly evaluated environmental impacts. Includes a cursory analysis of the AFB.
RWQCB Report 1. Seawater Cooling Tower 2. Dry Cooling 3. Seawater Hybrid Cooling 4. Aquatic Filter Barrier	December 26, 2001	Tetra Tech (consultant to RWQCB)	Evaluation of cost only for cooling tower, dry cooling, hybrid cooling, and AFB with no consideration for site constraints or resultant impacts.

3. The CEC Staff Used Improper Design Criteria In Conducting the Steam Flow Analysis Which Led it to Dry Cooling and Hybrid Designs that are Undersized.

The proposed Project is a nominal 1200 MW duct fired power plant across the Project's ambient temperature range of 35-85^{o}F. It is essential to be able to produce the nominal output over the full temperature range in consideration of two basic scenarios. First, regardless of the temperature in Morro Bay, there can be periods of high temperature throughout the State that require additional capacity to support the grid. Secondly, even during periods of cooler temperatures, there will be times when other plants will be out of service for maintenance or other reasons and additional capacity at the nominal output for MBPP will be required. The design of any alternative cooling system must meet the basic objectives of the proposed Project in accordance with CEQA. This was reiterated by Duke/Fluor Daniel (D/FD) during a teleconference with James C. Henneforth (a consultant to the CEC) on September 5, 2001 (see Appendix F for a summary of the call and the ensuing e-mail correspondence).

Given this requirement, the steam flow rate used as the design point in the Staff Draft Report (which corresponds to Noise Option 1) is incorrect. Duke calculates that the proper flow rate requires an approximate 50% increase in cooling fan capacity of the dry cooling and hybrid cooling systems. The steam flow rate used as the design point in the Staff Draft Report, 1,097,000 lbs/hr for each 600MW block, would *not* achieve the nominal 1200 MW Project definition over the ambient temperature range. In fact, the CEC design cannot achieve the nominal output for any temperatures above 55^{o}F. At temperatures of 55^{o}F and higher, the output falls short as a result of steam turbine backpressure limitations. Duke has verified this by performing additional heat-balance simulations for the proposed CEC designs. The results of these simulations are depicted graphically in Figure 1. The figure shows the net output of the proposed Project and both the duct fired and unfired net output of Option 1 over a portion of the Project's ambient temperature range. The curves representing the net output of CEC Option 1 reflect the maximum possible output without exceeding the Steam Turbine Generator's (STG) backpressure limit of 7.0 inches of mercury. As can be clearly seen, the Staff Draft Report's dry cooling design cannot achieve the nominal output of the proposed Project for ambient temperatures above 55^{o}F. Similarly, marginal performance would be expected for the CEC staff's hybrid designs.

Figure 1: Net Output Comparison of Proposed Project and CEC Dry Cooling Design



Duke's analysis indicates that the correct size for the air cooled condensers (ACC) to accommodate the proper steam flow rate (1.642 million lbs per hour per 600 Mw block[9]) is a cooling capacity that is approximately 50% larger than the CEC's proposed base case (based on 1.097 million lbs per hour per 600 Mw block). The CEC staff's hybrid design is similarly undersized. (See Duke's January 7th report for more detailed information on properly sized designs.) As a result, throughout the Staff Draft Report the analysis of environmental impacts, efficiency losses, and costs are significantly understated.

Moreover, as discussed in the next section, the Staff Draft Report's error of assuming the incorrect steam flow rate was compounded by another significant error in the staff's noise analysis, which in-turn became the flawed basis for all subsequent environmental analyses throughout the document.

[9] See Duke Energy Morro Bay, LLC AFC, 2001, Section 8, appendix 8.1, case 6.

4. The CEC Staff's Noise Analysis of ACCs Concluded that at Least 50% More Lower Horsepower (and thus Quieter) Fans Would be Necessary to Come Close to Meeting the City of Morro Bay Noise Ordinance, but Did Not Use this Equipment Configuration as the Basis for Evaluating Impacts.

The Staff Draft Report clearly recognizes that the base case (Noise Option 1) in all instances fails to satisfy the City of Morro Bay's noise ordinance, as well as the CEC's significance threshold (L_{90} + 5 dB).

> "The predicted values indicate that, in the base case (Option 1), the fan noise levels would exceed the noise standards of the Morro Bay Noise Element at the nearest residences. The fan noise levels at the nearest residences would also exceed the 5 dBA L_{90} increase that the staff uses as a threshold for determining whether additional analysis is required to assess whether project noise results in a significant noise impact." (page 67)

The Staff Draft Report explicitly states that Option 3 (which incorporates more, but lower horsepower, cooling fans, and subsequently, a larger plot area) would likely be required to achieve compliance with local LORS noise requirements. As shown in Table 7 on page 67 of the Staff Draft Report, Noise Option 3 would have 50% more fans (increased costs of 30%) than the base case. Inexplicably, this larger and reportedly noise-compliant Option 3 cooling configuration was never mentioned throughout the balance of the Staff Draft Report analyses; the non-compliant Option 1 base case was used instead. This concern alone compels Duke's finding that the design characterization used in the Staff Draft Report for the assessment of all other impacts is undersized, and all impacts should be revised upward. By using Noise Option 1, which cannot meet local LORS, the evaluation of all other reported impacts, both environmental and economic, are fatally flawed.

In addition to the flaws for the other topics' impacts that result from the use of the incorrect noise case, the fundamental noise analysis itself also errs in a manner that significantly understates the real noise impacts. This is because the CEC staff *only* analyzes the expected alternative cooling system noise emissions. The noise emissions from the rest of the proposed power plant (which would typically be operating when the cooling system is being used) are conspicuously omitted from noise impact consideration. This is an analytical and methodological fatal flaw, as noise impacts cannot be judged properly without considering the cooling system as an incremental source that is part of the total noise impact of the entire Project.

In addition to these major shortcomings, other mischaracterizations in the CEC analysis include:

1) Analysis that ignores time-of-day and the differentiation of daytime vs. nighttime receptors

2) Possibly overly optimistic range of noise reduction benefits for the various dry cooling and hybrid configurations; and with little substantiation of those reduction factors or basis
3) Simplistic methodology for noise source definition and noise propagation effects
4) Unclear presentation regarding benefits, applicability, and results for the use of "super low noise fans"
5) Inconsistency in reporting the predicted noise results especially regarding the implementation of "super low noise fans", which lack elaboration on their design basis, source, etc.

These issues are discussed in more detail in Appendix G. Remarkably, most of these requirements (and certainly the avoidance of "piecemealing" the noise analysis by analyzing only incremental effects) are ones that the CEC staff insists that applicants adhere to in the analysis of noise impacts from proposed projects. Yet staff has not adhered to its own analytical standards in this Staff Draft Report.

In contrast to the Staff Draft Report, the noise impact analysis included in Duke's January 7th report properly evaluates the cumulative noise emissions from adding a dry or hybrid cooling system to the once-through cooled base case. Duke's report has provided a more realistic portrayal of the overall potential noise emissions from the plant utilizing the alternative cooling systems. Duke's report shows that even with Best Available Control Technology for noise, per information from GEA[10], non-compliant and unmitigatable noise emissions will most likely result from using <u>any</u> dry cooling systems at MBPP, even those sized according to Staff's Option 3.[11]

Cumulative Changes Required for Properly Sized Cooling Alternatives

When taken together, the need to size cooling options to accommodate the steam flow required to achieve a nominal 1200 MW power plant across the Project's ambient temperature range and to come close to meeting the City of Morro Bay's noise ordinance, all of the alternatives would be considerably larger and thus have greater adverse environmental impacts than the designs evaluated in the Staff Draft Report. (The resultant increased size is consistent with the system analyzed in Duke's January 7th report.) Specifically, the cumulative impact of proper steam flow rate and noise analysis would require a dry cooling design that has 100% more fans, approximately 92% more volume, and approximately 74% more land area for the equipment footprint than the base case analyzed in the Staff Draft Report (based on the designs in Duke's January 7th report). The hybrid design would require 108% more fans, approximately 173% more volume, and approximately 104% more land area for the equipment footprint than what was analyzed in the Staff Draft Report (based on the designs in Duke's January 7th report). See Tables 4 and 5 below for a summary of this information.

[10] GEA is the primary vendor Duke and the CEC consultants worked with to develop the equipment estimates.
[11] In preparing the January 7th report, Duke requested that the vendors supply equipment that would achieve 40 dBA at 400 feet. The vendors replied that this was not possible, and therefore designed the systems for the best possible at 45.8 dBA for the ACC and 43.5 dBA for the hybrid system at 400 feet. The Duke report therefore represents the "best case" available from the noise perspective.

Table 4: Comparison of Dry Cooling Equipment Sizes

Element	CEC Design Dry Cooling Alternatives 1 and 2 (Noise Option 1)	Duke Design (best case to meet design criteria and noise requirements)	Percentage Increase in Size
ACC Length	330 feet	640	94%
ACC Width	206 feet	185	-10%
ACC Height	100 feet	110	10%
Total Footprint	**67,980 square feet**	**118,480 square feet**	**74%**
Total Volume	**6.8 million cubic feet**	**13 million cubic feet**	**92%**
Total of Fans	**20**	**40**	**100%**

Table 5: Comparison of Hybrid Equipment Sizes

Element	CEC Design Hybrid Cooling Alternatives 1 and 2 (Option 1 Noise)	Duke Design (best case to meet design criteria and noise requirements)	Percentage Increase in Size
ACC Length	260	450	73 %
ACC Width	174	225	29 %
ACC Height	82	100	22 %
ACC Footprint	45,240 square feet	101,250 square feet	124 %
Cooling Towers Footprint	7,056 square feet	5,184 square feet	-27 %
Total Footprint	**52,296 square feet**	**106,434 square feet**	**104%**
Total Volume	**3.7 million cubic feet**	**10.1 million cubic feet**	**173%**
Total Fans	**24**	**50**	**108%**

5. Additional Environmental Impacts from Requiring the CEC's Proposed Dry Cooling and Hybrid Design at this Specific Plant Site

The Dry Cooling and Hybrid Designs Would Create Significant Adverse Visual Impacts that Could Not be Mitigated

As noted earlier in this document, the CEC staff analyzed the visual impacts of conceptual dry cooling and hybrid designs that would never meet the Project's design criteria, the City of Morro Bay's noise ordinance, or the CEC's threshold for significance.

Duke agrees with the finding of the CEC staff that, from a visual perspective, the proposed Project (with once-through-cooling) has far less visual impact than any of the dry cooling and hybrid alternatives (page 89). Further, both the dry cooling and hybrid alternatives would, in fact, cross the threshold of significance, and would create a significant adverse visual impact that could not be mitigated. Correcting the staff's assumed height, width, and length relationship of noise compliant structures would lead to structures dramatically larger than evaluated by the Staff Draft Report and, as such, would create additional adverse impacts.

Tables 4 and 5 above show the comparison of equipment sizes that were evaluated for visual impacts by the CEC staff in Dry Cooling and Hybrid Alternatives and those proposed by Duke in the January 7th Report. See Attachment H for the KOPs showing Duke's design originally presented in the Duke's January 7th report.

The addition of the dry cooling or hybrid structures (even at the size the Staff Draft Report assumes) will have significant visual impacts on the coast. These visual impacts directly violate Coastal Act policies on visual and scenic resources, as well as important policies in the City's General plan and CLUP (see the Land Use LORS discussion below for more detail). The CEC staff is correct when they acknowledge that the seawater system will have less visual impacts – in fact, there will be no new impacts – than the alternatives evaluated in the Staff Draft Report.

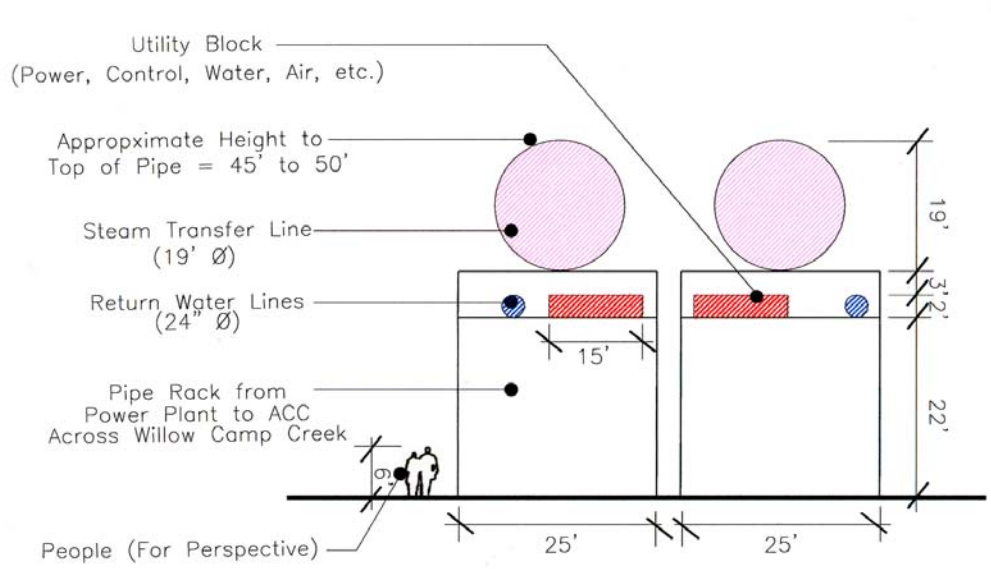
Furthermore, the Staff Draft Report states that visual impacts will be mitigated by the proposed CEC conditions (page 88), but it provides no details and fails to explain how or why these conditions would mitigate such significant impacts. Specifically, it is difficult to understand how the CEC's proposed condition VIS 1, regarding paint color, finish treatment, and requesting a plan to cover industrial appearing elements (which will further enlarge the Project thereby blocking more views to the beach, the water and Morro Rock), could possibly mitigate the negative visual impacts from a new set of structures that would be so large, located on the California coastline, and in the Scenic Highway 1 viewshed. The condition of landscaping as required in VIS 2 could also provide some screening for the cooling structures; however, it is unrealistic to expect that landscaping could mitigate the visual effects of a mechanical structure the size of a football field that stands over a hundred feet in the air.

Offering the proposed Project's conditions for certification as mitigation does not ensure those mitigation measures and conditions will satisfy the Coastal Commission and the City of

Morro Bay when considerably larger structures are proposed within the viewshed of Morro Rock. This concern is compounded when one considers that the true visual impacts would be substantially greater than those analyzed in the Staff Draft Report.

Visual impacts of the connecting pipe racks (one per steam turbine) from both the Dry Cooling Alternative 2 and Hybrid Alternative 2 are also not fully considered. These pipe racks, as shown in Figure 2 below, carry 19-foot diameter pipelines (based on the CEC design) on top of a 27-foot high structure that must rise over a 33-foot levee. This places the top of the large diameter steam pipelines at least 80 feet above sea level and/or 60 feet above the ESHA. The steam pipelines must remain at that level for what appears to be approximately 300 to 400+ feet along the northeastern edge of the facility and into the ESHA in order to minimize backpressure.[12] The pipelines and pipe racks will be visible from KOPs 5, 6, 7, 13, 14, and 15 and will cause negative visual effects to each of these views. Given the effort Duke has put forth to reduce visual impacts by consolidating and lowering other pipe racks that are necessary for the Project, interested citizens and trained professionals alike would consider these alternatives a step backward to meeting the visual needs of the community.

Figure 2: Section View of Pipe Racks



[12] The CEC drawings on Plates 3 and 7 conflict with the narrative text of the Staff Draft Report.

The Dry Cooling and Hybrid Designs Have Land Use Impacts and Create Significant Inconsistencies in Local LORS that Cannot be Cured by a CEC Override

The dry and hybrid cooling alternatives are inconsistent with the City ordinances and standards listed below and in Appendix I, and they are simply not feasible alternatives pursuant to Public Resources Code sections 25523(d) and 25525. Section 25525 provides that the CEC:

> …[S]hall not certify any facility... when it finds, pursuant to subdivision (b) of Section 25523, that the facility does not conform with any applicable state, local, or regional standards, ordinances or laws, unless the commission determines that such facility is required for the public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity.

Since the applicant's proposed cooling method does comply with all City of Morro Bay ordinances and standards, the CEC must conclude that the applicant's proposal is a more prudent and feasible mean of cooling than those options that do not conform with these applicable requirements. Accordingly, the standards for an override cannot be met and neither dry cooling nor hybrid cooling can be certified by the CEC in this case.

Land Use Impacts

All of the alternatives evaluated by the CEC staff have significant land use impacts with existing land use and zoning designations, as well as the objectives, polices and programs in its Coastal Land Use Plan, especially Dry Cooling Alternative 2 and Hybrid Alternative 2.

The CEC staff appears to understand this fatal flaw. For instance, the Draft Staff Report says, " If construction and operations of Dry Cooling Alternative Two were conducted in a manner that fully adheres to these objectives, policies, programs and zoning ordinances, no significant impacts to land use would occur." (page 60) There is no way that this alternative could meet the staff's own test: it would be in an ESHA, be seen from Highway 1, have the mass of a football field, and be ten stories high. Nor could Hybrid Alternative 2 meet this test. Failing to meet this test, by the staff's own conclusion, both of these alternatives must be found by the CEC to have significant adverse impacts. The other alternatives also would have significant adverse impacts. See Appendix I for details.

City of Morro Bay Zoning Conflicts

Program LU-39.1 in the City of Morro Bay General Plan and Policy 12.06 in the Coastal Land Use Plan (CLUP) require that the plant site be designated for coastal-dependent industrial use. Consistent with these plans, the property is zoned M-2, Coastal-Dependent Industrial.[13] The CLUP defines the term "Coastal-Dependent Industrial", consistent with

[13] The City's zoning maps use a slightly different term, "Coastal Development Industrial", which is regarded as synonymous with "Coastal-Dependent Industrial". Staff Draft Report, page 62.

Section 30101 of the Coastal Act, as an area for uses that must be "located on or adjacent to the sea in order to function."[14] (CLUP page 23)

As the Staff Draft Report recognizes (page 63), elimination of the seawater cooling system would make the Project inconsistent with these basic planning and zoning designations. If the City declines to change its ordinances, the CEC would have to attempt to exercise an override under Section 25525 to approve dry cooling. Neither the Coastal Commission nor the CEC can force the City to change its zoning and land use designations.[15]

The second major local inconsistency concerns the height of the dry cooling and hybrid equipment. The M-2 zone carries a 30-foot height limitation, which would be exceeded by the ACCs height of 100-110 feet (Zoning Code Section 17.24.150). The Staff Draft Report does not mention this limitation. While the new plant is a replacement of existing structures and an exception to the limit (Ibid), the City would have to conclude that the dry cooling and hybrid equipment would also qualify for this exception. Given the City's opposition to dry cooling, there is no basis for believing the City would reach such a conclusion. The height of these new structures would therefore be inconsistent with the Zoning Code, requiring a conditional use permit for a conceptual and/or precise plan of development (see Section 17.40.030(D)), or a variance (see Section 17.60.060, et seq.). If the City objects that it would not grant those approvals for the dry cooling or hybrid equipment, this raises a second consistency issue for the CEC.

Consistency with local LORS

While the proposed Project satisfies all the local LORS, the dry cooling and hybrid designs would not be consistent with several local LORS. The cooling units' height and size conflicts with other broad General Plan policies. Policy LU-15 states that the "present human scale and leisurely, low intensity appearance of Morro Bay should be maintained through careful regulation of building height, location and mass." Policy LU-38 states, "small, high-quality, non-polluting industrial development should be encouraged. Such should be an extension of existing development of this nature." Finally, Policy LU-39 states "Power plant expansion shall be limited to small facilities." Each of these appears inconsistent with the size, scale and location of the dry cooling or hybrid units.

