

DEPARTMENT OF FISH AND GAME

1416 NINTH STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-3531



Mr. George W. Knighton, Chief
Environmental Projects Branch
Division of Site Safety and Environmental Analysis
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Knighton:

We have reviewed the Addendum to the Final Environmental Impact Statement for the Operation of the Diablo Canyon Nuclear Plant Unit 1 and 2, Docket Numbers ~~50-275~~ and 50-323, dated May, 1976 (SCH 75061735). We found that the information in the subject addendum is related to updated assessments of environmental impacts associated with the construction and operation of Units 1 and 2 of the power plant, located on the Pacific Ocean, 12 miles southwest of San Luis Obispo, California.

In order to adequately comply with guidelines of the National Environmental Policy Act of 1969 (NEPA), we believe that the final Environmental Statement should address the comments and concerns of the Department of Fish and Game (DFG), expressed under the following major headings of Summary and Detailed Comments.

SUMMARY COMMENTS

1. The Addendum reports that the benthic community of the "Intake Cove was essentially destroyed" and that a "new, but different benthic community has been initiated." This statement seems to imply that such change, if not satisfactory, is at least a necessary result of plant construction. Department of Fish and Game, on the contrary, is still actively pressing for appropriate mitigation or compensation for losses resulting from the siltation of Intake Cove. We believe that a final Addendum should also discuss the issue of mitigation measures.
2. We believe the report correctly identifies that excessive amounts of copper were discharged into Diablo Cove during routine pump operations, and this resulted in damage to the benthic marine community. The ultimate fate and disposition of this mass emission of copper and nickel from the 1974 pump testing operations has not been adequately identified. Mitigation measures for losses of fish and wildlife resources should be discussed in the final Addendum.
3. The Department has continued concern for the long-term and short-term effects of the discharge of foam on marine organisms and ecosystems in

9500

and around Diablo Cove. Since the effects of foam on marine organisms are not adequately known, we believe that there is significant potential for environmental damage. We suggest that the Significant Technical Specification Requirements (STSR) should assure that the applicant will adequately study and control foam and foam impacts, as well as mitigate for any unavoidable foam damage to fish or wild-life resources.

4. We do not concur with the Nuclear Regulatory Commission (NRC) staff evaluation that the loss of "10 to 20 acres of bull kelp will not adversely affect the regional marine life that is dependent on kelp." Department of Fish and Game and others have shown that numerous species are dependent upon bull kelp for many aspects of their life histories. We believe that the elimination of 20 acres of such food and habitat constitutes a significant impact upon animals inhabiting Diablo Cove, and possibly outside the Cove.
5. We strongly disagree with the finding that "populations of abalone and sea urchins within Diablo Cove have been reduced primarily due to factors unrelated to the operation of the plant." In adopting a Cease and Desist Order, the California Regional Water Quality Control Board concurred with the DFG finding that PGE Diablo Canyon Plant discharged quantities of toxic substances (copper - nickel) that interfered with marine life. We believe abalone and sea urchin reductions in Diablo Cove have been primarily due to factors related to the operation of the plant.
6. Although the losses of pelagic larval fishes might be minimal, near-shore larval fishes, as well as zooplankton and phytoplankton have a great potential for entrainment and subsequent damage from passage through the condensor system. We suggest that the STSR reflect such concern for potential entrainment losses and recommend that the applicant be required to perform sufficient studies to determine organism entrainment losses and proposed mitigation measures.
7. Although confirmation of the staff's predictions related to biological impacts of thermal and other effects is important research, an investigation of potential power plant management alternatives (such as closed cycle cooling) and mitigation for unavoidable losses are required under NEPA regulations. We recommend that the STSR's contain specific criteria for such alternatives and mitigation.

We have additional concern that the proposed STSR's have not addressed all potentially significant adverse environmental factors that might result from the construction and future operation of the plant. Specifically, three major areas of concern to the Department are:

- a) The STSR's should address the subject of and solutions to foaming, its impacts, and potential mitigation measures;
- b) the STSR's should include the studies for engineering feasibility, design, and impacts for discharge alternatives (such as offshore

outfall) should 316a demonstrations fail to show lack of harm to marine ecosystems;

- c) the STSR's should include the engineering, feasibility, and environmental impacts of Intake Cove modification to improve circulation for silt removal.

We recommend revision of the STSR's to address these concerns.

8. Thermal impact predictions at a ΔT of 19°F and 22°F are admittedly inconclusive. Since there is a significant lack of applicable data, we recommend that the applicant be required to collect sufficient data, with appropriate confidence limits, to assure more complete protection of living marine resources outside of Diablo Cove.
9. Data on existing fin-fish fisheries in the vicinity of the power plant along with projected fisheries use are not adequately addressed.
10. Studies of currents show rather unusual gyres and areas of sluggish circulation in north and central Diablo Cove during operation of Unit 2 and 1, respectively. Since significant toxicities and mortalities occurred in the past in such areas, we recommend that the applicant conclusively demonstrate that future plant operation, with such gyre phenomena, will not cause toxic conditions in Diablo Cove or surrounding receiving water. Specific potential toxic parameters, include, but are not limited to, chlorine, trace metals, chlorinated organics, and temperature. The impact of scouring should also be addressed. The STSR's should be revised to include specifications for additional current monitoring.