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[14] Section 17.24.150 of the Zoning Code provides that the purpose of the M-2 District is "to provide districts for [sic] industrial development wherein manufacturing and other industries which require a site on or close to the ocean or harbor can locate and operate while maintaining an environment minimizing offensive or objectionable noise, dust, odor or other nuisances, all well designed and property landscaped."

[15] The Staff Draft Report cites Coastal Act Section 30515 as allowing the Coastal Commission to amend a local coastal program, when the local agency has refused to do so, upon the application of any person proposing an energy facility development. However, this section applies only where the purpose of the amendment is "to meet public needs of an area greater than that included within the [certified LCP] that had not been anticipated by the person making the application at the time at the time the [LCP] was before the commission for certification." It is not clear that this section would have any application in the present day, since the LCP was certified long ago and dealt with the plant expansion on its face. Also, it would require that Duke itself initiate the amendment request to change the land use designation and zoning.

Inconsistencies with City of Morro Bay policies in key areas are summarized below and are presented in more detail in Appendix I.

Noise LORS Conflicts

General Plan Table N-5 lists the maximum allowable noise exposure from stationary noise sources. The hourly level of the noise is 50 and 45 dBA for daytime and nighttime, respectively; the maximum levels are 70 and 65 dBA. According to the Staff Draft Report, in the base case (which corresponds to Option 1), "the fan noise levels would exceed the noise standards of the Morro Bay Noise Element at the nearest residences." (page 67) This elevated noise level will conflict with the following Objectives of the General Plan Noise Element:

- To protect the citizens of Morro Bay from the harmful and annoying effect of exposure to excessive noise (No. 1).
- To protect the economic base of Morro Bay by preventing incompatible land uses from encroaching upon existing or planned noise producing uses (No. 2).
- To preserve the tranquility of residential areas by preventing the encroachment of noise producing uses (No. 3).
- To avoid or reduce noise impacts through site planning and Project design, giving second preference to the use of noise barrier and/or structural modifications to buildings containing noise-sensitive land uses (No. 5).

Duke's proposed Project with once-through cooling is consistent with all of these objectives.

Construction of the dry cooling or hybrid designs would also be inconsistent with Program N-1.5, which states, "the noise standards in this chapter represent maximum acceptable noise levels. New development should minimize noise exposure and noise generation." In addition, Program N-1.4 states: "new development of noise-sensitive land uses shall not be permitted where the noise level due to existing stationary noise sources will exceed the noise level standards of Table N-5 unless effective noise mitigation measures have been incorporated into the design of the development to reduce noise exposure to or below the levels specified in Table N-5."

Policy N-3 provides that existing and potential incompatible noise levels in problem areas should be reduced through land use planning, building and subdivision code enforcement, and other administrative means. Accordingly, Program N-3.1 states that the City will not allow development of noise sensitive uses near major noise sources unless mitigation measures to reduce noise to acceptable levels are implemented. The noise levels of Option 1 analyzed by the CEC staff cannot be mitigated without substantially increasing the size of the equipment (see discussion above), which will in turn, increase the other impacts (visual, biology, etc.) of the Project.

Visual LORS Conflicts

The Staff Draft Report states that the ACC equipment could "appear quite massive." (pages 78-79) Duke concurs; the proposed dry cooling and hybrid designs conflict with multiple Coastal Act, General Plan, and CLUP policies respecting visual and scenic resources 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 the 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.

Section 30251 is nearly identical to both General Plan Policy VR-2 and CLUP Policy 12.01. Policy 12.01 refers to "highly scenic areas, such as those designated on Figure 31." Figure 31 in the CLUP is the "Areas of Visual Significance" figure, which includes the PG&E Power Plant as an Area of Visual Significance. Policy VR-2 refers to "highly scenic areas, such as those designated in Figure VR-1." Figure VR-1, however, lists "Scenic Views" (not "Areas of Visual Significance"). The Plant is not listed as a Scenic View, although there does appear to be a nearby Scenic View to the northeast of the Plant.

Similarly, CLUP Policy 12.11 and General Plan Program VR-3.4 state:

> Industrial development shall be sited and designed in the Land Use Plan to protect views to and along the ocean and scenic coastal areas, to minimize land alteration, to be visually compatible with the character of the surrounding areas, and where feasible, shall include measures to restore and enhance visually degraded areas. In addition, industrial development shall be subordinate to the character of the setting.

It appears that Program VR-2.2 / CLUP Policy 12.06 would also apply to the alternative cooling designs. New development in areas designated on Figure VR-2 (or CLUP Figure 31 - Areas of Visual Significance) as having visual significance shall include as appropriate the following:

a. Height/bulk relationships compatible with the character of surrounding areas.
b. Designation of land for parks and open space in new development.
c. View easements or corridors designed to protect views to and along the ocean and scenic and coastal areas.

As noted before, the dry cooling or hybrid units would also conflict with General Plan Program LU-39.1 and CLUP Policy 5.01, which state:

> The City shall designate the existing PG&E parcel and the Chevron pier parcel as coastal-dependent industrial uses. Any proposals for energy-dependent industrial uses within zones designated for general industrial development will require an amendment to the land use plan consistent with Section 30515 of the Coastal Act. Power plant expansion on PG&E owned property should have priority over other coastal dependent industrial uses. Power plant expansion shall be limited to small facilities whose location would not further affect the views of Morro Rock from State Highway One and high use visitor-serving areas, consistent with Policy 12.11.

Finally, the dry cooling or hybrid designs would be inconsistent with the draft Agreement to Lease between Duke and the City, a document carefully developed by Duke and the City to ensure compliance with all applicable local LORS. A central premise of that agreement (and the MOU before it) is that the existing plant will be removed in order to improve visual and scenic resources near Embarcadero Road and Morro Rock. Both Dry Cooling Alternative 1 and Hybrid Alternative 1 would introduce a massive new structure close to the Embarcadero, defeating that objective. Alternative 2 for both the dry cooling and hybrid designs would move the equipment back, but they would still be highly visible and would also invade the ESHA.

Terrestrial Biology LORS Conflicts (Dry Cooling Alternative 2 and Hybrid Alternative 2)

As noted in the Terrestrial Biology discussion below, the equipment for Dry Cooling Alternative 2 and Hybrid Alternative 2 are located directly in, and not adjacent to, as described in the CEC Staff Draft Report, the ESHA and will encroach on the ESHA and ESHA buffers.

Locating either the Dry Cooling Alternative 2 or Hybrid Alternative 2 would conflict with the following ESHA policies:

- Coastal Act Section 30240(a) / General Plan – Environmentally Sensitive Habitat Objective – "ESHAs shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas."

- General Plan Policy LU-55 – "All ESHAs shall be protected against adverse impacts to the maximum extent feasible."

- General Plan Program LU-55.2 – "Development in areas adjacent to ESHA and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall maintain the habitats' functional capacity."

- General Plan Policy LU-56 – Morro Bay Sand Spit, Morro Rock, and existing wildlife habitats should be preserved in their natural state.

- Zoning Code Section 17.40.040(A)(1) – "Only uses dependent on the sensitive resources and which do not result in significant disruption of habitat values shall be permitted in the ESH overlay zone."

- Zoning Code Section 17.40.040(A)(2) – "New uses and expansion of existing uses allowed in the primary zone classification shall not be permitted unless specifically listed as allowed in the ESH overlay district." (The uses listed as permitted in the ESHA, and only with a CUP, include only activities in wetlands, estuaries, sand dunes, stream corridors, and all other resource-dependent uses that do not significantly degrade the habitat values. Section 17.40.040(C)(1)-(6).

- Zoning Code Section 17.40.040(D)(2)(a) – "No uses which will cause significant disruption to the ecosystem or habitat values shall be permitted."

- Zoning Code Section 17.48.300 (review of projects that drain into nearby ESHAs) – The Staff Draft Report does not indicate whether the dry cooling or hybrid alternatives would be such a project. Section 17.48.300 applies to development within 1000 feet of any wetland and 250 feet of any other ESHA and states, "a project may be approved only if it is designed to minimize adverse effects on sensitive habitat areas and will not result in significant disturbance to or degradation of such areas and is consistent with all ESH protection policies." Section 17.48.300(C).

Regarding buffers, the Staff Draft Report states "standard mitigation would include requirements such as … buffer zones around sensitive areas." (page 55) Since the dry cooling and hybrid equipment is located inside the ESHA and buffer zone, the CEC staff statement does not make sense. Locating the equipment in the ESHA buffer will conflict with the following policies:

- General Plan Program LU-55.4 / CLUP Policy 11.06 – Buffering setback areas a minimum of 100 feet from ESHAs are required…No permanent structures shall be permitted within the setback area except for structures of a minor nature, such as fences…Buffers can be reduced to not less than 50 feet.

- General Plan Program LU-55.8 / CLUP Policy 11.14 / Zoning Code Section 17.40.040(D)(4)(b) – require a minimum buffer strip along streams (100 feet in rural areas; 50 feet in urban areas).

- Zoning Code Section 17.40.040(D)(4)(d) – requires a minimum buffer of at least 100 feet in all ESHAs other than wetlands, streams, and sand dunes. Reduction of buffers is permitted. Section 17.40.040(D)(6). See also General Plan Program LU 55-9 / CLUP Policy 11.14 (adjustments to the minimum buffer must protect the biological productivity and water quality of the streams).

Duke's proposed Project is consistent with the all the local LORS.

Cultural Resource LORS Conflicts

This section was submitted under a separate, confidential filing.

Land Use Site Constraints

Duke does not have adequate vacant land available on the current MBPP site to locate properly sized Dry Cooling Alternative 1 and Hybrid Alternative 1 units regardless of orientation. Therefore, Duke would have to attempt to purchase additional property immediately adjacent to the plant to accommodate the alternative cooling component. The most likely property would be on land owned by PG&E, but Duke has no reason to believe PG&E would be willing to sell. Any alternative that cannot be located on the existing Duke property is not feasible. Furthermore, even if Duke could purchase sufficient property from PG&E to site an appropriately-sized dry or hybrid cooling system, this property's proximity to high-voltage electrical wires and equipment would cause Duke serious safety concerns. These concerns would further degrade the constructibility of the Project, by limiting the range of movement of cranes, other construction equipment, and conceivably workers as well.

In addition, with a properly sized system, Duke would no longer have sufficient space for the crane access and laydown area that is required for roof removal of the turbine enclosures for maintenance. This feature (turbine enclosures design) was implemented for both visual and noise mitigation. The alternative would be to significantly increase the enclosure heights to accommodate self-contained bridge cranes. There are similar impacts and concerns associated with the Hybrid design.

Terrestrial Biology Will be Significantly Impacted by the Location of the Alternative Cooling Equipment in Alternative 2 for both the Dry Cooling and Hybrid Designs

Dry Cooling Alternative 2

In section 4.2 of the CEC Staff Draft Report, Dry Cooling Alternative 2 is located northeast of the power plant site and is described as placing "the ACCs in an area currently utilized to dump seaweed captured on the once-through cooling system screens and proposed as a parking area during new power plant construction. This site is bordered on two sides by an Environmental Sensitive Habitat Area (ESHA) of riparian woodland." (page 49) This statement is incorrect. As shown in plate 3, "Dry Cooling Alternative 2 Preliminary Site Plan," of the CEC's Report, the ACCs are not bordered by ESHA, *but are squarely and substantially within the ESHA*. The overlap of the condensers and the ESHA is shown in Figure 3.

This alternative would result in a direct, permanent impact to approximately 1 acre of riparian habitat related to the footprint of the ACCs due to the 1.56 acres of the ACC equipment proposed in the Staff Draft Report. In addition, the footprint of the ACCs would impact approximately 0.4 acre of ESHA buffer. In addition, two 19- ***foot*** diameter steam

pipelines supported on separate pipe racks would need to run approximately 300-400+ feet from the steam turbine to the ACCs, crossing over Willow Camp Creek and its associated riparian, stream and wetland ESHA, and associated biota. The pipe rack would need to be at least 22 feet above the grade of the existing berm (which is 33 feet above sea level) in order to allow adequate clearance for vehicles and equipment. The 19-foot diameter pipeline (CEC design) would extend above this height. The combined height of the pipe rack and the pipeline would therefore be 45-50 feet above the top of the existing levee. (80 feet above sea level and/or 60 feet above the ESHA, see Figure 2). Additional impacts to riparian, stream and, wetland ESHA, and associated biota could be associated with the support structures for the pipe rack.

Proper operation of the ACC equipment requires the permanent clearance of vegetation within approximately a 25 to 50 foot area around the perimeter of the ACC structure for proper airflow and maintenance access (the vendor would determine the exact area of the vegetation clearance based on topography and wind direction). This 25 to 50 foot clearance corresponds to an additional ESHA impact of from 0.18 acre to 0.33 acre (see Figure 3). This vegetation clearance would also affect from 0.12 acre to 0.26 acre within the ESHA buffer.

In summary, Dry Cooling Alternative 2 would permanently impact from 1.18 to 1.33 acres of wetland and stream/riparian ESHA, not including the additional permanent impacts that may be associated with the foundation footings that may be required in the ESHA and/or Willow Camp Creek to support the pipe rack. ***Duke's proposed Project has no permanent impacts to wetland and stream/riparian ESHA.*** The impacts to ESHAs and associated biota related to Dry Cooling Alternative 2 are significantly greater than those of the proposed Project.

The CEC document states that "terrestrial biological resources impacts are not expected to be significant … with implementation of appropriate and feasible mitigation … standard mitigation would include requirements such as …buffer zones around sensitive areas…" (page 50). A portion of the ACC facility, as proposed in Dry Cooling Alternative 2, is within the ESHA buffer. ESHA buffer impacts related to the footprint of the ACCs totals approximately 0.4 acre (see Figure 3). It is impossible to implement the staff's proposed mitigation of buffering sensitive areas when Alternative 2 is located *inside* both the ESHA and the buffer zone. In addition, as discussed above, proper operation of the ACC structure will require permanent vegetation clearance within portions of ESHA buffers.

Hybrid Alternative 2

Under Hybrid Alternative 2 the hybrid cooling system is again placed northeast of the currently proposed power plant site. The Staff Draft Report states that "as with Dry Cooling Alternative 2, this facility design places the dry (ACC) and wet cooling towers adjacent to an ESHA. This ESHA is proposed to be used as a temporary parking lot during construction…" (pages 50-51) First, it is important to correct the misstatement that "the ESHA is proposed to be used as a temporary parking lot during construction." The proposed temporary parking lot is sited outside of the ESHA and outside of the required ESHA buffers. As with Dry Cooling Alternative 2, the facility under Hybrid Alternative 2 is not sited "adjacent to an ESHA", as stated in the Staff Draft Report, *but is sited within an ESHA*, as shown in Plate 7 of the Staff

Draft Report. The ESHA impact of the ACCs footprint in the preliminary site plan is approximately 0.9 acres as shown in Figure 4. Both cooling towers are located outside of the ESHA. A portion of the ACC and a portion of one of the cooling towers under Hybrid Alternative 2 impact a total of approximately 0.2 acre of the required ESHA buffer from the edge of the riparian vegetation and the edge of the wetland of Willow Camp Creek.

As described for Dry Cooling Alternative 2, steam pipelines would be required to run between the power plant and the ACCs. These pipelines would be placed on pipe racks (one per steam turbine), which would cross Willow Camp Creek. Support structures, depending on their required locations could potentially permanently impact additional wetland and stream/riparian ESHA and associated biota as the pipelines traverse the ESHA to connect to the ACCs.

In addition to the impacts of the footprint of the structures, proper operation of the ACC equipment requires the permanent clearance of vegetation within an estimated 25 to 50 foot area around the perimeter of the ACC structure for proper air flow and for maintenance access (again, the vendor would determine the exact area of the vegetation clearance based on topography and wind direction). This 25 to 50 foot clearance corresponds to an additional ESHA impact of from 0.23 acre to 0.43 acre (see Figure 4). This vegetation clearance would also affect from 0.11 acre to 0.25 acre within the ESHA buffer.

As stated in the Staff Draft Report, the hybrid designs would also require the installation of a water pipeline running north of the MBPP site to the Morro Bay-Cayucos Wastewater Treatment Plant. This pipeline will be 8-10 inches in diameter and between 0.5-1.0 mile long. As indicated in the Staff Draft Report "both [pipeline] routes would have to cross under Morro Creek." (page 28) The crossing would require either trenching the pipeline through Morro Creek or directional boring under Morro Creek. If trenching were the chosen method, a small amount of additional wetland and stream/riparian ESHA would be temporarily impacted by the Hybrid Alternative 2.

Hybrid Alternative 2 would permanently impact 1.13 to 1.33 acres of wetland and stream/riparian ESHA, not including the additional permanent impacts that may be associated with the foundation footings that may be required in the ESHA and/or Willow Camp Creek to support the pipe racks. In summary, the impacts to ESHAs and associated biota related to Hybrid Alternative 2 are significantly greater than those of the proposed Project.

Table 6 compares the acreage of impact within the project site ESHAs for Dry Cooling Alternative 2, Hybrid Alternative 2, and the proposed Project. As shown below, both of the cooling alternatives have significantly greater permanent ESHA impacts than does the proposed Project. In both of these alternatives this is attributable to the permanent impacts associated with the placement of the ACCs in the wetland and stream/riparian ESHA. In contrast, Duke's proposed Project has no permanent impacts to wetland and stream/riparian ESHA for the installation of the high-pressure gas line and the temporary footbridge connecting the craft parking area to the plant site. Duke has proposed to revegetate these

areas after installation of the pipeline and removal of the footbridge in the docketed Stream Protection Plan and will therefore have minor, temporary impacts to adjacent ESHA.

Table 6: Comparison of ESHA Impacts

Alternative	ESHA Acreage Permanently Impacted	Project Component	Habitat Type
CEC Dry Cooling Alternative 2	1.0 [1]	ACC Footprint	Wetland and Stream/Riparian
	0.18 – 0.33	Vegetation Clearance for Air Flow	Wetland and Stream/Riparian
	0.33	Construction Access Road	Coastal Dune Scrub
Total	*1.51 to 1.66*		
CEC Hybrid Alternative 2	0.9 [1]	ACC Footprint	Wetland and Stream/Riparian
	0.23 – 0.43	Vegetation Clearance for Air Flow	Wetland and Stream/Riparian
	0.33	Construction Access Road	Coastal Dune Scrub
Total	*1.46 to 1.66*		
Adjusted Footprint of CEC Dry Cooling Alternative 2 Based on Duke's Analysis	1.6 [1]	ACC Footprint	Wetland and Stream/Riparian
	0.29 to 0.56	Vegetation Clearance for Air Flow	Wetland and Stream/Riparian
	0.33	Construction Access Road	Coastal Dune Scrub
Total	*2.22 to 2.49*		
Adjusted Footprint of CEC Hybrid Alternative 2 Based on Duke's Analysis	1.7 [1]	ACC Footprint	Wetland and Stream/Riparian
	0.22 to 0.39	Vegetation Clearance for Air Flow	Wetland and Stream/Riparian
	0.33	Construction Access Road	Coastal Dune Scrub
Total	*2.25 to 2.42*		
Duke's Proposed Project	0.33	Construction Access Road	Coastal Dune Scrub
Total	*0.33*		

[1.] Additional wetland and stream/riparian ESHA impacts are expected to be associated with the foundation footings for the pipe rack support structures needed for the steam transfer line between the power plant and the ACC structure. Quantification of this impact is not possible at this level of design development.

Issues Related to Both Dry Cooling Alternative 2 and Hybrid Alternative 2

As discussed in Sections 3 and 4 above, the CEC staff evaluated the impacts of significantly undersized equipment. Under Dry Cooling Alternative 2, when the adjusted, appropriately sized footprint of 640 feet by 185 feet is centered on the CEC footprint, as shown in Figure 5, permanent ESHA impacts related to the footprint are substantially greater than those analyzed and discussed in relation to the CEC staff's Dry Cooling Alternative 2. ESHA impacts attributable to the adjusted footprint of Dry Cooling Alternative 2 total 1.6 acres compared to 1.0 acre of ESHA impact of CEC staff's Dry Cooling Alternative 2 footprint. Additional ESHA impacts of 0.29 acre to 0.56 acre would be required for vegetation clearance in order to ensure adequate airflow for proper functioning of the ACCs. By comparison, 0.18 acre to 0.33 acre of ESHA would be impacted for vegetation clearance utilizing the CEC staff's Dry Cooling Alternative 2. An ESHA buffer impact of 0.7 acre would be associated with the footprint of the ACCs and an ESHA buffer impact of from 0.11 acre to 0.23 acre would be associated with the vegetation clearance required around the ACCs in the adjusted, appropriately sized configuration.

Similarly, under Hybrid Alternative 2, when the adjusted, appropriately sized footprint of 450 feet by 225 feet is centered on the CEC footprint, as shown in Figure 6, permanent ESHA impacts related to the footprint are substantially greater than those analyzed and discussed in relation to CEC staff's Hybrid Alternative 2. The ESHA footprint impacts of the adjusted footprint total 1.7 acres compared to 0.9 acre of ESHA impact attributable to CEC staff's Hybrid Cooling Alternative 2 footprint. Additional ESHA impacts of from 0.22 acre to 0.39 acre would be required for the vegetation clearance to ensure adequate airflow for proper functioning of the ACC. By comparison, 0.23 acre to 0.43 acre of ESHA would be impacted for vegetation clearance utilizing the CEC staff's Hybrid Alternative 2. An ESHA buffer impact of 0.5 acre would be associated with the footprint of the ACCs and an ESHA buffer impact of from 0.15 acre to 0.31 acre would be associated with the vegetation clearance required around the ACCs in the adjusted, appropriately sized configuration. A summary of the impacts related to both CEC staff's Dry Cooling Alternative 2 and Hybrid Alternative 2 and the adjusted, appropriately sized alternatives is shown in Table 6.

The location of Dry Cooling Alternative 2 or Hybrid Alternative 2 within the ESHA and ESHA buffer would not be consistent with several policies within the City of Morro Bay Coastal Land Use Plan related to ESHAs and permitted uses within ESHA buffers. For a complete discussion see the Land Use section of this document above and Appendix I.

With respect to noise impacts on terrestrial biology, the CEC's noise analysis is flawed both in the initial assumptions and in analysis methodology and therefore cannot be used to make assessments of any potential biological impacts. See the noise section in this document for details. Noise impacts therefore will be discussed in a qualitative manner, rather than a quantitative manner. Compared to the proposed Project, both the Dry Cooling Alternative 2 and Hybrid Alternative 2 introduce the additional noise source associated with the ACCs and cooling towers within a riparian ESHA. Noise impacts of the Dry Cooling Alternative 2 and Hybrid Alternative 2 would therefore be greater within the ESHA than those of the proposed Project. Additional quantitative studies in this location, with practicable noise abatement

measures, would be required to determine if these impacts would be significant in terms of terrestrial biological resources.

Relocation of Dry Cooling Alternative 2 or Hybrid Alternative 2 Outside of the ESHA

Relocating either Dry Cooling Alternative 2 or Hybrid Alternative 2 further to the east of the site to move them outside of the ESHAs and the ESHA buffers; and into the area currently proposed as the temporary parking lot is not technologically feasible due to excessive pressure drop, higher condenser back pressure, and premature condensation of steam.

Cultural Resources will be Disrupted in Alternative 2 for both the Dry Cooling and Hybrid Designs

This section was submitted under a separate, confidential filing.

Other Impacts of Dry Cooling and Hybrid Cooling

Air Quality

The CEC staff estimates that the hybrid cooling tower would add PM10 emissions (from cooling tower drift) of 0.99 tons/year, based on a circulating water rate of 25,000 gpm, a drift rate of 0.0006%, and a TDS level of 3000 ppm. In contrast, Duke estimated an emission rate of 8 tons/year, based on a circulating water rate of 36,972 gpm for each of the two towers, a drift rate of 0.0005%, and a TDS level of 10,000 ppm. Both the CEC staff and Duke's math is correct for the case analyzed. The difference between the two calculations is related to the design assumptions (number of towers, circulating water rate per tower, and TDS level).

The CEC staff argues that it is not possible to quantify the emissions increase associated with the decreased efficiency of the plant through the use of the dry cooling or hybrid designs, because there is no way to tell where the extra power will come from. That is not correct. One can reasonably and easily assume that the extra power can come from a plant similar to the Morro Bay units. The extra power will not come from hydro or nuclear plants because these plants are always base-loaded prior to fossil-fuel plants. Such an assessment of the increased emissions was included in Duke's assessment of this issue, and should have been included in the CEC's analysis as well.

EPA's recent analysis of dry cooling leads to similar conclusions. In their analysis, EPA concluded as follows:

> "This significant reduction in electricity production is another reason EPA has not selected dry cooling as the best technology available for minimizing adverse environmental impacts on a nationwide or regional basis. Because of the performance penalty, power producers using dry cooling produce more air emissions per kilowatt-hour of energy produced. Nationally, EPA estimates that a minimum requirement based on dry cooling would cause significant air emissions increases

over wet cooling systems. EPA projects for the dry cooling alternative that CO2, NOX, SO2, and Hg emissions would increase by 8.9 million, 22,300, 47,000, and 300 pounds per year, respectively. See Chapter 3 of the *Technical Development Document* for more information on EPA's air emissions analysis, including a discussion of the coincidence between maximum air emissions and the periods of the most severe air pollution problems. These additional non-aquatic environmental impacts (in the form of air emissions) further support EPA's determination that dry cooling does not represent best technology available for minimizing adverse environmental impact on a national or region-specific basis." [16]

EPA's calculations were based on their assumption that 83 power plants, nationwide, would be required to switch to dry cooling under the proposal under consideration, and that this switch would result in a decrease in capacity at those generating units of 1904 MW (0.51%). The increased emissions shown above reflect EPA's estimate of the annual air quality impacts associated with such a decrease. While EPA's specific numbers are not applicable to the instant case (many of the plants analyzed by EPA were coal-fired power plants), they indicate that:

- it is certainly possible to quantify the air quality impacts associated with efficiency decreases, as demonstrated in both Duke's analysis and that performed by EPA; and

- it is imprudent, and environmentally irresponsible, to dismiss the effects of "small" decreases in plant efficiency on air quality as insignificant and not worthy of further consideration.

Flooding

Dry Cooling Alternative 1 and Hybrid Alternative 1 appear to be located in or near the flood overflow path identified in Duke's Morro Creek Flood Hazard Evaluation (FHE) (June 12, 2001). This overflow path is not identified in the current Flood Insurance Rate Map. The overflow paths were identified using updated and fine-scaled topographic data and two-dimensional modeling. If the dry cooling towers are located outside of Duke's proposed berms locations (as it appears), then the cooling equipment would be subject to flooding. If the proposed berms need to be moved further east to protect the cooling equipment, then the berms would be located in and could impede or block the flood overflow pathway. Moving the berms would require the FEMA map to be changed and therefore FEMA approval, as well. In turn, flooding could be exacerbated elsewhere during a base flood event. The Staff Draft Report fails to analyze this issue in any respect for proposed Dry Cooling Alternative 1 or Hybrid Alternative 1. If this effect is significant, construction of the cooling equipment in this location may be prohibited due to regulatory constraints and subject Duke to unacceptable risk of liability.

[16] National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities, 66 Fed Reg. 65256 (2001) (codified at 40 CFR Parts 9, 122, 123, 124, and 125) (see Appendix C).

Both Dry Cooling Alternative 2 and Hybrid Alternative 2 also appear to be located at a significant flood overflow path and flooding area identified in Duke's Morro Creek Flood Hazard Evaluation (FHE). (June 12, 2001) This proposed location would be significantly flooded during a base flood event (among the deepest flood waters predicted during a base flood event). Further, in order to protect the site, substantial berms would need to be constructed in the flood overflow path. The construction of berms in this location is likely to significantly increase flooding elsewhere. The Staff Draft Report states only that this area "may potentially lie within a floodplain." The Staff Draft Report fails to analyze this issue in any serious manner. Instead the CEC staff *assumes* that FEMA would authorize the construction of the new berms or fill in a significant flooding and overflow pathway, and that the substantive requirements of the City of Morro Bay Flood Damage Ordinance (MBMC 17.72) could be met. Construction of the dry cooling towers and protective berms in this location is likely to be prohibited due to regulatory constraints and may also subject Duke to unacceptable risk of liability.

Hazardous Materials

For all the dry cooling and hybrid alternatives, staff correctly notes that use of sodium hypochlorite for biofouling control in once-through cooling water would be eliminated. However, staff does not quantify the increased use of oxygen scavenging chemical (e.g., carbohydrazide or aqueous hydrazine), and the new use of biocides to prevent microbial growth in the wet cooling tower water. Increased use of the oxygen-scavenging hazardous chemical and new use of biocides would increase the transport of these chemicals through the City of Morro Bay. The City has made clear its desire to reduce, not increase the transport of hazardous chemicals through the community.

Traffic and Transportation

The CEC's assessment of the potential impacts from implementation of the alternative cooling configurations is correct in its overall conclusion that Dry Cooling Alternative 1 and Hybrid Alternative 1 configurations would result in no significant Traffic and Transportation impacts. Both these configurations <u>*could not*</u> be built in parallel with the power block because this area is required for crane access and traffic flow. Therefore, the Dry Cooling Alternative 1 and Hybrid Alternative 1 configurations would require at least a 12-month extension to the construction schedule.

The construction of Dry Cooling Alternative 2 and Hybrid Alternative 2 configurations due to their location could be approached in two different manners:

1. They could be built in parallel with the power block without an extension to the construction schedule, but the craft manpower loading would increase by 100-125 people for a period of approximately one year. This increase would occur during the same peak manpower loading period currently identified in the proposed Project.

2. Maintain the current peak manpower limits, delay the construction of the alternative cooling units, and extend the construction schedule by approximately one year. This extension is contrary to the City of Morro Bay's desire to compress the construction

schedule as much as possible.

Both of these configurations have impacts to cost, schedule, and other elements that have not been fully analyzed by Duke. It is also important to note that while these impacts would remain insignificant relative to the status quo per CEQA, the fact that they would be prolonged or increased will concern the City and local residents and should be acknowledged by the CEC staff. Indeed, minimizing the duration of these impacts has been an important goal of both the City and Duke in their agreements regarding the Project.

The ACC equipment, whether implemented alone or as part of a hybrid configuration, are massive structures that require a substantial labor force for their construction. Each ACC would require numerous piles and extensive foundations and slabs, thereby substantially increasing the amount of concrete pouring required during initial construction. The additional concrete pours would cause several more days where large numbers of concrete trucks (50 or more) would deliver loads to the site each day. Through the anticipated use of the adjacent batch plant on Atascadero Road, most of this concrete truck activity would be away from City traffic. But an increase in deliveries of supplies to the batch plant in the days preceding each pour would still be required.

Once foundations have been poured, construction of the ACCs themselves will require heavy cranes to erect a large amount of structural steel, 32-foot diameter fans (CEC base case), piping, and electrical equipment. This would increase delivery traffic by a notable amount, though the CEC correctly notes that these deliveries could be scheduled for off peak hours to avoid unacceptable impacts to key intersections in Morro Bay.

The main elements of the ACCs are typically delivered in bundles of two to four fans. 20 to 40 or more ACC bundles could be required, depending upon the configuration selected. These bundles are large and would need to be stored offsite as they are staged for construction. This could increase offsite laydown requirements (by approximately 4 acres) and would certainly increase delivery traffic.

In summary, while traffic impacts from implementation of any cooling alternative would continue to be managed by Duke to avoid significant effects to Morro Bay residents, implementation of the ACC alternatives, whether alone or in a hybrid configuration, would significantly prolong the construction schedule or substantially increase the peak work force contrary to the interests of the local residents, Duke, and the State.

6. Constructibility

Dry Cooling Alternative 1 and Hybrid Alternative 1 Will Require the Demolition and Relocation of Equipment and Buildings

The CEC's Alternative 1 for both the Dry Cooling and Hybrid designs places the additional cooling equipment to the south of the power block. The Staff Draft Report makes no mention of ancillary equipment and buildings currently planned or designated for placement in that area. This equipment would need to be placed somewhere, but the Staff Draft Report provides no guidance on where the equipment would be located, does not address the costs of moving the equipment and buildings farther away from the power block, nor the impacts to plant constructability that these changes create.

The buildings and equipment that would need to be relocated for Alternative 1 for both the dry cooling and hybrid alternatives include:

1. The Closed Cooling Water System consisting of:
   - Pumps (3)
   - Exchangers (3)
   - 24"-30" supply/return lines
   - Evaporator
   - Polishing skid
   - Distilled water tank
   - Chemical injection skids
2. The Administration/Control Building
3. Warehouse
4. Parking lot
5. Ammonia Storage Tanks
6. Oily Water Separator (existing)
7. Fire water tank (existing)
8. Pump house (existing)
9. Numerous utility services supporting Units 1 through 4 including the current gas pipeline

See Figure7, Sheets 1 through 4 for the equipment and building space required and a visual description of how the buildings and equipment may be relocated using the dry cooling configuration from Duke's January 7th report. The relocation of the equipment and buildings shown in Figure 7 has not been confirmed (engineered/layout) to determine its viability.

CEC staff may have assumed that the equipment and buildings referred to could be placed under the ACC structure. However this is not feasible for a variety of reasons including:

1. Standard practice avoids placing any equipment under the ACC structure, except for the associated vacuum pumps and condensate tank, in order to keep the area clear for airflow.

2. It is preferred to avoid placing anything under the structure that emits heat or requires significant maintenance access.

3. If significant amounts of equipment or buildings (plot space) of significant height were placed under the structure, the ACC height would have to be increased accordingly in order to maintain required air volume. The increased height would require careful seismic design resulting in increased cost.

4. There is inherently limited space available underneath the ACC because of the complex web of structural steel required to support the structure.

Duke has considered the issue of relocating the equipment and buildings described above and believes they can best be relocated south of the ACCs. However, this solution is not without the economic and technical challenges described below.

1. Locating the ACC equipment creates substantial constructability issues. Specifically, crane access and staging areas adjacent to the power block area have been totally eliminated. The only practical construction plan is to "hold out" construction of the ACCs until after the majority of the power block is constructed and all large cranes are removed from the area. This will extend the construction schedule by at least 12 months, which violates one of the key commitments Duke has made to the City of Morro Bay (a shortened construction schedule).

2. Before Duke could relocate the equipment and buildings to make room for the dry or hybrid cooling system, the existing equipment and facilities on that part of the site that would have to be demolished. Duke does not believe this cost or schedule impact has been incorporated into the CEC document.

3. The new location of the equipment and buildings would extend and increase the size of the primary pipe rack, along with the associated pipe and electrical cable runs resulting in both schedule and cost impacts that have also been overlooked by the CEC document.

4. The equipment and building would impact the underground cooling water intake pipelines and existing discharge tunnels (as mentioned in the CEC Staff Draft Report on page 23). It is not clear that the existing discharge tunnels could be avoided and may have to be relocated. This cost and schedule impact has not been considered in the CEC document. Furthermore, this would result in a much earlier shutdown of existing Units 1 through 4 resulting in a substantial loss of electrical generation and possible California electrical grid instability depending on power demands at the time. Specifically, Duke estimates that in this scenario the existing plant would have to be taken down 10-12 months prematurely, removing up to 5 million MWh of available power from the California electrical grid.

5. Moving the control room farther away from the power block is generally considered poor design. It compromises the ability of the plant operator to monitor the status of operating units, respond to emergencies, and creates safety issues that would otherwise not be present.

Transmission Lines to Switchyard – Dry Cooling Alternative 1 and Hybrid Alternative 1

The Staff Draft Report did not address any impacts to the transmission line routing to the switchyard. The lack of identification of impacts is apparently due to the undersizing of the system. If it were properly sized (see Duke's January 7th report), there are clear impacts to

transmission facilities and access to the switchyard for both Dry Cooling Alternative 1 and Hybrid Alternative 1. It would most likely result in installing the transmission lines underground. Putting the lines underground would significantly increase the cost of these alternatives.

The CEC Draft Staff Report Understates Economic Costs of the Alternative Cooling Designs

The cost analysis presented in the Staff Draft Report is misleading and in some cases incorrect. As discussed earlier, both the dry cooling and the hybrid systems are significantly undersized with respect to capacity and noise requirements. These have significant cost implications for the Staff Draft Report's conclusions. Furthermore, the Staff Draft Report does not analyze the increased annual energy cost or the lifetime cost (PV) of the alternatives as Duke has estimated in its "Morro Bay Power Plant Cooling Options" report of January 7, 2002. The discussion below compares the Duke results to the Staff Draft Report results. For brevity, Duke's general observations and specific corrections to erroneous information in the Staff Draft Report are contained in Appendix J.

1) Capital Cost

Table 7 presents the capital cost buildups for Duke's analysis of dry and hybrid cooling (as presented in the Duke January 7th report), and the cost buildups for the alternatives presented in the CEC Staff Draft Report. It is not possible to directly compare all of the cost components of the CEC staff's estimate against Duke's because the Staff Draft Report did not adequately describe the elements of each of their cost components. However, Duke has identified some of the significant reasons for the CEC's underestimated capital costs (additional details are contained in Appendix K).

- *Nominal Output:* Duke's dry cooling and hybrid designs as described Duke's January 7th Report can achieve the nominal net output (1200MW) of the proposed Project over the Project's ambient temperature range. The CEC alternative cooling designs are undersized and would not achieve the nominal output definition of the proposed Project.[17] The CEC staff's base case design would have to include at least 50% more fans, with a corresponding increase in cost to meet the nominal output definition of the proposed Project. Because the CEC staff's design is incorrectly sized, it is not possible to compare its cost to Duke's $80 – 85 million capital cost estimate that is based on a properly sized design employing the lowest noise technology available from ACC vendors.

- *Noise:* Duke's conceptual ACC design incorporates GEA's extra-cost low noise package that would deliver the best possible noise performance available in the marketplace and therefore have the greatest chance of compliance with local noise ordinances. The CEC base case design would not come close to meeting local noise

[17] This lost generation is not just a Duke problem, as it affects the capacity available to the system operator. Moreover, because this effect increases with temperature, it is likely to be greatest during those times when the system most needs capacity.

ordinances as explained in Section 3. The Staff Draft Report states that the design would have to include 50% more fans to begin to be compliant. According to the CEC, addressing just noise non-compliance increases the estimated capital cost for the base case design by at least 30%.[18] It was not possible to judge the accuracy of this estimated cost increase because no background on how it was derived was provided in the Staff Draft Report. For comparison, the capital costs for Duke's conceptual design appropriately sized for the correct steam rate and employing the best available GEA low-noise technology is about 70% higher than the CEC base case.

- *Steam Duct:* The Staff Draft Report's cost numbers apparently do not incorporate the cost of the additional length of required steam ducts that are incorporated into Duke's estimates. Vendors typically provide budgetary equipment quotes including 50 feet of steam transfer line and two elbows. The alternatives in the CEC Staff Draft Report will require more than 50 feet of steam transfer line, adding an estimated $3 to $5 million to the CEC's estimated cost for Dry Cooling Alternative 1 and Hybrid Alternative 1, and $5 to $10 million for Dry Cooling Alternative 2 and Hybrid Alternative 2. In addition, the CEC fails to account for the costs of the elevated pipe racks required to support the steam ducts and additional services (electrical, air, water, etc.).