DETAILED COMMENTS

Summary and Conclusions

Page 1

1. The document correctly indicates that the original benthic marine community in the Intake Cove was destroyed by siltation resulting from plant construction activities. Department of Fish and Game believes that the original benthic community cannot be reestablished because of silt deposition, bottom instability, and lack of "natural" cleansing action. We do not believe that the community that reestablishes in such silt or mud bottom will be as productive or as rich as the original rocky substrate community. Department of Fish and Game and PGE are presently discussing appropriate mitigation for marine resource losses incurred. Because the environmental damage to the Intake Cove resulted from construction impacts from the plant, we recommend modification of the STSR to include an assessment of the need and procedures for cleanup and restoration of Intake Cove, as well as mitigation for losses of marine resources.

2.. Although staff clearly identified numerous impacts resulting from construction and test operation of the plant, we have identified an additional serious potential adverse impact. Excessive amounts of copper and nickel were discharged to Diablo Cove during pump testing operations in June-July 1974.. In order to understand past and possible future impacts of trace metal discharge to marine waters from plant operation, we believe the following questions must be answered:

- a) What is the ultimate disposition or "sink" for trace metals that have been or might be discharged into the Cove?
- b) Are or might such metals be incorporated in plant or animal tissues, within or outside Diablo Cove?
- c) Are there any short- or long-term residual effects, such as biomagnification?
- d) Are there any means or methods for abating or cleaning up significant trace metal discharges?
- e) What mitigation is proposed for any unavoidable losses or damage to marine organisms?

Department of Fish and Game recommends that the STSR be amended to address and solve these trace metal problems, thus assuring more adequate protection of fish and wildlife resources.

Page ii

2.. With reference to conclusion 4b. (1) i., the report states that temperature and area of the plume will vary and will be ". . . . most adverse when offshore currents move in a northerly direction." A number of questions regarding the thermal plume were not answered in the report:

- a) The temperature and area of the plume will be adverse to what?
- b) How will the plume affect marine plants and animals?
- c) What is the extent of the thermal plume?
- d) Will adverse effects of the plume be detected outside of Diablo Cove?
- e) Will the plume sweep along the shoreline into North, Intake, or South Coves? If so, will it cause any effects upon the distribution of marine organisms?

In order to clarify the environmental impact report, we recommend that information and data be supplied to answer these questions.

3. In regard to conclusion 4.4 that the source of copper (and nickel) discharge has been eliminated, the report states that 7% of the original copper-nickel surface area remain in the plant. The potential for discharge of copper-nickel to Diablo Cove therefore is still present, albeit of lesser hazard than with the former copper-nickel condensor system. Because of this, the question regarding the long-term effect of a "slug" dose of copper upon the marine ecosystem does not appear to have been adequately addressed.
4. Conclusion 4.b.5. reports that excessive amounts of foam are produced during pump operation. It states that the applicant has developed a plan of action for studying the effects of such foam. The report does not indicate that the applicant will be required to abate or control the foam. Since there are potential adverse impacts to marine organisms and communities from such foam discharge, such as light inhibition and decreased photosynthetic activity, we suggest that the Addendum adequately address abatement, control, and mitigation of foaming as a result of the discharge. We recommend that the STSR's include specifications to control and abate adverse impacts resulting from foaming, as well as providing for mitigation in the event that adverse impacts are detected.
5. The report states in conclusion 4.b.6. that the loss of as much as 20 acres of bull kelp in Diablo Cove will not adversely affect the regional marine life. No substantiation nor data were provided in the Addendum to support that concept. We point out that 20 acres of kelp contribute approximately 150,000 pounds of biomass to the marine food chain of Diablo Cove. The kelp provides food and habitat for an immense variety of animals and plants. A more rigorous analysis of kelp energetics at the Diablo Cove site to conclude that its removal will not adversely affect regional marine life is needed. We recommend that the final Addendum contain such an analysis.

Furthermore, although DFG agrees that some animal populations in Diablo Cove have been reduced by a combination of factors including construction and preliminary testing, as well as such natural effects as sea otter foraging, it is important to consider that kelp bed production in the area immediately adjacent to Diablo Cove should not be adversely affected by plant operation. Department of Fish and Game is presently pursuing a management plan for the sea otter, a fully protected State animal. Kelp and associated marine organisms are integral food chain components of the otter's life history, and consequently needed to maintain a healthy sea otter population. The Addendum should recognize the importance of adequately assuring complete protection for the sea otter during construction and operation of the plant.