- *Hybrid water treatment:* The Staff Draft Report's $3 million cost to upgrade the CMBWTP (Cayucos Morro Bay Waste Treatment Plant) to tertiary quality is significantly underestimated. The Staff Draft Report incorrectly assumes that the effluent from the CMBWTP is currently treated to a secondary level prior to discharge to Morro Bay (Staff Draft Report, page 28) and bases its cost estimate on this erroneous assumption. Duke's estimate to upgrade the CMBWTP is based on cost information from a report prepared by Carullo Engineers for the CMBWTP, which specifically analyzed the cost to upgrade the CMBWTP to tertiary quality. More importantly, as a matter of policy there can be no assurance that the City of Morro Bay would choose to upgrade its treatment plant or allow Duke to have the right to the plant's output for 30 years.

- *Erection Costs:* The Staff Draft Report's erection costs which do not include preparation costs (see below) are grossly understated based on information and quotes supplied to Duke by dry cooling and hybrid cooling systems vendors. According to the quotes Duke received, erection costs are typically 50% of the equipment and material cost. The CEC erection cost factor is roughly half of what the vendors assume.

- *Preparation Costs*: Vendor quotes do not include any site preparation such as excavation, backfill/compaction, piling, spread footings, or piers. The preparation costs have been estimated by Duke and are included in the capital cost estimate. They do not appear to be included in the CEC estimates

[18] 30% cost increase per Staff Draft Report Table 7, page 67

- *Transmission Lines to Switchyard (Alternative 1 Cases Only):* Access to the switchyard as currently planned for the proposed Project would not be feasible for either Dry Cooling Alternative 1 or Hybrid Alternative 1. Alternative routing overhead also does not appear viable. The most likely solution would be to place transmission lines underground resulting in significant cost impacts. However, the mere proximity of the high-voltage equipment would remain a serious safety concern.

- *Relocate Buildings and Equipment (Alternative 1 Cases Only):* For both Dry Cooling Alternative 1 and Hybrid Alternative 1 there are both buildings and existing equipment that would have to be demolished and then relocated or replaced to accommodate these cooling alternatives. This will add additional costs to the overall Project.

Table 7: Capital Cost Comparison
(in millions)

	ACC		Hybrid	
	Duke	**CEC**	**Duke**	**CEC**
Equipment	$40.5	$25.7	$36	$19
Owner supplied Equipment and Material		$1.9		$4.6
Erection	$20	$6.6	$15	$3.8
Preparation	$20-25		$15-20	
Indirect and Fees		$12.7		$10
WTP Upgrade	NA	NA	$15	$3
TOTAL CAPITAL COST	**$80-85**	**$47**	**$81-86**	**$40**

Duke's cost estimate above does not include the relocation of the proposed equipment and buildings designed in the proposed Project, nor does it include the following:

- extension of pipe racks, cables, closed cooling water lines, etc. due to relocation,
- underground transmission lines,
- demolition/replacement of the fire water tank,
- demolition/ replacement of the oily water separator system,
- demolition/ replacement of pump house and pumps, and
- extension and rerouting of existing fire water lines,

Duke estimates that the cost impact due to the above items and other miscellaneous construction activities could add at least an additional $10 to $20 million to the Project.

2) Additional Annual Energy Cost

Although the Staff Draft Report does not estimate the additional annual energy cost as a result of alternative cooling as Duke has done in its January 7th report, the Staff Draft Report does estimate the efficiency impact of alternative cooling. However, it erroneously concludes that the economic impact of alternative cooling would be insignificant.

The CEC estimated efficiency impact (10 to 12 MW) might be insignificant when viewed as a percentage of the nominal output of the plant (1%), but it is significant when properly viewed as a recurring economic cost for the life of the Project. For example if dry cooling were used, the efficiency loss would reduce annual revenue by about $3 million[19] compared to the proposed Project. This translates into a $37 million PV (Present Value) opportunity cost for the Project with dry cooling.[20] This is nearly 85% of the CEC's estimated capital cost ($47 million) of the ACC, and therefore quite significant. This estimated loss does not account for the higher efficiency losses during the warmer summer months. (Duke estimates the efficiency impact would be up to 3% during the summer months.[21]). For comparison, using the mean dry cooling energy penalty from the EPA's proposed rule for new facilities, the present value operating cost representing the inefficiency of the dry cooling alternative more than doubles to $81 million.[22]

3) Lifetime Cost (PV)

The CEC chose not to evaluate the lifetime cost of dry and hybrid cooling as Duke has done. The cost build up underlying analysis is fundamentally flawed, so it is not possible to compare lifetime cost metrics with Duke's results.

4) Additional Economic Impacts

The preceding sections evaluate the plant specific economic impacts of alternative cooling systems. There are also other economic and business risks that should be considered. For example, less efficient plants are dispatched (called on to produce power) less frequently. Duke is currently evaluating these risks and will present the results after the analysis is complete.

Finally, if Duke determined that the best way to accommodate additional construction at an ever-more congested site were to stretch out the construction schedule, the additional interest during construction would become a serious cost factor.

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[19] 10 to 12 MW less output for 8,000 hours of operation per year and a $32.5/MWh forecasted national average electricity generation price. (SOURCE: POEMS, U.S. DOE, 1999)

[20] 7% discount rate, 30 year project life

[21] Based on increase in net heat rate at 68F from Duke's "Updated Analysis of Alternative Cooling Systems for the Morro Bay Modernization Project"

[22] Mean annual energy penalty of 2.1% per Chapter 3 "Dry Cooling" of Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities (EPA-821-R-01-036). November 2001.

7. Other Process Concerns with the Staff Draft Report

The Staff Draft Report was incorrect and inconsistent in how it analyzed the impacts of possible cooling water alternatives to Duke's proposed Project. At the global, and perhaps most important, level as discussed elsewhere in this report, the Staff Draft Report is premised on two faulty assumptions. The report failed to choose alternative cooling options that could meet Duke's Project objectives of a 1200 Megawatt plant over a range of operating conditions and all environmental impacts were evaluated based on an equipment configuration that the CEC staff acknowledged would not meet the City of Morro Bay noise ordinance.

In addition to these global shortcomings, the Staff Draft Report fails to consistently follow other analytical procedures as required by CEQA. CEQA requires that alternatives must be compared to both the existing conditions (the existing plant) and to the applicant's proposed Project. While some of the Staff Draft Report section writers followed this framework, several did not. Further, in most CEQA documents it is customary for the author to provide a comprehensive table that compares the environmental impacts of each alternative in each of the disciplines to the existing condition and to the applicant's proposed Project. Such a table is not provided in the Staff Draft Report, leaving the reader to try to mentally sketch the relative merits of each approach.

Finally, as stated earlier in the document, Duke believes the CEC staff is wrong both as a matter of policy and of law to suggest that it could override the myriad of inconsistencies with local LORS that the staff's alternatives must overcome.

8. Staff Analysis of the Aquatic Filter Barrier

The Staff Draft Report fails to give a balanced evaluation of the AFB's ability to substantially reduce entrainment. The Staff Draft Report fails to compare the AFB to existing conditions and often raises negative statements regarding the AFB that are unsupported and sometimes even contradictory.

The Staff Draft Report has other limitations as well:

- It fails to incorporate CEQA baseline assumptions for existing marine biology conditions.
- It fails to recognize a number of parameters of the CWA Section 316(b) in its analysis including:
    - BTA (Best Technology Available) requirements to accurately take into account non-water quality environmental impacts;
    - the disproportionate cost aspects of air cooling and hybrid cooling; and
    - misapplication of the BTA analytical approach due to the failure to thoroughly consider certain CWIS (Cooling Water Intake Structure) technologies (i.e. Aquatic Filter Barrier) that have real BTA potential to "minimize adverse environmental effects", while at the same time giving disproportionate attention to cooling systems (i.e. Air cooling and Hybrid Cooling), which are arguably not applicable under the 316(b) definition of BTA for alternative CWISs.

AFB Impact to the Harbor

Many of the statements regarding the AFB's effect on harbor traffic and transportation are nothing more than unsupported supposition. This supposition gives rise to a concern of the efficacy of the entire Staff Draft Report. For example, staff suggests that if construction vessels moor in an unauthorized manner they could create a safety hazard. (page 77) However, there is no indication that unauthorized mooring or anchoring would ever take place. Moreover, the entire basis of staff's analysis is two highly conceptual designs for the AFB, neither of which is likely to represent the final design if an AFB is eventually installed. Staff concludes that the AFB could impact the US Coast Guard (USCG) and City of Morro Bay Harbor vessels traveling at high speeds when called on rescue missions. (page 77) However, the USCG vessels are currently moored in the vicinity of the AFB and should not have any problem beginning or ending voyages at the USCG facility due to the presence of the AFB.

The Staff Draft Report notes that the "USACE [United States Army Corps of Engineers] stated that any impacts to navigation may prevent them from permitting the AFB." (pages 32-33) The CEC staff does not provide any citation or source for this statement. Moreover, this statement ignores the fact that nearly every structure placed in Morro Bay, including docks and piers, impede navigation to some extent and have probably been built with appropriate permits. The mere fact that a structure affects navigation does not require the Corps to deny permits.

Further, CEC staff arguments are often contradictory. After stating that the AFB would interfere with navigation (pages 32-33), staff then states that the AFB design incorporating a boat dock would result in a positive impact on recreation with increased human activity in and around the AFB. (page 51) Although navigation issues will be important in the USACE/USCG permitting process, there is no indication that these obstacles cannot be overcome with the appropriate design. In fact, if the CEC permits the AFB to be considered for its BTA potential on a "to be demonstrated" basis, alternative designs to overcome potential navigation issues, to minimize marine biology effects, and to create a positive visual and recreational impact will all be part of the demonstration program for the AFB.

The CEC states that the AFB will likely have a significant land use effect due to impacts on recreation, harbor operation, and coastal access. (page 61) The CEC neglects to consider the possibility of alternative design concepts that would reduce or avoid negative impacts. Little evidence is offered to show that harbor operations could not accommodate the AFB, or that the vast number of Morro Bay recreational opportunities would be significantly affected. On the contrary, a floating dock/boardwalk design included in the AFB could significantly benefit boating, kayaking, and other harbor water recreational and commercial fishing related opportunities.

The CEC's Staff Draft Report states that: "[S]ediment may build up around the AFB requiring frequent dredging." (page 32) This is a weak argument as sediment already builds up elsewhere in Morro Bay, including the harbor entrance and the existing CWIS, requiring periodic dredging. The CEC Staff Draft Report fails to indicate whether current dredging practices would need to be increased after the AFB installation or that this would result in any changes to the existing conditions.

The CEC assumption that commercially harvested species could in any way be impacted by the loss of "essential fish habitat" due to the area encompassed by the AFB is not backed by scientific facts. Preliminary surveys of the benthic habitat in the vicinity of the AFB indicate that eelgrass beds could very likely be avoided. The CEC statements of disaster scenarios (page 52) due to inclement weather fail to consider either the protective harbor characteristics of Morro Bay or the AFB designs that can protect against such unlikely scenarios. On the contrary, there is no evidence from the 316(b) Report that species of commercial or recreational value or their habitats will be adversely affected by the Project.

Visual Impacts of the AFB

The CEC's conclusion that air cooling structures can be constructed and not create a significant visual impact, while at the same time arguing that the visual impact of a floating cover or a limited boardwalk and dock associated with the AFB would create a significant impact which cannot be mitigated simply does not make sense. Nowhere are these CEC staff statements verified by standard planning guidelines or other valid approaches. Without provision of the guidelines for comparison of the impacts of these two alternatives, it is impossible to reconcile these conclusions.

Duke also questions the CEC's finding that the AFB "alternative is not preferred because of the residual degradation of visual quality that would be experienced from a portion of the

Embarcadero and Coleman Drive." Because the AFB alternative has not yet been designed, it is at least premature to come to such a conclusion.

The "Experimental" Nature of the AFB

Staff asserts that "[e]xperimental actions such as the AFB in a state and federal estuary are considered to be exceptionally risky, and receiving agency approval may not be feasible". (page 52) No support whatsoever is provided for this statement. On the other hand, the staff noted that where an AFB was deployed at a power plant in the Hudson River area "[e]ntrainment reductions of up to 82 percent were observed and impingement was essentially eliminated" (*Evaluation of Cooling Systems Alternatives Revised Draft*, Dec. 26, 2001. page 2.).

The CEC staff's comment that the "early version of the AFB performed poorly" (page 11) is highly subjective, out of context, and fails to reflect that as with any new technology, the initial deployment of the AFB was expected to have problems. The purpose of the experimental installation was to work out the bugs in the system. Considering the difficulty of the Lovett Site on the Hudson River (high waves, ice movement, and underwater obstacles including discharge pipes on the river floor) and the newness of the technology, the fact that the AFB achieved close to an 80% reduction in larvae entrained is, in fact, promising.

It should be noted that the AFB performance would be evaluated for effectiveness at the MBPP site. If the AFB performs as well as it has elsewhere (e.g., Lovett Generating Station on the Hudson River), then the changes in the habitat within the AFB enclosure would be of little significance given the overall benefit to the estuary. Further, if AFB is determined to be ineffective, then it could be removed and habitat would again be accessible to marine and estuarine organisms. For that reason, "loss" of habitat within the AFB enclosure should not be considered a significant impact.

Feasibility of Locating the AFB in Morro Bay

While the AFB technology is relatively new and evidence of its application is limited, its demonstration of 80% effectiveness in an environment in some ways more severe than Morro Bay is hardly incriminating. On the contrary, the conditions in Morro Bay may be more favorable for the AFB than the Hudson River. Duke agrees that prior to implementation of AFB technology, the importance of a pilot and/or demonstration project and appropriate effectiveness monitoring is required.

CEC staff provides no basis for the conclusion that the AFB is "unacceptable for use in a state and federally-designated estuary." (page 54) Staff clearly recognizes that the AFB at the Lovett facility has resulted in a reduction of entrainment by more than 80% and near elimination of impingement (*Evaluation of Cooling Systems Alternatives Revised Draft* Dec. 26, 2001. page 2.), yet concludes that the AFB is "unacceptable" for Morro Bay. Such a statement without more substantial documentation is, at best, merely conclusory and, at worst, may reflect a calculated approach and bias to reach the desired conclusion. It is also noteworthy that the same CEC staff has proposed the AFB as "potential BTA" pending the outcome of a demonstration to be conducted with a full-scale implementation of an AFB at the Contra Costa Power Plant in the Bay Area in the spring of 2003. It is arguable that the

Morro Bay environment is more capable of accommodating the AFB than the San Joaquin/Sacramento River delta.

The CEC Staff Draft Report characterized Morro Bay as a high-energy coastal environment (page 53) with "generally severe environmental conditions" (page 11) stating that it is an inappropriate and unacceptable environment in which to deploy and operate the AFB. (page 54) This is simply inaccurate. Morro Bay is a protected harbor and not an exposed (high-energy) marine environment. Further, contrary to suggestions by CEC staff, there is little basis to conclude that the Hudson River setting is more or less "dynamic" than Morro Bay. (page 53)

The Morro Bay tidal currents may be ideal to help keep the filter barrier functioning effectively. The protected harbor and double jetty outside the harbor entrance should provide protection from tidal surges. In contrast, the Lovett Generating Station on the Hudson River is subject to substantial currents, the presence of large wood debris, an irregular and rocky bottom that interferes with the AFB forming an effective seal, and icing in winter conditions. Not withstanding these challenges, the AFB has been effective at the Lovett facility. Finally, the Morro Bay bottom is largely sandy with only limited eelgrass along the shoreline, which should enable a well-designed AFB to largely avoid any sensitive marine habitat areas. The bottom does not have obstacles such as those that plagued the Lovett power station in New York. The fact that the technology has not been in place over a long period of time should not preclude it from being considered as a potential solution. The evidence available from its limited existence is highly supportive of its beneficial application to the Morro Bay case.

9. Conclusion

In summary, had the CEC staff sized the dry cooling and hybrid alternatives to serve the Project that Duke has proposed in the AFC (1200 MW nominally) and followed their own conclusions for a larger equipment configuration in the noise section of the document (and subsequently based the balance of the environmental analysis on those conclusions), the resultant environmental and other impacts would have led the reader to the inevitable conclusion that:

- Neither dry nor hybrid cooling alternatives would be feasible at this site for a 1200MW plant.
- All alternatives analyzed by the CEC staff would fail to meet the local noise standards. The environmental impacts from the larger, but quieter, equipment configuration that could have met the standards were never analyzed.
- All alternatives would have significant impacts on visual resources, and Alternative 2 for both the dry cooling and hybrid designs would have significant cultural and biological impacts.
- Both Dry Cooling Alternative 1 and Hybrid Alternative 1 are premised on Duke constructing cooling equipment on land it does not own and has no reason to believe it will own.
- Both Hybrid Alternatives 1 and 2 are premised on the unfounded assumption that the City of Morro Bay would be willing to make changes to its wastewater treatment plant and to dedicate available water to Duke for the next 30 years.
- Even if the City were to commit the use of wastewater to Duke, without an additional reliable back-up water source, neither of the hybrid cooling alternatives could be considered feasible.
- All the alternatives are inefficient and prohibitively costly relative to the benefits, as supported by EPA's conclusions on dry cooling.
- All the alternatives would not be feasible because the standards for CEC override of local LORS could not be met.

The Staff Draft Report is fundamentally flawed in its analytical methodology (noise, steam flow rate, etc.). Accordingly, its current conclusions are not supported by facts and cannot be relied on in either the CEC or RWQCB proceedings.

Duke will continue to evaluate the analytical framework and conclusions of the Staff Draft Report between now and the workshop and evidentiary hearings to identify any other concerns with the staff's analysis. Duke looks forward to discussing these observations and continuing concerns at the workshop in March and at the subsequent evidentiary hearings.

10. Appendices

Appendix A	**Duke Energy Morro Bay, LLC Jan 24th Letter**
Appendix B	**City of Morro Bay Resolutions Against Dry Cooling**
Appendix C	**EPA Findings on Dry Cooling**
Appendix D	**Duke's Comments on the Tetra Tech Report**
Appendix E	**Summary of Duke's Jan 7th Report**
Appendix F	**Record of September 5, 2001 Conversation with CEC**
Appendix G	**Noise Issues**
Appendix H	**Duke's KOPs Showing Air Cooling Condensers**
Appendix I	**Land Use Plans and Policies That May Conflict With the CEC's Dry and Hybrid Cooling Options**
Appendix J	**Corrections and Observations of the Staff Draft Report**
Appendix K	**Cost Issues**

Appendix A:
Duke Energy Morro Bay, LLC Jan 24th Letter

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RE: Preliminary Evaluation of CEC and Tetra Tech Alternative Cooling Reports

Dear Paul and Roger:

We have completed our preliminary evaluation of the CEC's "Morro Bay Power Plant Cooling Options" report (Draft January 7, 2002) and Tetra Tech's "Evaluation of Cooling System Alternatives Proposed Morro Bay Power Plant" report (Draft December 26, 2001). While we will be submitting our complete comments later per the schedule, we have already identified several significant issues that we want to apprise you of right away. Duke believes there are fundamental flaws in both reports, which result in an understating of the consequential impacts of alternative cooling systems. Specifically:

- The CEC report uses a base-case design (Option 1) for the expected mass and bulk of various cooling system alternatives to assess the environmental and other impacts of each alternative. However, the report clearly recognizes that Option 1 in all instances fails to satisfy the noise ordinance of the City of Morro Bay. The report explicitly states that Option 3 (which incorporates more cooling fans and subsequently a larger plot area) would likely be required to attempt to comply with local LORS noise requirements (pg 67). This fact compels that the design upon which all other impacts are assessed needs to be assumed to be about 50% larger. Option 1's failure to satisfy the noise requirement clearly invalidates the impact results of the report because they are based on the base-case design which the report states would violate required compliance with local LORS.

- The steam flow rate and temperature design points used to size the ACC and Hybrid systems in the CEC and Tetra Tech reports are incorrect. The steam flow rate used results in undersized alternative cooling systems, which leads to inadequate cooling capacity for the nominal plant design. The maximum steam flow rate used to size the cooling equipment in the CEC and Tetra Tech reports is 1,097,000 lbs/hr (non duct fired) at 64°F. In order for the cooling system to in fact work for the MBPP, the equipment must be sized for a maximum steam flow rate of 1,642,000 lbs/hr (duct fired) at 85°F per 600MW power block. Duke's analysis in the "Updated Analysis of Alternative Cooling Systems For the Morro Bay Modernization Project" report (January 7, 2002) is based on these correct assumptions.

- Duke's understanding of the Tetra Tech analysis is that they chose a generic design not specific to the unique requirements of the Morro Bay site. Duke does not believe it is proper to compare a generic design to one tailored to the specific attributes of the Morro Bay site.

The incorrect design points used in the CEC report, as referenced in bullet 2 above, is apparently the result of misinterpreting the data provided to Aspen Consulting at the beginning of their investigation. The CEC

report states on page 21 under Design Criteria "...These values were discussed with the Applicant and agreed to for the conceptual analysis..." Duke disagrees with this characterization.

On September 5, 2001, Duke participated in a teleconference with Aspen to discuss alternative cooling. Aspen's request for data during the meeting was NOT focused on or agreed to as the design point. The data discussed was relative to Duke's earlier preliminary sizing of the ACC and Hybrid systems as reflected in the 316(b) report. During this discussion, Duke also clearly indicated that the preliminary sizing would not support the nominal 1200MW output in accordance with the AFC. Duke also stated its "intent to maintain the power output of the plant at 1200MW which would necessitate increased supplemental firing and preferred that this be the basis for comparison (see Attachment 1). Duke was asked to provide electronic CAD drawings of the plot plan and elevations, but Duke stated that it would not make these drawings available in electronic form due to concerns of confidentiality. As an alternative, Duke extended an invitation to Aspen to visit D/FD's office and review the design basis (this offer was also repeated during a later teleconference). While Aspen expressed an interest in so doing, Aspen never made themselves available for such a meeting.

Duke received an email from the CEC on September 10 requesting that D/FD provide the criteria to be used in the cooling alternative. Duke responded via email on September 20 by forwarding the same data it had previously given to vendors in order to obtain preliminary sizing of the ACC and Hybrid systems as reflected in the 316(b) report (see Attachments 2 and 3). This data and corresponding narrative clearly indicate that the data is for a non-duct fired design condition and that Duke's expectation would be that in either the dry cooling or hybrid case the final design would result in larger units which only further increases the impacts of each alternative.

In parallel to the request for data from the CEC, a fax (see Attachment 4) was received from Aspen on September 10, 2001 requesting drawings and technical data. This was followed up by a phone call from Susan Lee (Aspen) requesting electronic CAD files. The request for the electronic files was again denied by D/FD for the same reasons as expressed to the CEC (regarding confidentiality). As such, a letter (see Attachment 5) responding to Aspen's fax request was issued on September 20, 2001. Again, the data provided to Aspen was data that was previously provided to the vendors for preliminary sizing, data available from the AFC or from D/FD's historical database.

In summary, there are fundamental flaws in the CEC and Tetra Tech reports. These result in significantly understating the impacts of alternative cooling systems. Duke believed it was imperative to advise both agency staffs of this critical observation as it has significant implications for the conclusions of the CEC and Tetra Tech Analysis. Duke's analysis in the "Updated Analysis of Alternative Cooling Systems For the Morro Bay Modernization Project" report (January 7, 2002) is based on the correct assumptions. We will follow up with a more detailed written analysis of the CEC and Tetra Tech reports in accordance with the FSA schedule.

Sincerely,

Andrew Trump/JMT

Andrew Trump
Director of Business Development
Duke Energy, LLC

CC: Bob Therkelson, CEC
Kae Lewis, CEC
Caryn Holmes, CEC

Appendix B:
City of Morro Bay Resolutions Against Dry Cooling

PLANNING COMMISSION RESOLUTION NO. 01-01

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF MORRO BAY, RECOMMENDING THAT THE CITY OPPOSE THE USE OF "DRY AIR COOLING" FOR THE MORRO BAY POWER PLANT

WHEREAS, the Planning Commission of the City of Morro Bay reviewed several methods of "Dry Air Cooling" at its special meeting of August 9, 2001; and

WHEREAS, the Planning Commission made the following findings:

A. The various methods of "Dry Cooling" that require cooling towers or structures that were reviewed could cause an unsightly and unnecessary blight upon the community.

B. The various methods of "Dry Cooling" that require the use of fresh water that were reviewed could cause a potential hardship on the City water supply.

C. The various methods of "Dry Cooling" that use mechanical pumps and fans that were reviewed may cause unnecessary noise levels upon the Community.

D. The various methods of "Dry Cooling" that use salt water for cooling that were reviewed may cause unnecessary "salt drift" in the air and pollute the surrounding lands.

E. The various methods of "Dry Cooling" that were reviewed use excessive amounts of land that is prime land along the Embarcadero Road that could otherwise be used for Community benefit.

F. The various methods of "Dry Cooling" that were reviewed could cause an unsightly steam plume that may pollute the environment and cause an unsightly blight upon the Community.

NOW, THEREFORE, BE IT RESOLVED the Planning Commission recommends the City reaffirm its support for the Duke proposed upgrade to construct a new, efficient, state-of-the-art generation facility as stipulated in the City and Duke MOU adopted by resolution on February 28, 2000; and

BE IT FURTHER RESOLVED the Planning Commission recommends the City reaffirm its support of the demolition of the existing power plant.

APPROVED, on the 9th day of August, 2001 by the following vote:

AYES: Baxley, Carnes, Doubledee, Vesterfelt
NOES: 0
ABSENT: 0
ABSTAIN: Barta

THAD BAXLEY, Vice-Chairperson

ATTEST:

GREIG CUMMINGS, Secretary

RESOLUTION NO. 57-01

RESOLUTION REGARDING ALTERNATIVE COOLING METHODS PROPOSED FOR THE MORRO BAY POWER PLANT

THE CITY COUNCIL
City of Morro Bay, California

WHEREAS, On February 28, 2000, after extensive public input and consideration, the City Council entered into a Memorandum of Understanding (MOU) with Duke Energy regarding Duke's planned modernization of the Morro Bay Power Plan; one of the primary goals of the MOU is to secure the demolition of the existing power plant and its replacement with a substantially smaller, less visually obtrusive facility; and

WHEREAS, On June 12, 2000, after engaging in an extensive public pre-application review process with Duke Energy, the City Council approved a package of pre-application recommendations for transmittal to Duke Energy and the California Energy Commission (CEC) that included many measures intended to reduce the visual obtrusiveness of the new facility, minimize noise impacts, avoid inconsistencies with City land use policies, as well as address many other issues of local concern; and

WHEREAS, the City, in its subsequent comments on the Duke Application for Certification (AFC), the data adequacy of the AFC, the AFC's consistency with local ordinances, regulations and standards (LORS) and its comments on the Preliminary Staff Assessment prepared by CEC staff, has consistently emphasized that the modernization project must result in a project that is substantially less visually obtrusive, meets local noise standards and must be otherwise consistent with local LORS in order to merit City support; and

WHEREAS, the City Planning Commission and City Council conducted separate discussions on August 9, 13 and 27, 2001 of concerns related to various alternative methods of cooling the proposed facility currently under consideration by the CEC. Through these discussions, based on the information currently available, the Planning Commission and City Council determined that these alternative methods of cooling, known collectively as "dry cooling," may have the potential to cause increased adverse impacts to Morro Bay with regard to noise, visual resources, air quality, socio-economics, water resources, and land use due to the size, bulk, location, noise, air emissions and potential fresh water use of some or all of these dry cooling alternatives, creating the possibility that the project may become inconsistent with local LORS.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Morro Bay, California, that:

a) Based on currently available information, the City Council opposes requiring alternative cooling methods for the proposed Morro Bay Power Plant that would cause or exacerbate adverse effects on visual, noise, air quality, socio-economic and other local resources compared to the proposed project;

b) The City Council notes that a project using an alternative cooling method that would negate the need for the proposed project to be located on the coast may jeopardize the City's preliminary finding that the project is considered Coastal Dependent and therefore jeopardize consistency with the existing zoning and coastal land use plan designations of Coastal Dependent Industrial that apply to the project site;

c) The City Council, pursuant to Section 15064.7 of the State Guidelines for the Implementation of the California Environmental Quality Act (CEQA), further determines that any evaluation of the significance of the proposed project's impacts for the purposes of compliance with CEQA should be based on a comparison with a baseline condition that includes permitted, historical operations of the existing facility to determine what real, tangible, reductions can be expected from new plant operations.

PASSED AND ADOPTED by the City Council of the City of Morro Bay at a regular meeting thereof held on this twenty-seventh day of August, 2001 on the following vote:

AYES: Anderson, Elliott, Peirce, Peters
NOES: Crotzer
ABSENT: None

RODGER ANDERSON, Mayor

ATTEST:

BRIDGETT BAUER, City Clerk

Appendix C:
EPA Findings on Dry Cooling

Introduction

On December 18, 2001, the United State Environmental Protection Agency (US EPA) published a final rule that implements section 316(b) of the Clean Water Act (CWA) for new facilities that use water withdrawn from rivers, streams, lakes, reservoirs, estuaries, oceans, or other bodies of water of the United States for cooling purposes. The rule establishes the best technology available for minimizing adverse environmental impacts from cooling options. Dry cooling was not included in the US EPA's list of "best technology available" options for a variety of reasons. The US EPA's explanation of these reasons is reproduced *verbatim* below.

EPA Findings on Dry Cooling

C. Why EPA Is Not Adopting Dry Cooling as the Best Technology Available for Minimizing Adverse Environmental Impact?

In establishing best technology available for minimizing adverse environmental impact the final rule, EPA considered an alternative based on a zero-intake flow (or nearly zero, extremely low flow) requirement commensurate with levels achievable through the use of dry cooling systems. Dry cooling systems (towers) use either a natural or a mechanical air draft to transfer heat from condenser tubes to air. In conventional closed-cycle recirculating wet cooling towers, cooling water that has been used to cool the condensers is pumped to the top of a recirculating cooling tower; as the heated water falls, it cools through an evaporative process and warm, moist air rises out of the tower, often creating a vapor plume. Hybrid wet-dry cooling towers employ both a wet section and dry section and reduce or eliminate the visible plumes associated with wet cooling towers.

In evaluating dry cooling-based regulatory alternatives, EPA analyzed a zero or nearly zero intake flow requirement based on the use of dry cooling systems as the primary regulatory requirement in either (1) all waters of the U.S. or (2) tidal rivers, estuaries, the Great Lakes, and oceans. The Agency also considered sub-categorization strategies for the new facility regulation based on size and types of new facilities and location within regions of the country, since these factors may affect the viability of dry cooling technologies.

EPA rejects dry cooling as best technology available for a national requirement and under the sub-categorization strategies described above, because the technology of dry cooling carries costs that are sufficient to pose a barrier to entry to the marketplace for some projected new facilities. Dry cooling technology also has detrimental effect of electricity production by reducing energy efficiency of steam turbines and is not technically feasible for all manufacturing applications. Finally, dry cooling technology may pose unfair competitive advantages by region and climate. Further, the two-track option selected is extremely effective at reducing impingement and entrainment and while the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so a at cost that is

more than three times the cost of wet cooling. Therefore, EPA does not find it to represent the ‘‘best technology available’’ for minimizing adverse environmental impact. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word ‘‘minimize’’ in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or water bodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). An application of dry cooling will virtually eliminate use of cooling water and impingement and entrainment, in almost all foreseeable circumstances, would reduce a facility’s use of cooling water below the levels that make a facility subject to these national minimum requirements.

1. Barrier to Entry

EPA has determined that higher capital and operating costs associated with dry cooling may pose barrier to entry for some new sources in certain circumstances. (In general, barrier to entry means that it is too costly for a new facility to enter into the marketplace). A minimum national requirement based on dry cooling systems would result in annualized compliance cost of greater than 4 percent of revenues for all of 83 projected electric generators within the scope of the rule. For 12 generators, costs would exceed 10% of revenues. EPA’s economic analysis demonstrates that a regulatory alternative based on a national minimum dry cooling-based requirement would result in annualized compliance costs to facilities of over $490 million, exceeding the annual costs of a regulation based on recirculating wet cooling towers by more than 900 percent ($443 million annually).

Because the technology can cause inefficiencies in operation under certain high ambient temperature conditions and because of the greater capital and operating costs of the dry cooling system compared with the industry standard of using recirculating closed cycle wet cooling systems, requiring dry cooling as a minimum national requirement could, in some cases, also result in unfair competitive advantages for some facilities. Thus, while at least one state has required dry cooling, EPA does not believe it is appropriate to mandate this requirement on a national basis. In EPA’s view the disparity in costs and operating efficiency of the dry cooling systems compared with wet cooling systems is considerable when viewed on a nationwide or regional basis. For example, under a uniform national requirement based on dry cooling, facilities in the southern regions of the U.S. would be at an unfair competitive disadvantage to those in cooler northern climates, far more than if the rule were not based on such a requirement. Even under the regional sub-categorization strategy for facilities in cool climatic regions of the U.S., adoption of a minimum requirement based on dry cooling could impose unfair competitive restrictions for new facilities. This relates primarily to the elevated capital and operating costs associated with dry cooling. Adoption of requirements based on dry cooling for a subcategory of facilities under a particular capacity would pose similar

competitive disadvantages for those facilities. Furthermore, EPA is concerned that requiring dry cooling for a subcategory of new facilities would create a disincentive to building a new combined-cycle facility (with associated lower flows) in lieu of modifying existing facilities, which may have greater environmental impacts. Dry cooling systems can cost as much as three times more to install than a comparable wet cooling system. For example, the Astoria Energy LLC Queens application filed with the State of New York indicated that a dry cooling system would cost $32 million more to install than a hybrid wet-dry cooling system for a proposed 1,000-MW plant. Operating costs would be $30 million more for the dry cooling system than the hybrid wet-dry system.47 The State of New York estimates that use of a dry cooling system at the 1,080-MW Athens Generating Company facility would cost approximately $1.9 million more per year, over 20 years, than a hybrid wet/dry cooling system. The total dry cooled projected cost would be approximately $500 million. Because dry cooling systems are so much larger than wet cooling systems, these systems' operation and maintenance require more parts, labor, etc. Costs of this magnitude, when imposed upon one subcategory of facilities but not another, provide a disparate competitive environment, especially for deregulated energy markets. New facilities are competing against the many combined cycle and coal-fired facilities already in the marketplace or slated for substantial expansion that use wet, closed-cycle cooling systems or even once-through cooling systems. The potential economic impact should EPA not similarly require dry cooling for some or all existing facilities might cause some firms to, at the least, delay their entry into the marketplace until they better understand the regulatory environmental costs faced by their competitors.

2. Energy Penalty and Other Non-Aquatic Impacts

Given the performance penalty of dry cooling versus wet cooling, the incremental air emissions of dry cooling as compared with wet cooling provide additional support for why EPA is rejecting dry cooling. Dry cooling technology results in a performance penalty for electricity generation that is likely to be significant under certain climatic conditions. By ''performance penalty'' EPA means that dry cooling technology requires the power producer to utilize more energy than would be required with recirculating wet cooling to produce the same amount of power. EPA concludes that performance penalties associated with dry cooling tower systems pose a significant feasibility problem in some climates. As discussed in Chapter 3 of the *Technical Development Document*, EPA estimates the mean annual performance penalty of a dry cooling system relative to recirculating wet cooling towers at 1.7 and 6.9 percent for combined-cycle and coal-fired facilities, respectively. Peak summer energy shortfalls for dry cooling towers as compared to wet towers can exceed 2.7 and 9.3 percent for combined cycle and coal-fired facilities, respectively. These performance penalties could have significant technical feasibility implications. For example, dry cooling facilities have as a design feature turbine backpressure limits that often trigger a plant shut down if the backpressure reaches a certain level. Peak summer effects of inefficiency of dry cooling can and do cause turbine backpressure limits to be exceeded at some demonstrated plants, which in turn experience shutdown conditions when the backpressure limits are reached. In addition, these performance penalties could pose potential power supply and reliability issues if dry cooling were required on a nationwide or regional basis. For example, EPA estimates that in hot climates dry cooling equipped power plants experience peak summer energy penalties of 3.4 to 4.3 percent for combined cycle plants and 14.8 to 19.4

percent for coal fired plants, as compared to once-through cooling systems. These peak summer penalties represent significant reductions in production at power plants in periods when demand is greatest. Compared to the selected option which a large majority of new facilities were planning to install independent of this rule, all 83 electric generators would be required to install dry cooling technology. The energy impacts (power losses) associated with these 83 facilities are estimated to comprise 0.51 percent of total new electric generating capacity (i.e., a reduction in new design generating capacity of 1,904 MW). These energy impacts raise the concern that on a large scale, dry cooling technology may affect electricity supply reliability. This significant reduction in electricity production is another reason EPA has not selected dry cooling as the best technology available for minimizing adverse environmental impacts on a nationwide or regional basis. Because of the performance penalty, power producers using dry cooling produce more air emissions per kilowatt-hour of energy produced. Nationally, EPA estimates that a minimum requirement based on dry cooling would cause significant air emissions increases over wet cooling systems. EPA projects for the dry cooling alternative that CO2, NOX, SO2, and Hg emissions would increase by 8.9 million, 22,300, 47,000, and 300 pounds per year, respectively. See Chapter 3 of the *Technical Development Document* for more information on EPA's air emissions analysis, including a discussion of the coincidence between maximum air emissions and the periods of the most severe air pollution problems. These additional non-aquatic environmental impacts (in the form of air emissions) further support EPA's determination that dry cooling does not represent best technology available for minimizing adverse environmental impact on a national or region-specific basis.

3. Cost-Effectiveness

EPA also considered the incremental costs and impingement and entrainment reduction between the selected option and dry cooling. Dry cooling, while very effective in reducing impingement and entrainment, is very expensive to implement. EPA understands that dry cooling can virtually eliminate the need for cooling water and therefore dramatically reduces impingement and entrainment. However, EPA has determined that the costs associated with implementing dry cooling are ten times as expensive as wet cooling. EPA has shown that the selected option, requiring facilities to reduce their intake flows to a level commensurate with that which can be attained by a closed-cycle, recirculating cooling water system, would reduce the amount of water withdrawn for cooling purposes by 70 to 98 percent. In addition, EPA has shown that this would result in corresponding reductions in impingement and entrainment. Further, the record shows that other requirements in the rule, such as velocity and proportional flow limits and the requirement to implement design and construction technologies, would result in additional reductions in impingement and entrainment. Based on the information available in the record, EPA estimates that the selected option may result in reduction of impingement to levels that could possibly exceed 99 percent. Estimated reductions in entrainment could also be substantial on a case-by-case basis (70 to 95 percent). Because EPA's selected option is very effective in reducing impingement and entrainment and is one-tenth the cost, EPA believes that it is reasonable to reject dry cooling as a nationally applicable minimum in all cases.

4. Technical Feasibility of Dry Cooling for Manufacturers

EPA considers that dry cooling technologies for manufacturing cooling water intake structures, as a whole, pose significant engineering feasibility problems. The primary feasibility issue is that dry cooling requires nearly zero water intake and many manufacturers reuse cooling water in their process. This dual use for process and cooling water prevents the application of dry cooling. In addition, many manufacturers require cooling water at an available temperature that is not reliably met by utilizing dry cooling. However, in some specific circumstances, EPA is aware of several demonstrated cases of dry cooling for cogeneration plants that are associated with manufacturers.

Source: National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities, 66 Fed Reg. 65256 (2001) (codified at 40 CFR Parts 9, 122, 123, 124, and 125).

Appendix D:
Duke's Comments on the Tetra Tech Report

The Tetra Tech report only analyzes the economic costs of dry cooling, hybrid cooling, wet cooling (i.e. cooling tower), and the Aquatic Filter Barrier.[23] No consideration is made of environmental and other impacts in the analysis. It is inappropriate to propose and analyze the economics of alternative cooling designs in a vacuum without consideration of the specific constraints (e.g., plot size, noise) of the Morro Bay site. In their analysis Duke and the CEC have considered and incorporated site specific impacts and constraints, making it difficult, if not impossible to make direct comparisons between Tetra Tech's work and the other results.

However, in the interest of completeness, Duke has analyzed the Tetra Tech analysis and evaluated their results. Numerous flaws and inaccuracies in the analysis have been uncovered. These are summarized below along with general observations about their analysis:

- The Tetra Tech report does not specifically state the design point used for equipment sizing, but data provided in the report (the number of fans and ACC equipment size are exactly the same as the CEC analysis) leads to the conclusion that Tetra Tech probably assumed the same incorrect design point as the CEC, with the resulting inadequacies of the design as described previously in this document.

- Tetra Tech's analysis assumed seawater as the source of make-up water for the hybrid cooling tower. Although seawater is technically feasible as a make-up water source, both Duke and the CEC staff did not consider it in their current analysis and assumed treated wastewater in order to eliminate entrainment and impingement impacts. The resulting designs are vastly different, and for this reason Tetra Tech's hybrid costs cannot be compared to those estimated by the CEC or Duke.

- Tetra Tech's estimate of the annual energy penalty for dry and hybrid cooling (about $1.3 million) is at least half of what it should be. The Tetra Tech report states that 386,000 MMBtu/yr of additional fuel would be required to make up the 12.9MW of lost output of dry cooling.[24] Calculating the heat rate from this data results in 3,416 Btu/kWh[25] which is approximately 50% of what would be expected for a combined-cycle power plant. Duke believes that Tetra Tech erroneously identified in the report the incremental fuel usage for the entire plant as 386,000 MMBtu/yr. This fuel usage must represent the incremental fuel usage of <u>each</u> power block, leading to an

[23] Section 6 of Duke's 316(b) report was prepared by D/FD and addressed both mechanical draft and natural draft cooling towers that would use seawater in pages 6-62 - 6-75 of that report. Additionally, Duke discussed hybrid parallel (wet/dry) systems that would use seawater for the wet portion in pages 6-76 - 6-81 of that report.
[24] Tetra Tech December 26 report, page 6: "…Duke would be required to burn the additional natural gas equivalent to 386,000 MMBTU annually…"
[25] Based on 8,760 hr/year of operation that is consistent with Tetra Tech's assumption used in calculating scenario 2.

incremental fuel usage for the entire plant of 772,000 MMBtu/yr. Correcting this mistake doubles Tetra Tech's annual energy penalty to about $2.6 million annually, and produces a commensurate increase in the NPV and annualized amortized cost numbers shown in the report.

- Page 5 of the Tetra Tech report states that Duke's 102 MW ACC loss is the average loss. This is not correct. In Duke's June 29th letter regarding alternative cooling costs to the CCRWQCB and CEC note 2 for the ACC clearly states, "…net output of proposed plant will be reduced up to 102 MW…" This represents the maximum loss at high ambient temperatures, not an average loss as characterized by Tetra Tech.

- The use of a historically low current wholesale fuel price ($3.5/MMBtu) as used by Tetra Tech is not appropriate for estimating the energy cost of a project over 30 years. Duke's analysis presented in the January 7th report correctly uses an average future forecasted price.[26]

- Tetra Tech does not break out the absolute and incremental costs as the CEC staff and Duke have done in their respective reports making it difficult, if not impossible, to make an apples-to-apples comparison between the Tetra Tech cost data and the CEC's and Duke's.

- The Tetra Tech analysis of Dry Cooling Systems (beginning on page 4) does not even mention noise concerns and/or noise control of their assumed dry cooling configuration. Since noise abatement in any kind of a power plant cooling system can potentially have dramatic 'ripple' effects in the rest of the system's design (e.g., larger fans, higher horsepower pumps, increased number of cells, etc.), the lack of any kind of noise impact analysis is a glaring deficiency that effectively draws into serious question the validity of the assumptions used.

- Tetra Tech in their analysis assumed seawater as the source of make-up water for the hybrid cooling tower, but did not analyze the negative impacts of seawater drift. For example, as Duke stated in their 316(b) report:

  > Drift would also lead to increased fine particulate salt emissions from the facility in the form of dissolved solids emitted with the drift droplets. Cooling tower drift "raining" out of the plume could cause a nuisance salt-water deposition on the surrounding area which could result in increased equipment maintenance

[26] In evaluating the 30 year cost of a project it is essential that assumptions reflect the expected value over the project life, otherwise the results will be inappropriately skewed. Fuel prices today are at historically low levels and will unlikely remain so over the long term, so it is incorrect to use today's low fuel price as Tetra Tech has done. For example, in predicting the fuel cost for operating your automobile over its ten year life, you would underestimate the lifetime fuel cost if you used today's historically low fuel price ($1.29/gal) because today's price doesn't represent the expected price over the subsequent ten years. Duke has used an expected mean fuel price ($4.23/MMBtu) in its analysis. This price was derived from market driven future price data and thus reflects the market's view of expected future fuel prices.

requirements in the plant and adverse effects on nearby agriculture, and at times on local businesses and residences.

- The analysis of Wet Cooling Systems (beginning on page 6) only superficially mentions noise concerns by stating that "…although typically less costly than drift abatement [which was seen as potentially increasing total cooling tower costs by more than 100%], further costs would be incurred if noise abatement is required."

The Tetra Tech reports goes on to say "detailed…analysis of potential air quality and noise impacts, and design and costing of drift and noise abatement technologies are beyond the scope of this study." Noise abatement in any kind of a cooling system can potentially have dramatic inter-relational effects on the rest of the system's main design parameters – including the sizing, operations, and costs of the assumed system. Neglecting any kind of noise impact assessment or noise mitigation approach, especially in the case of the MBPP, which has been shown in the AFC to have complex and extensive noise control issues, does not fully address the problems, or analyze the correct set of design parameters, and, as a result, it is not possible to arrive at valid findings. The omission of a noise analysis by the Tetra Tech report, therefore, invalidates all other conclusions presented in the report.

Appendix E:
Summary of Duke's Jan 7th Report

On January 7th 2002, Duke submitted an updated analysis of 1200MW dry and hybrid alternatives for the MBPP site. The assumptions used in that analysis were updated and are used when comparing, contrasting, and critiquing the CEC staff's Report.

To summarize the findings of Duke's Jan 7th report:

1. Neither the air-cooled nor hybrid alternative could be constructed within the footprint constraint of Duke's current site.

2. Neither the air-cooled nor hybrid alternative would comply with several ordinances and regulations (LORS) with respect to negative visual impacts of new structures on the coast of California.

3. Neither the air-cooled nor hybrid alternative is consistent with the strongly expressed desires of the community with respect to the visual impacts of the Project.

4. When compared to Duke's proposed Project, both alternatives would have negative visual, and noise impacts.

5. It is not clear that it is even feasible to construct either alternative, given the site constraints and required earthquake standards. Were these limitations to be fully analyzed, Project costs are expected to be significantly higher.

6. While the estimated costs of both alternatives is considerably less than in our previous analysis, even the reduced incremental costs of the alternatives ($106-$114 million on a Net Present Value basis) are wholly disproportionate to relatively modest marine biology benefits from reduced use of seawater cooling.

7. Hybrid cooling represents the worst of both worlds: Increased complexity over air-cooled condensers means lower reliability for about the same cost, and it is premised on availability of make-up water that is far from certain.

Duke believes that the analysis done in its January 7th report remains accurate.

Appendix F:
Record of September 5, 2001 Conversation with CEC

CALIFORNIA ENERGY COMMISSION
REPORT OF CONVERSATION Page 1 of 1

Energy Facilities Siting and
Environmental Protection Division

FILE: Morro Bay

PROJECT TITLE: Morro Bay

☒ **Telephone**	(714) 775-9541	☐ **Meeting Location:**	
NAME:	James C. Henneforth	**DATE:** 9/5/01	**TIME:** 10:30am
WITH:	Andy Trump - Duke, John Tory –Duke, Russ Poquette –Duke/Fluor Daniel		
SUBJECT:	Morro Bay Alternate Cooling Systems		

COMMENTS:
Duke called to offer explanations and assistance in the development of the CEC alternative cooling analysis for the Morro Bay Project.

I explained the purpose of the analysis is to determine if there is a viable alternative to a once through cooling system that would have fewer impacts. It was explained that the analysis will address dry cooling, hybrid cooling using reclaimed water, and aquatic filter (Gunderboom) with once-through cooling.

Duke wanted to be sure that the analysis would address any impacts from the alternatives such as visual, space requirements, noise, and air emissions. They stated their intent to maintain the power output of the plant at 1200MW which would necessitate increased supplemental firing and preferred that this be the basis for comparison. They expressed concern that to locate cooling towers on the existing site would impact their schedule for shutdown of the existing units due to the interference with the current cooling water tunnels.

Duke was advised that to meet our tight timeframe it is necessary that they provide electronic CAD drawings of the plot plan and elevations. Duke stated they would not make these drawing available in electronic form due to concerns of confidentiality and loss of control.

It was expressed to Duke that if there is prior agreement on the design criteria, fewer questions related to the analysis would result and they agreed.

ACTION ITEM:
J. Henneforth to identify what criteria is necessary for the analysis and Duke to provide recommended values prior 9/14.

cc: Kae Lewis - CEC Susan Lee - Aspen Paul Miller Aspen	**Signed:** **Name**: James C. Henneforth

"Jim Henneforth"
<jhenneforth@socal.rr.com>

09/10/01 12:24 PM

To: <Russell.Poquette@Fluor.com>
cc:
Subject: Morro Bay Alt Cooling Analysis

Russ,

Attached are the information requests for criteria to be used in the cooling alternative analysis for Morro Bay. If you have any additions please feel free to add them. I intend to use this data in requesting information from the venders and estimating impacts on plant operations.

Thanks,
Jim

- MB CTDesign CriteriaDry.doc

- MB CTDesign CriteriaHy.doc

Proposed Morro Bay Power Plant
Alternative Cooling Technology

Hybrid Cooling Tower Design Conditions

Design Conditions

Site Elevation

Parameter	ISO	Winter	Summer
Ambient Temperatures			
Dry Bulb			
Wet Bulb			
RH			
Steam Flowrate (lb/hr) (to condenser)			
Cooling water flowrate			
Col water design temp			
Hot water design temp			
Cooling Tower Duty			

Proposed Morro Bay Power Plant
Alternative Cooling Technology

Dry Cooling Tower Design Conditions

Design Conditions

Site Elevation

Parameter	ISO	Winter	Summer
Ambient Temperatures			
Dry Bulb			
Wet Bulb			
RH			
Steam Flowrate (lb/hr)			
Steam Conditions			
Exhaust Temp			
Enthalpy (Btu/lb)			
Backpressure			

Russell Poquette

09/20/01 09:48 AM

To: "Jim Henneforth" <jhenneforth@socal.rr.com>@FLUORCORP@FLUOR
cc: Andrew L Trump/NorthAmerica/EnergyServices@DukePower
Subject: Re: Morro Bay Alt Cooling Analysis

Jim

Sorry for the delay. We had some internal adjustments plus our guy was out some this week. I have decided to provide the requested data in a consolidated format below. We did not set up our data in the same format that you requested so we recast it in the way that we provided to/received from the vendor. The approach we took was to provide the vendor with data that would facilitate a quick response and provide us with a configuration that would be conservative (on the small side) so that we could obtain a size . We then used that information to perform an intuitive analysis to assess the additional impacts and constraints (land use, visual, noise, emmissions, power loss etc) associated with the cooling alternatives based on our experience. At some point there may be a need to perform a refined detailed analysis that addresses the max backpressure that the turbines can operate at, final configurations etc. Our expectation is that in either the dry cooling or hybrid case the final design will result in larger units which only further impacts the situation. In any event, the data presented below is what was provided to/received from the vendor.

Design Conditions (Non Duct Fired)	Dry Cooling	Hybrid Cooling
Site Elevation (feet)	23	23
Ambient Temperatures		
Dry Bulb (deg F)	64	64
Wet Bulb (deg F)	58	58
Rel Humid (%)	70	70
STG Exhaust Flowrate (kpph)	1097	1097
STG Exhaust Enthalapy (btu/lb)	1103.8	1062
Condenser Pressure (psia) (Vendor defined backpress)	1.9	1.26
Condenser Saturation Temp (deg F)	124	109.5

Russ

Appendix G:
Noise Issues

In the Staff Draft Report, the analysis started with expected noise emissions from nominal offerings and worked its way down to what they claim are acceptable units, via a selection of cell vs. horsepower options. However, the CEC staff's disclosure is inconsistent in how it presents the analyses and results for the unacceptable configurations compared to the presentation for the compliant configuration. Thus, it is hard to tell if their compliant case is truly meeting all the requirements, since few details are given.

In progressing through the ACC options for noise, the CEC staff trade off 20 fans at 200 hp to 25 fans at 150 hp to 30 fans at 100 hp. The respective noise emissions are 66 dBA at 400' to 60 dBA to 52 dBA. Although it is implied, it is not clearly stated in the CEC Staff Draft Report if these noise values are for each bank of the fan quantities noted above or for the entire 2-bank system which would be double the fan numbers listed above (40, 50, 60 respectively). If the latter, then they may have oversimplified the distances to receptors by taking the geometric center of the entire system. This methodology may also be too simplistic in that no accounting is made quantitatively or numerically for equipment shielding, barrier attenuation, or other propagation effects. This approach is conservative, but can't be directly compared to the Duke analysis that ***did*** account for these propagation effects.

The noise values were reported by the CEC staff to have come from GEA. However, these values are not consistent with the information that GEA provided to D/FD, as reported in Duke's January 7th Report. The CEC's quietest GEA number is still noisier than the values that were given to D/FD. This, coupled with the fact that the CEC-assumed cooling system is considerably smaller than the units analyzed by Duke, presents a serious problem with an apples-to-oranges comparison.

The CEC-reported range of noise emissions, broken down by configuration, seems a bit optimistic. The reader is told that one can increase the fans by 50%, trade that off against halving each fan's horsepower, and end up with a 14 dB overall reduction from the array.[27] This seems aggressive and, possibly, overly optimistic. Further substantiation of this information is not provided in the Staff Draft Report, so it is unclear how realistic these reductions might be for an actual installation.

The CEC staff's analysis compares the expected alternative cooling system noise emissions with the City of Morro Bay Noise Element and CEC's +5 dB criterion for acceptability, regardless of time-of-day. Since both of the primary noise criteria are dependent on time-of-

[27] To provide a frame of reference for decibel differences, the following general descriptions are given (all assume normal noise levels). The subjective response of the human ear to increases or decreases in sound pressure level of 3 dB is that the change in loudness is 'just perceptible'; a 5 dB change is 'clearly noticeable'; a 10 dB difference will be 'twice or half as loud'; and a 20 dB change will be 'much louder or quieter'.

day, several of the locations chosen in the CEC results tables may not be applicable assessment points for noise impact assessment.

By far, the most serious failing in the CEC staff analysis is that it analyzes only the expected alternative cooling system noise emissions and compares them to the City of Morro Bay Noise Element and CEC's +5 dB criterion for acceptability. The entire rest of the proposed power plant (which has to be running for the cooling system to be making noise) is inexplicably neglected from noise impact consideration. This is a fatal flaw in that the acceptability of the cooling system noise cannot be judged properly without considering such a system as an incremental source that has been added to the plant proposed in the AFC.

In contrast to the Staff Draft Report, the noise impact analysis included in Duke's January 7th report properly evaluates the cumulative noise emissions from adding a dry or hybrid cooling system to the once-through cooled base case. Duke's report has provided a more realistic portrayal of the overall potential noise emissions from the plant utilizing the alternative cooling systems. Duke's report shows that even with Best Available Control Technology for noise, per information from GEA, non-compliant and unmitigatable noise emissions will most likely result from using any dry cooling systems at MBPP, even those sized according to Staff's Option 3.

Super Low Noise Fans

The Staff Draft Report goes beyond the CEC stated quietest GEA option (Option 3) and talks about "super low noise fans". It is unclear how these relate to the GEA Option 3 fans, if these "super low noise fans" are even available from GEA, if they only relate to the cooling tower fans, or, if available, how and/or if they could work physically on this plot plan. Very little information is given on these "super low noise fans". This lack of clarity is extended to the noise analysis results in that a generalized statement is given that these "super low noise fans are about 15 dBA quieter than conventional fans." However, it is unclear if the "conventional fans" are GEA Option 1, 2 or 3. (Recall that the CEC already claimed a 14 dB benefit from Option 1 to Option 3, so an additional 15 dB on top of the 14 dB (a total of 29 dB) would be astounding). Although the noise results are presented in tables for the three nominal options at various receptors, no such tabled results are given for the super low noise fans (again, begging the question at to how quiet these systems really are proposed to be). This is a serious problem in that these super low noise fans are concluded to be needed for the 2nd alternative location for both the dry and hybrid cooling configurations. To properly evaluate the various alternative cooling options for noise impacts, a consistent and more-complete reporting of results is necessary. The results of the final, recommended configuration are not given in tables, but only in general statements in the report narrative, without the associated receptor noise levels.

The Cost Analysis is Not Correct

The Staff Draft Report used the Option 1 (base case) configuration for the cost analysis (page 22). Since that case was clearly stated as resulting in noise emissions that would exceed

applicable LORS[28], it is inappropriate to use an incompliant configuration for the cost analysis or for any other topic's impact assessment. The CEC staff cost analysis should have used whatever configuration was deemed to comply with the noise requirements, as well as all other environmental LORS.

In summary, the Staff Draft Report on alternative cooling systems noise impacts is sorely lacking technically, quite inadequate in its depth and breadth of presentation, and very misleading. Thus, valid conclusions are precluded and properly informed decisions for or against dry cooling alternatives are impossible.

[28] See Tables 7, 8, 9, 10, 11, and 12 on pages 67 through 71 of the Staff Draft Report.

Appendix I:
Land Use Plans and Policies That May Conflict With the CEC's Dry and Hybrid Cooling Options

LAND USE PLANS AND POLICIES THAT MAY CONFLICT WITH THE CEC'S DRY AND HYBRID COOLING OPTIONS

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
CALIFORNIA ENERGY COMMISSION, WARREN ALQUIST ACT (PRC Section 25000 et seq.) (WAA)				
WAA Policy 25529	As a condition of certification of any facility proposed to be located in the Coastal Zone, the CEC shall require that an area be established for public use. The CEC shall also require that the facility be set back from the shoreline to permit reasonable public use and to protect scenic and aesthetic values.	YES	PROBABLY NOT- Alternatives would have more visual impact than proposed Project and Alternative 1 would be located closer to the coast than the proposed Project	PROBABLY NOT- Alternatives would have more visual impact than proposed Project and Alternative 1 would be located closer to the coast than the proposed Project
CALIFORNIA COASTAL ACT (PRC Section 30000 et seq.) (CCA)				
CCA Policy 30253(3)	New development shall be consistent with the requirements imposed by an air pollution control district or the State ARB as to each particular development.	YES	UNKNOWN	UNKNOWN
CCA Policy 30260	Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division.	YES	NO- Alternatives could cause the project to be classed as non-coastal-dependent	NO- Alternatives could cause the project to be classed as non-coastal-dependent
CITY OF MORRO BAY - GENERAL PLAN (GP)				
GP Text	The Morro Bay power plant does have some constraints in terms of expansion. While cooling water is readily available, air quality standards may be a limiting factor. Environmental determination and an EIR would be required before expansion could occur. (page II-16)	YES	NO- Alternatives have not been comprehensively evaluated	NO- Alternatives have not been comprehensively evaluated
II. Land Use, Open Space, and Conservation Elements (LU)				
D. Objectives, Policies and Programs				
GP Policy LU-4	Prior to the issuance of a coastal development permit, the City shall make the finding that the development complies with all applicable Land Use Plan policies. (LCP 29)	YES	PROBABLY NOT- Alternatives do not meet the requirements of the CLUP	PROBABLY NOT- Alternatives do not meet the requirements of the CLUP

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
GP Policy LU-15	The present human scale and leisurely, low intensity appearance of Morro Bay should be maintained through careful regulation of building height, location and mass.	YES	PROBABLY NOT- Alternatives would add additional mass to the coast	PROBABLY NOT- Alternatives would add additional mass to the coast
GP Policy LU-20/ LU-35	The City should explore all means to maintain and encourage the development of harbor-related land uses along the Embarcadero. Opportunities for such forms of development should be given priority over those that are not dependent on waterfront locations or related to the public's use and enjoyment of this area.	YES	NO- Alternatives could cause the project to be classed as non-coastal-dependent	NO- Alternatives could cause the project to be classed as non-coastal-dependent
7. Industrial/Energy-Related Development				
GP Objective	To protect the City against any of the potential adverse impacts associated with energy development. (New, *sic page II-74*)	YES	NO- Alternatives would have more negative impacts than proposed Project	NO- Alternatives would have more negative impacts than proposed Project
Coastal-Dependent Industrial Uses				
GP Policy LU-38	Small, high-quality, non-polluting industrial development should be encouraged. Such should be an extension of existing development of this nature	YES	NO- Alternatives would be larger than the proposed Project	NO- Alternatives would be larger than the proposed Project
GP Policy LU-39	Industrial uses located on or adjacent to the harbor and beaches shall be regulated to protect the environment and priorities shall be established for coastal dependent land uses.	YES	NO- Alternatives would have more negative impacts than proposed Project and could cause the project to be classed as non-coastal-dependent	NO- Alternatives would have more negative impacts than proposed Project and could cause the project to be classed as non-coastal-dependent
Coastal-Dependent Energy Development				
GP Policy LU-40	Measures shall be taken by the City to protect against the potential adverse environmental impacts created by energy development. (New, sic)	YES	NO- Alternatives would have more negative impacts than proposed Project	NO- Alternatives would have more negative impacts than proposed Project

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
GP Program LU-40.2	The routing of any new pipelines or transmission lines shall utilize whenever possible existing pipeline or transmission line corridors. (LCP 124)	YES	NO- Alternatives would require more additional piping (some through ESHA) than proposed Project along new routes	NO- Alternatives would require more additional piping (some through ESHA) than proposed Project along new routes
Sensitive Lands and Open Space				
GP Policy LU-54	Development along the shoreline and open sea shall be consistent with the requirements of the Coastal Act.	YES	UNKNOWN- Alternatives may not be consistent with the Coastal Act	UNKNOWN- Alternatives may not be consistent with the Coastal Act
GP Objective	Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.	YES	NO- Alternative 2 would disrupt habitat and would not be dependent on such resources	NO- Alternative 2 would disrupt habitat and would not be dependent on such resources
GP Policy LU-55	All environmentally sensitive habitat areas shall be protected against adverse impacts to the maximum extent feasible. (New)	YES	NO- Alternative 2 would disrupt habitat; there are less damaging options	NO- Alternative 2 would disrupt habitat; there are less damaging options
GP Program LU-55.2	Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall maintain the habitat's functional capacity.	YES	NO- Alternative 2 would disrupt habitat and cannot be sited to prevent impacts that significantly degrade such areas	NO- Alternative 2 would disrupt habitat and cannot be sited to prevent impacts that significantly degrade such areas

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
GP Program LU-55.10	No structures shall be located within the stream corridor except: public trails located within a buffer when no alternative location is feasible but outside of riparian habitat; necessary water supply projects; flood control projects where no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development; and development where the primary function is the improvement of fish and wildlife habitat. Bridges (when support structures are located outside the critical habitat areas) may be permitted when no alternative route/location is feasible. All development shall incorporate the most protective mitigations feasible. (LCP 212)	YES	NO- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located across stream corridor; cooling fans are not permitted structures	NO- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located across stream corridor; cooling fans are not permitted structures
GP Program LU-55.11	All permitted development, including dredging, filling, and grading within stream beds and setback buffer areas shall be limited to activities necessary for the construction of uses specified in the above policy [Program LU-55.10]. When such activities require removal of riparian plant species, revegetation with local native riparian species shall be required. Projects which would cause the removal of vegetation shall be subject to review and comment by U.S. Fish and Wildlife Service and the Department of Fish and Game.	YES	NO- Alternative 2 would encroach on ESH and ESHA buffers; required development would not be consistent with Program LU-55.10	NO- Alternative 2 would encroach on ESH and ESHA buffers; required development would not be consistent with Program LU-55.10
GP Policy LU-56	Morro Bay Sand Spit, Morro Rock, and existing wildlife habitats should be preserved in their natural state.	YES	NO- Alternative 2 would encroach on ESH and ESHA buffers; the habitat would not be preserved in its natural state	NO- Alternative 2 would encroach on ESH and ESHA buffers; the habitat would not be preserved in its natural state

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
III. Circulation Elements (C)				
7. Pipelines and Utility Transmission Lines				
GP Program C-37.5	Pipeline routes should be selected so that grading and removal of native vegetation is minimized and that environmentally sensitive habitats are avoided.	YES	NO- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located across stream corridor; environmentally sensitive habitats would not be avoided	NO- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located across stream corridor; environmentally sensitive habitats would not be avoided
GP Program C-37.8	All new pipeline and support facilities should be constructed underground when feasible. Existing pipelines should be buried as a condition of any development permits.	YES	NO- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located above ground across stream corridor	NO- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located above ground across stream corridor
IV. Visual Resources and Scenic Highway Element (VR)				
GP Objective	To enhance, protect and preserve the existing and potential visual resources of Morro Bay and its surroundings.	YES	NO- Alternatives would have more visual impact than proposed Project and would not preserve the existing visual resources of Morro Bay and its surroundings	NO- Alternatives would have more visual impact than proposed Project and would not preserve the existing visual resources of Morro Bay and its surroundings

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
V. Safety Element (S)				
C. Objectives, Policies and Programs				
GP Policy S-4	New development should be protected from potential flooding. (New)	YES	NO- Alternatives appear to be located in the flood plain	NO- Alternatives appear to be located in the flood plain
GP Program S-4.1	All development, including construction, excavation and grading, except for flood control projects and agricultural uses shall be prohibited in the 100-year floodplain areas unless off-setting improvements in accordance with the HUD regulations are required. Development within flood plain areas shall not cause further stream channelization, alignment modifications or less of riparian habitat values consistent with Section 30236 of the Coastal Act. Permitted development shall be consistent with all applicable resource protection policies contained in the Coastal Act and in the City Land Use Plan. The Land Use Plan Map shall designate the flood prone lands at the western limits of the Morro and Chorro Valleys for agricultural uses. Developments in the flood prone areas within the City shall include finished floor elevations two feet above the 100-year flood elevation. The heights of permitted development shall be compatible with the character of the surrounding area and not conflict with scenic and visual qualities. (LCP 180-181)	YES	NO- Alternatives appear to be located in the flood plain	NO- Alternatives appear to be located in the flood plain
VI. Noise Element (N)				
GP Objectives	1. To protect the citizens of Morro Bay from the harmful and annoying effect of exposure to excessive noise 2. To protect the economic base of Morro Bay by preventing incompatible land uses from encroaching upon existing or planned noise producing uses 3. To preserve the tranquility of residential areas by preventing the encroachment of noise producing use 5. To avoid or reduce noise impacts through site planning and project design, giving second preference to the use of noise barrier and/or structural modifications to buildings containing noise-sensitive land uses	YES	NO- CEC alternatives fail to consider existing noise emissions from plant; Option 1 would not meet the City's Noise limits; even option 3 has adverse impacts not consistent with table N-5	NO- CEC alternatives fail to consider existing noise emissions from plant; Option 1 would not meet the City's Noise limits; even option 3 has adverse impacts not consistent with table N-5

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
GP Program N-1.4	New development of noise-sensitive land uses shall not be permitted where the noise level due to existing stationary noise sources will exceed the noise level standards of Table N-5 unless effective noise mitigation measures have been incorporated into the design of the development to reduce noise exposure to or below the levels specified in Table N-5.	YES	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions
GP Program N-1.5	The noise standards in this chapter represent maximum acceptable noise levels. New development should minimize noise exposure and noise generation."	YES	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions, and quieter alternatives are available	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions, and quieter alternatives are available
GP Policy N-3	Existing and potential incompatible noise levels in problem areas should be reduced through land use planning, building, and subdivision code enforcement, and other administrative means.	YES	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions
GP Program N-3.1	The City will prohibit development of noise sensitive uses near major noise sources unless mitigation measures to reduce noise to acceptable levels are implemented.	YES	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions	NO- No option would meet the City's Noise limits shown in Table N-5 when analysis of alternatives includes existing plant noise emissions

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
CITY OF MORRO BAY - COASTAL LAND USE PLAN (CLUP)				
Chapter VII. Energy/Industrial Development				
CLUP Text GP Policy LU-107 & 109	According to a CEC report entitled "Feasibility of Expansion of Existing Coastal Zone Power Plants," the power plant site is the minimal adequate for expansion of small facilities whose location would not further affect the unique view corridor of Morro Rock and the report indicates that conversion is unfeasible due to a variety of factors. The study does conclude that expansion is feasible for a small-scale facility utilizing either steam turbine, the existing generating system, combined cycle, or combustion.	YES	NO- Alternatives would further affect the unique view corridor of Morro Rock from some vantage points more than proposed Project	NO- Alternatives would further affect the unique view corridor of Morro Rock from some vantage points more than proposed Project
F. Policies on Energy Related Development				
General Policies				
CLUP Policy 5.01 GP Program LU-39.1	The City shall designate existing PG&E parcel and the Chevron pier parcel as coastal-dependent industrial uses. Any proposals for energy development industrial uses within zones designated for general industrial development will require an amendment to the land use plan consistent with section 30515 of the Coastal Act. Power plant expansion on PG&E owned property shall have priority over other coastal dependent industrial uses. 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.	YES	NO- Alternatives could cause the project to be classed as non-coastal-dependent and would further impact the views of Morro Rock than proposed Project	NO- Alternatives could cause the project to be classed as non-coastal-dependent and would further impact the views of Morro Rock than proposed Project
CLUP Policy 5.04 GP Program LU-39.4	In the areas designated for industrial land uses, coastal-dependent uses shall have priority over non-coastal dependent uses.	YES	NO- Alternatives could cause the project to be classed as non-coastal-dependent	NO- Alternatives could cause the project to be classed as non-coastal-dependent
CLUP Policy 5.21 GP Program LU-40.16	Substantial landscaping and screening to mitigate the visual impacts of existing and future facilities; with particular emphasis on screening the facilities located between the power plant and Highway One.	YES	PROBABLY NOT- Alternatives would have greater visual impacts from HWY 1 than proposed Project	PROBABLY NOT- Alternatives would have greater visual impacts from HWY 1 than proposed Project

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
Specific Planning Area Policies, Area 3 - Bayfront				
CLUP Policy 5.22 GP Program LU-40.17	The City shall insist that the present operation and any further expansion of the PG&E Plant conform to the standards of the Federal and State pollution control requirements and emission levels be maintained.	YES	UNKNOWN	UNKNOWN
Chapter X. Hazards				
D. Hazards Policies				
CLUP Policy 9.03	All development, including construction, excavation and grading, except for flood control projects and agricultural uses shall be prohibited in the 100-year floodplain areas unless off-setting improvements in accordance with HUD regulations are required. Development within floodplain areas shall not cause further stream channelization, alignment modifications, or less riparian habitat values consistent with Section 30236 of the Coastal Act. Permitted development shall be consistent with all applicable resource protection policies contained in the Coastal Act and the city Land Use Plan. The Land Use Map shall designate the flood prone lands at the western limits of the Morro and Chorro Valleys for agricultural use. Development in the flood prone areas within the city shall include finished floor elevations two feet above the 100 year flood elevation. The heights of permitted development shall be compatible with the character of the surrounding areas and not conflict with the scenic and visual qualities.	YES	NO- Alternatives appear to be located in the flood plain	NO- Alternatives appear to be located in the flood plain

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
Chapter XII. Environmentally Sensitive Habitat Areas				
E. Environmentally Sensitive Habitat Area Policies				
CLUP Policy 11.01	Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas. The City shall either prepare a wetlands/estuarine map or, if funding does not permit such preparation, adopt the National Wetland Inventory by U.S. Fish and Wildlife Service dated 1979, as the mapping illustration of the wetland and estuarine areas contained within City boundaries. If the City adopts the National Wetland Inventory Mapping as their LUP wetlands habitats and types, all proposed development located within 100 feet of the mapped wetland boundaries shall be required to submit additional mapping based on U.S. Fish and Wildlife and Coastal Commission Statewide Interpretive Guidelines done by a qualified biologist. The additional mapping will be submitted for review and approval from U.S. Fish and Wildlife and the California Department of Fish and Game. After public agency approval has been obtained, the City shall define buffer areas except where biologists identify the need for a greater buffer to protect the overall wetland system or a particular resource. Developments permitted within wetland and/or buffer areas are limited to the uses listed in Section 30233(c) of the Coastal Act.	YES	NO- Alternative 2 would disrupt habitat and would not be dependent on such resources	NO- Alternative 2 would disrupt habitat and would not be dependent on such resources
CLUP Policy 11.02	Development in area adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall maintain the habitats' functional capacity.	YES	NO- Alternative 2 would have more negative impacts than proposed Project and encroaches on ESH and ESHA buffers	NO- Alternative 2 would have more negative impacts than proposed Project and encroaches on ESH and ESHA buffers

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
CLUP Policy 11.05	Prior to the issuance of a coastal development permit, all projects on parcels containing environmentally sensitive habitat as depicted on the Land Use Plan map or habitat map included within the LUP and on the adopted U.S Fish and Wildlife wetland inventory map, or projects on parcels within 250 feet of all designated areas (except wetland where projects on parcels within 1000 feet is the criterion), or projects having the potential to affect an environmentally sensitive habitat area must be found to be in conformity with the applicable habitat protection policies of the Land Use Plan. All development plans, grading plans, etc., shall show the precise location of the habitat(s) potentially affected by a proposed Project. Projects which could adversely impact an environmentally sensitive habitat area shall be subject to adequate environmental impact assessment by a qualified biologist(s). In areas of the City where sensitive habitats are suspected to exist but are not presently mapped or identified in the city's Land Use Plan, projects shall undergo an initial environmental impact assessment to determine whether or not these habitats exist. Where such habitats are found to exist, they shall be included in the City's environmentally sensitive habitat mapping included within the LUP.	YES	NO- Alternative 2 would have more negative impacts than proposed Project and encroaches on ESH and ESHA buffers	NO- Alternative 2 would have more negative impacts than proposed Project and encroaches on ESH and ESHA buffers
CLUP Policy 11.06 GP Program LU-55.4	Buffering setback areas a minimum of 100 feet from sensitive habitat areas shall be required. In some habitat areas setbacks of more than 100 feet shall be required if environmental assessment results in information indicating a greater setback area is necessary for protection. No permanent structures shall be permitted within the setback area except for structures of a minor nature such as fences or at-grade improvements for pedestrian or equestrian trails. Such projects shall be subject to review and comment by the department of Fish and Game prior to commencement of development within a setback area. For other than wetland habitats, if subdivision parcels would render the subdivided parcel unusable for its designated use, the setback area may be adjusted downward only to a point where the designated use is accommodated but in no case is the buffer to be less than 50 feet. The lesser setback shall be established in consultation with the Department of Fish and Game. If a setback area is adjusted downward mitigation measures developed in consultation with the Department of Fish and Game shall be implemented.	YES	NO- Alternative 2 would create permanent structures and would encroach on ESH and ESHA buffers with permanent structures	NO- Alternative 2 would create permanent structures and would encroach on ESH and ESHA buffers with permanent structures

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
CLUP Policy 11.14 GP Program LU-55.8 & 55.9	A minimum buffer strip along all streams shall be required as follows: (1) a minimum buffer strip of 100 feet in rural areas; (2) a minimum buffer strip of 50 feet in urban areas. If the applicant can demonstrate that the implementation of the minimum buffers on previously subdivided parcels would render the subdivided parcel unusable for its designated use, the buffer may be adjusted downward only to a point where the designated use can be accommodated, but in no case shall the buffer be reduced to less than 50 feet for rural areas and 25 feet for urban areas. Only when all other means to project modifications are found inadequate to provide for both the use and the larger minimum buffer. The lesser setback shall be established in consultation with U.S. fish and Wildlife and the California Department of Fish and Game and shall be accompanied by adequate mitigations. The buffer area shall be measured landward from the landward edge of riparian vegetation or from the top of the bank (e.g., in channelized streams). Maps and supplemental information may be required to determine these boundaries. Adjustments to the minimum buffer must protect the biological productivity and water quality of the streams. Assessment of impact shall include, but not be limited to the following factors: (a) Soil type and stability of stream corridors; (b) How surface water filters into the ground; (c) Slope of land on either side of the stream; and (d) Location of the 100 year flood plain boundary. Where riparian vegetation has been previously removed, except for stream channelization, the buffer shall allow for the re-establishment of riparian vegetation to its prior extent to the greatest degree possible.	YES	NO- Alternative 2 would disrupt habitat and have more negative impacts by encroaching on ESH; would also fail to conform with the requirements of ESHA buffers	NO- Alternative 2 would disrupt habitat and have more negative impacts by encroaching on ESH; would also fail to conform with the requirements of ESHA buffers
CLUP Policy 11.15	No structures shall be located within the stream corridor except: public trails located within a buffer when no alternative location is feasible but outside of riparian habitat; necessary water supply projects; flood control projects where no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development; and development where the primary function is the improvement of fish and wildlife habitat. Bridges (when support structures are located outside the critical habitat areas) may be permitted when no alternative route/location is feasible. All development shall incorporate the most protective mitigations feasible.	YES	NO- Alternative 2 would create permanent structures and would encroach on ESH and ESHA buffers	NO- Alternative 2 would create permanent structures and would encroach on ESH and ESHA buffers

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
CLUP Policy 11.16	All permitted development, including dredging, filling, and grading within stream beds and setback buffer areas shall be limited to activities necessary for the construction of uses specified in Policy 11.15. When such activities require removal of riparian plant species, revegetation with local native riparian species shall be subject to review and comment by U.S. Fish and Wildlife Service and the Department of Fish and Game.	YES	NO- Alternative 2 would create permanent structures in the buffer that are not specifically allowed by Policy 11.15	NO- Alternative 2 would create permanent structures in the buffer that are not specifically allowed by Policy 11.15
CLUP Policy 11.17 GP Program LU-55.12	The Biological productivity of the city's environmentally sensitive habitat areas shall be maintained and, where feasible, restored through maintenance and enhancement of the quality and quantity of Morro and Chorro groundwater basins and through prevention of interface with surface water flow. Stream flows adequate to maintain riparian and fisheries habitat shall be protected.	YES	UNKNOWN- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located across stream corridor	UNKNOWN- Alternative 2 would encroach on ESH and ESHA buffers; pipe racks (45-50 feet high) would be located across stream corridor
CLUP Policy 11.19 GP Program LU-55.14	No vehicle traffic shall be permitted in wetlands and pedestrian traffic shall be regulated and incidental to the permitted uses. New development adjacent to wetlands shall not result in adverse impacts due to additional sediment, runoff, noise, and other disturbances.	YES	UNKNOWN- Alternatives would result in increased noise that may negatively impact wetlands	UNKNOWN- Alternatives would result in increased noise that may negatively impact wetlands
Chapter XIII. Visual Resources (VR)				
E. Visual Resources Policies				
VR Intro.	Scenic views of unique and varied coastal scenes are important to people both in terms of aesthetics and functional qualities. Aesthetically, viewing an attractive scene can be, for many, a rewarding experience. For other people, scenic views give identity, character, and value to their community. Visually attractive areas are good locations for recreational activities and facilities.	YES	UNKNOWN- Alternatives would have more visual impact than proposed Project	UNKNOWN- Alternatives would have more visual impact than proposed Project
VR "Conflicts and Issues"	While Morro Bay has been blessed with a physical setting of unique and spectacular visual quality, the community can improve, take better advantage of, and prevent abuses to its visual character. It is desirable to enhance Morro Bay's views. It is equally desirable that the city consciously seek to take better advantage of its visual qualities while attempting to restore and repair the damage that had been done to those qualities.	YES	NO- Alternatives would have more visual impact than proposed Project and would not improve the City's visual character	NO- Alternatives would have more visual impact than proposed Project and would not improve the City's visual character

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
CLUP Policy 12.01 GP Policy VR-2	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 and coastal areas, to minimize the 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 area such as those designated on Figure 31, shall be subordinate to the character of its setting.	YES	NO- Alternatives would have more visual impact than proposed Project and cooling fans would not be visually compatible with the character of the surrounding areas	NO- Alternatives would have more visual impact than proposed Project and cooling fans would not be visually compatible with the character of the surrounding areas
CLUP Policy 12.02	Permitted development shall be sited and designed to protect views to and along the coast and designated scenic areas and shall be visually compatible with the surrounding areas. Specific design criteria shall be established for the following areas: The Embarcadero (as defined in Policy 2.03) Downtown commercial area. The criteria shall include the following specific requirements and shall be applied to proposed Projects on a case-by case basis during architectural review: Building height/bulk relationship compatible with existing surrounding uses; landscaping to restore and enhance visually degraded areas using native and drought resistant plant and tree species; Preservation and enhancement of views of the ocean, bay, sandspit and Morro Rock; Any other requirements applicable from Coastal Commission conceptual approval of the Urban Waterfront Restoration Plan.	YES	NO- Alternatives would have more visual impact than proposed Project and additional equipment would not help preserve and enhance views of Morro Rock	NO- Alternatives would have more visual impact than proposed Project and additional equipment would not help preserve and enhance views of Morro Rock
CLUP Policy 12.04	[T]he City shall identify and work towards the removal or require the mitigation of the effects of those nonconforming uses that cause visual blight or otherwise demean the character of residential neighborhoods and commercial districts.	YES	NO- Alternatives would have more visual impact than proposed Project and would create a visual blight	NO- Alternatives would have more visual impact than proposed Project and would create a visual blight
CLUP Policy 12.05 GP Program VR-3.2(d)	The City shall, as part of the implementation phase of the CLUP, adopt new provisions to … reduce allowable height and size where they interfere with views to and along State Highway One.	YES	NO- Alternatives would increase height and size of structures viewed from Highway 1	NO- Alternatives would increase height and size of structures viewed from Highway 1

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
CLUP Policy 12.06 GP Program VR-2.2	New development in areas designated on Figure 31 as having visual significance shall include as appropriate the following: Height/bulk relationships compatible with the character of surrounding areas or compatible with neighborhoods or special communities which, because of their unique characteristics, are popular visit destination points for recreation uses. Designation of land for parks and open space in new developments which because of their location are popular visitor destination points for recreation uses. View easements or corridors designed to protect views to and along the ocean and scenic and coastal areas.	YES	UNKNOWN-	UNKNOWN-
CLUP Policy 12.11 GP Program VR-3.4	Industrial development shall be sited and designed in areas specifically designated in the Land Use Plan to protect views to and along the ocean and scenic coastal areas, to minimize land alteration, to be visually compatible with the character of the surrounding areas, and where feasible, shall include measures to restore and enhance visually degraded areas. In addition, industrial development shall be subordinate to the character of its setting.	YES	NO- Alternatives would not protect views to and along the ocean and scenic coastal areas	NO- Alternatives would not protect views to and along the ocean and scenic coastal areas
CITY OF MORRO BAY ZONING ORDINANCE (Municipal Code Section 17) (MC)				
Coastal Dependent Industrial (M2) District				
MC Policy 17.24.150	Thermal power plant and support facilities which must be located on or adjacent to the sea in order to function (may be allowed with the appropriate permits and licenses). Conditional Use Permit is Required. Thirty foot building height limit. (For new construction only. Does not apply to replacement or repair of existing structures).	YES	NO- Alternatives could be non-coastal-dependent uses; 30' height limits would not be met	NO- Alternatives could be non-coastal-dependent uses; 30' height limits would not be met
Planned Development (PD) Overlay Zone				
MC Policy 17.40.030 (D)	General Development Standards The standards for development within a PD Overlay Zone shall be those of the base zoning District, provided however, that standards may be modified by the Planning Commission or City Council as they relate to: building heights, yard requirements; and minimum lot area for dwelling units in the density range provided that any specific design criteria of the General Plan and Coastal Land Use Plan, applicable to the property, is not exceeded. For those areas of the provisions of housing for the elderly or low/moderate income families, provisions of extraordinary public access, provision for protecting environmentally sensitive habitat (ESH) areas, but in all cases these provisions shall meet the Coastal Land Use policies.	YES	PROBABLY NOT- Alternatives do not meet the requirements of the CLUP	PROBABLY NOT- Alternatives do not meet the requirements of the CLUP

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
MC Policy 17.40.030 (E)	Consistency With General Plan and Local Coastal Plan New developments and uses may be permitted only if found to be consistent with the applicable policies of the Morro Bay General Plan and Local Coastal Program.	YES	PROBABLY NOT- Alternatives do not meet the requirements of the CLUP	PROBABLY NOT- Alternatives do not meet the requirements of the CLUP
Chapter 17.40 Special Treatment Overlay and Combining Districts and Specific Plans				
17.40.040 Environmental Sensitive Habitat (ESH) Overlay Zone				
MC Purpose	[Formerly 17.24.150] The purpose of the environmentally sensitive habitat overlay zone or "ESH" overlay zone is to protect and preserve areas in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could easily be disturbed or degraded by human activities and development. Environmentally sensitive habitat overlay zones shall extend not only over an ESH area itself but shall also include buffers necessary to ensure continued protection of the habitat areas. Only uses dependent on the sensitive resources and which do not result in significant disruption of habitat values shall be permitted in the ESH overlay zone. The ESH overlay zone may apply to areas not currently mapped as ESH designation. (Ord. 263 § 1 (part), 1984) New uses and expansions of existing uses allowed in the primary zone classification shall not be permitted unless specifically listed as allowed in the ESH overlay District. Proposed uses may require review and approval by the State Department of Fish and Game. Proposed uses may require permits from the Dept. of Fish and Game or may be prohibited.	YES	NO- Alternatives would have more negative impacts than proposed Project and could disrupt habitat, could be non-dependent uses of sensitive resources	NO- Alternatives would have more negative impacts than proposed Project and could disrupt habitat, could be non-dependent uses of sensitive resources
MC Policy 17.40.040 (A)(1)	Only uses dependent on the sensitive resources and which do not result in significant disruption of habitat values shall be permitted in the ESH overlay zone.	YES	NO- Alternatives would encroach ESHA and EHSA buffers and could be non-dependent uses of sensitive resources	NO- Alternatives would encroach ESHA and EHSA buffers and could be non-dependent uses of sensitive resources

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
MC Policy 17.40.040 (A)(2)	New uses and expansion of existing uses allowed in the primary zone classification shall not be permitted unless specifically listed as allowed in the ESH overlay district.	YES	NO- Alternatives would encroach ESHA and EHSA buffers and uses are not listed as allowed in ESH overlay zone	NO- Alternatives would encroach ESHA and EHSA buffers and uses are not listed as allowed in ESH overlay zone
MC Policy 17.40.040 (C)	C. Uses Allowed Only with a Conditional Use Permit 1. Wetlands: The following are conditionally permitted uses in wetlands: road and bridge replacements, very minor, incidental public facilities when there is no other feasible, environmentally less-damaging alternative; other scientific and education work; restorative measures; and commercial mariculture where no alteration of the wetland is necessary. 4. Stream Corridors: The following are conditionally permitted uses: controlled public access including public trails within the buffer; necessary pipelines and water supply projects where no alternative location exists; flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development; road and bridges where no alternative route/location is feasible and if support structures are not sited in the environmentally sensitive habitat.	YES	NO- Alternative 2 would encroach on ESH and ESHA buffers, create permanent structures in the buffers, and pipe racks (45-50 feet high) would be located across stream corridor	NO- Alternative 2 would encroach on ESH and ESHA buffers, create permanent structures in the buffers, and pipe racks (45-50 feet high) would be located across stream corridor

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
MC Policy 17.40.040 (D)	D. Special ESH Zone Standards 3. Buffers required, general a. Wetlands: The minimum buffer surrounding wetlands shall be one hundred (100) feet. Review area: minim of two hundred fifty (250) feet. b. Streams: The minimum buffer for streams shall be one hundred feet (100) in non urban areas and fifty feet (50) in urban areas. 6. Reducing buffers a. In all cases, except for wetlands, buffers may be reduced in accordance with the following standards if the application of the buffer specified in Section 17.40.040.D.4 on a previously subdivided parcel would render that subdivided parcel unusable for its designated use. b. Accommodation of designated use: Buffers may be reduced only to the point where the designated use is accommodated but in no case shall it be less than fifty (50) percent of the width called for in Section 17.40.040.D.4. Said reduction in setbacks may be permitted by the City, as provided above, only after consultation with the California Department of Fish and Game; the applicant shall implement as part of the development all mitigation measures deemed necessary for habitat protection after such consultation. All permitted reductions in buffer areas shall be found consistent with Policies 11.01, 11.05, 11.06, and 11.14 of the Coastal Land Use Plan. (Ord. 263 § 1 (part), 1984) 7. Uses in buffer area a. General: The uses permitted in buffers shall generally be limited to those permitted in the adjacent habitat area. Permanent structures: no permanent structures shall be permitted within buffer areas except for those of a minor nature such as: (2) in other districts: a) at grade improvements for pedestrian or equestrian trails; b) instructional or informational signs; c) designated observation areas, or other public access or educational facilities; d) fences; e) eaves. Applications for all such improvements shall be submitted to the department of fish and game for review and comment before the issuance of a coastal development permit. (Ord. 263 § 1 (part), 1984)	YES	NO- Alternative 2 would not meet minimum buffer requirements, in fact it would encroach on ESHA and EHSA buffers Alternative 2 would also create permanent structures in the buffers and pipe racks (45-50 feet high) would be located across stream corridor	NO- Alternative 2 would not meet minimum buffer requirements, in fact it would encroach on ESHA and EHSA buffers Alternative 2 would also create permanent structures in the buffers and pipe racks (45-50 feet high) would be located across stream corridor

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
MC Policy 17.40.040 (D)	D. Special ESH Zone Standards 9. Performance Standards: All other sections of this Chapter notwithstanding, no uses shall be permitted unless the following performance standards are met, as applicable, in new developments: a. Significant Adverse Effects: New development shall not result in significant adverse effects upon habitat values. b. Revegetation: Where permitted uses require the removal of riparian or dune related plant species, such removal shall be limited to the minimum amount necessary and revegetation with (1) native vegetation in the habitat areas of rare or endangered species, or (2) native, drought-tolerant plants where determined feasible and approved by the City. All such proposals calling for removal of vegetation and subsequent revegetation shall be submitted to the Department of Fish and Game for review and comment. g. Other Agency Permits: Prior to any construction, alteration or other improvement in areas designated as wetlands or estuaries the following shall be presented to the City: (1) 404 Permit: A Section 404 permit (or its equivalent successor) from the U.S. Army Corps of Engineers. (2) Letter from CDFG: A letter from the California State Department of Fish and Game stating compliance with Section 1601 and 1603 (or their equivalent successors) of the State Fish and Game Code. (Ord. 263 § 1 (part), 1984)	YES	NO- Alternative 2 would result in permanent, significant impacts by encroaching on ESHA and EHSA buffers	NO- Alternative 2 would result in permanent, significant impacts by encroaching on ESHA and EHSA buffers

Policy #	Policy	Proposed Project Consistent?	Dry Cooling Consistent?	Hybrid Cooling Consistent?
MC Policy 17.48.190	New development shall project and, where feasible, enhance the visual quality of the surrounding area. New development may be permitted only if the siting and design meet the following standards: A. Protection of public views: significant public views to and along the coast are protected. B. Natural landform protection: alterations to natural landforms are minimized. C. Compatibility: the development is visually compatible with the character of the surrounding area and any design themes adopted for the area by the city. D. Visual quality: restores and enhances visual quality in visually degraded areas. E. Scenic area standards: in highly scenic areas, as depicted in the Morro Bay coastal land use plan/coastal element, the following additional standards shall also apply: 1. Character: the proposed development shall be subordinate in character to its surrounding 2. Height/bulk: the height/bulk relationships in the development shall be compatible with the surrounding area View corridors: view corridors shall be incorporated into the development to protect significant public views to and along the shoreline and other scenic areas.	YES	NO- Alternatives would have more visual impact than proposed Project and would degrade public scenic views along the coast; would not protect public views	NO- Alternatives would have more visual impact than proposed Project and would degrade public scenic views along the coast; would not protect public views

Appendix J:
Corrections and Observations of the Staff Draft Report

- The CEC staff states that the STG backpressure at 74°F would be 3.87" Hg. This conclusion is inconsistent with both the Duke analysis and the CEC's own analysis. Page 22 of the Staff Draft Report states that the backpressure at 64°F, the design point, is 3.87" Hg. As the Staff Draft Report correctly explains, the backpressure will increase as the ambient temperature increases, so one would expect the backpressure to be higher at 74°F than at 64°F. In addition, Duke's heat-balance simulation results (Figure 1) for the CEC's dry cooling design shows that at only 64°F the STG back pressure would be significantly higher than 3.87" HgA, resulting in a 100 MW shortfall in net output compared to a once-through cooled plant. These serious inconsistencies raise serious questions about the CEC's estimate of a 10 MW reduction in output at 74°F.

- The CEC staff assumes that the net dry cooling auxiliary load is 1.6 MW. Duke's analysis is more conservative because it assumes the power to run the fans is equal to the power to run the once-through cooling pumps, and thus they cancel each other out on an incremental basis. The CEC auxiliary load is higher because their design is undersized (see discussion in Sections 3 and 4). If the staff's dry cooling system was properly sized to meet both the noise requirements and the nominal output of the proposed Project, then the auxiliary load would be roughly equal. (See Duke's January 7th report for more details.)

- The Staff Draft Report compares 12 MW lost output with Duke's 102 MW from 316(b) analysis. This is not a valid comparison. In Duke's June 29th letter regarding alternative cooling costs to the CCRWQCB and CEC, note 2 for the ACC clearly states "…net output of proposed plant would be reduced up to 102MW…" This represents the maximum loss at high temperatures and is not directly comparable to the 12 MW CEC number that is an average loss at a typical ambient temperature. Similarly, on page 25, paragraph 3 incorrectly states Duke's output loss as 100 MW.

- The Staff Draft Report erroneously states that the once-through plant will burn 300,000 lb/hr of natural gas per power unit and the corresponding net plant heat rate is approximately 6,981 Btu/kWh. Using a natural gas energy density of 21,000 Btu/lb leads to a nominal output of 902 MW per power unit which is clearly wrong. The Staff Draft Report should have stated the 300,000 lb/hr of natural gas for the entire plant, not per power unit.

- Page 31 of the CEC Staff Draft Report compares Duke's 316(b) hybrid cost number to staff's estimates. This comparison does not make sense because the 316(b) design was based on a seawater makeup rate of 5,000 gpm which is a very different design than the CEC's (1,200 gpm wastewater makeup).

- Duke agrees with the CEC staff that there are insufficient supplies of fresh water for plant cooling and the water for hybrid cooling should come from MBCWTP. However, Duke strongly disagrees with the statement on page 105 of the Staff Draft Report that states significant adverse impacts on plant reliability are unlikely. Page 10 of the Staff Draft Report indicates that one disadvantage of hybrid cooling is that it requires a dependable source of water. Municipal wastewater is not considered to be a reliable source of cooling water for a power plant. For example, Calpine's Metcalf plant will use municipal treated wastewater for cooling, but it will rely on potable water as a backup because interruptions in the wastewater supply may occur up to 2.5% of the time. Realistically, if wastewater were used for cooling at MBPP, a reliable backup source would have to be identified. It is not known what the reliability of the CMBWTP is, or if a sufficient quantity of potable water would be available for backup.

- The use of treated wastewater for the hybrid system will increase by about 50% the amount of solid waste generated by the CMBWTP. Disposing of this additional waste is an additional impact which needs to be evaluated.

Appendix K:
Cost Issues

Steam Duct Cost

At the conceptual stage, vendors typically provide budget quotes based on 50 feet of steam transfer line and two elbows because the quote is based on a preliminary plot plan where the final steam line distances are not yet known. Alternative 1 for both the dry cooling and hybrid systems appear to be between 125-200 feet from the steam turbine and similarly 300-400+ feet for Alternative 2 for both the dry cooling and hybrid designs. Based on historical data from D/FD, the additional 75-150 feet of steam piping for Alternative 1 would add approximately $3 to $5 million (@ $25,000 per foot installed) and for Alternative 2, $5 to $10 million to the equipment cost for both alternatives.

Hybrid Water Treatment

The CEC staff cost buildup significantly underestimates the cost required to upgrade the CMBWTP to disinfected tertiary quality as required for cooling tower make-up water. Page 28 of the Staff Draft Report incorrectly states "...Currently, the MBCWTP treats wastewater to a secondary level prior to discharge to Estero Bay…" In fact, the CMBWTP is operating under a 301(h) modified NPDES permit that allows it to discharge blended effluent. The effluent from the CMBWTP is a blend of primary and secondary treated wastewater made up of about 60% treated secondary effluent with the remainder primary. The CEC $3 million upgrade cost is apparently based on starting with 100% secondary effluent and treating it to tertiary. This cost will necessarily have to be higher because the 40% primary effluent from the CMBWTP would require secondary treatment first.

Duke's cost estimate for water treatment is based on a recent in-depth study done for the CMBWTP by an independent engineering firm.[29] The study estimates the cost to upgrade the existing facility to treat 100% of the effluent to secondary quality to be approximately $5 million, and an additional $10 million to treat 100% secondary to tertiary quality. The CEC $3 million estimate cannot be correct as it assumes 100% of the effluent is already treated to a secondary level, and the number is less than a third of the cost of just treating secondary to tertiary as estimated by the CMBWTP study.

Additional Annual Energy Cost

The Staff Draft Report erroneously concludes that the economic impact of the reduced efficiency of alternative cooling would be insignificant. For example the Staff Draft Report states that for dry cooling the average reduction in net output would be 12 MW (for a constant fuel input). The annual economic cost of this is roughly equal to the lost revenue opportunity resulting from the reduced output (12 MW) since the fuel cost remains the same. Specifically, the foregone annual revenue opportunity as a result of dry cooling is

[29] Cayucos/Morro Bay Comprehensive Recycled Water Study, Carullo Engineers, March 2000.

conservatively $3 million.[30] The $3 million annual revenue translates into a $37 million PV[31] (Present Value) for the life of the Project. This is over 80% of the CEC ACC design's capital cost ($47 million), and therefore significant to the Project economics.

[30] 8,000 hours of operation per year and a $32.5/MWh forecasted national average electricity generation price. POEMS, U.S. DOE, 1999.
[31] 7% discount rate, 30 year project life.