Introduction - 1.3 Status of the Staff's Environmental Review

Page 1-3

6. The Addendum indicates that staff's review uncovered several potential impacts related to the marine ecosystem that could not be addressed with thoroughness because of insufficient data. These informational gaps were purportedly translated into conditions for the continuation of an operating permit. However, the specific conditions contained in the STSR do not appear to address the following questions which we believe are important to consider:

- a) What specific marine environment study elements are contained in the permit for Intake Cove?
- b) for Diablo Cove?
- c) inshore waters adjacent to the site?

The Department has conducted several diving surveys in the Intake Cove. In areas where siltation is excessive, i.e., throughout most of the Cove, recovery of benthic marine communities is extremely limited. (Appendix I).

We believe that more complete descriptions and studies of existing marine resources in the Intake Cove are not necessary with respect to the siltation event. What is needed is a definitive report by either PGE or the NRC staff which addresses the issue regarding cleanup of Intake Cove. That report should discuss procedures which have been used in earlier attempts to clean the Cove; other procedures that might be available to achieve cleanup and suggestions for mitigation if other methods are not considered feasible.

- 7. One area of significant environmental concern to DFG not addressed by staff's review is the fate and disposition of the 1974 discharge of copper and nickel in excessive amounts to Diablo Cove. Because of the significant local and statewide environmental concerns resulting from the copper-nickel discharge, we recommend that conditions for issuance of continuation of construction permit include requirements for submission of additional information and data regarding the uptake and fate of those trace metals of concern.

1.4 Limitations in the State of California's NPDES Permit

Page 1-4

- 8. Department of Fish and Game staff would like the opportunity to review the applicant's proposed additional environmental justification data (i.e., predictive modeling and/or their program of operational surveillance) to assure full protection of living marine resources within the influence of the thermal plume.

2.. The Site

2.2.3. Ocean Use

Page 2-1

9. The report indicates that Diablo Cove has been degraded significantly as a viable fishery by natural predation and "human activities." Is the NRC staff using the term "human activities" to mean powerplant construction and operation? Some sport and commercial diving activities occurred in Diablo Cove during pre-plant construction. Those diving activities are under the strict control and regulation by DFG. We do not believe that environmental degradation occurred as a result of sport or commercial fishing activities.

2.7 Ecology of the Site and Environs

2.7.2. Aquatic Environs

California Department of Fish and Game - Diablo Cove Studies

Page 2-2

10. The report indicates that DFG biologists believed that red tide was the most likely factor causing declines in sea urchin populations. With reference to that comment, be advised that the Department, at this time, does not embrace that conclusion but prefers to maintain its position detailed in paragraph 7 of our October 7, 1975 letter to Mr. Dicker and which is attached to the NRC Addendum as Appendix A.
11. We note that the catch-per-unit effort for sportfish show that the catch in Diablo Cove (0.11 fish per hour) to be less than control stations in North Cove (1.63 fish per hour).
 - a) Is this difference due to construction and operation of the power plant? If so, what types of mitigation have been considered?

Abalone Laboratory Studies

Page 2-14

12. In regard to the thermal tolerance studies on abalone, the report indicates that higher temperatures had an adverse impact (= higher mortalities) on "embryonic" forms.
 - a) What will be the net impact of power plant temperature discharge on red and black abalone populations of Diablo Cove?
 - b) outside Diablo Cove?

Page 2-14 and 2-17

Table 3.5

13. The discussion of mortality rates of red abalone for 18°C should reflect the reliability of data collected.
- a) How many replicate tests were performed?
 - b) How much reliability do the data have?
 - c) In experiments 1, 2, 3, and 5 aren't there abnormally high control mortalities?
 - d) What statistical tests were used to establish "insignificant mortality?"

3.3.3: Thermal

3.3.3.1 Currents

Page 3-3

14. The report points out that sufficient data are not available to allow an evaluation of flow patterns or directional persistence of winter flows in the site vicinity.
- a) What data are available for onshore currents and local gyre conditions?

Page 3-8

15. Figure 3.3 refers to a stagnant flow condition in the northeastern portion of Diablo Cove during downcoast (southerly) current patterns with Unit 2 operating.
- a) What foam, thermal, physical, biological, and chemical impacts will this gyre have on marine resources?

Page 3-9

16. The conceptual sketch of flow pattern for upcoast currents shows a central cove gyre (Figure 3.4).
- a) What are the short-term and long-term foam, thermal, physical, biological, and chemical effects of this central gyre on marine resources during plant operation?

Page 4-1

17. The report indicates that damages to Intake Cove which occurred during removal of the cofferdam are being repaired. The report should indicate that silt removal from the Intake Cove has been terminated by PGE. Department of Fish and Game believes that the

terms of the cleanup and abatement agreement with the California Water Quality Control Board - Central Coast Region, to restore the Cove, has not been satisfactorily accomplished to date (See our earlier comment #6).

Page 4-2

18. The report should indicate that Intake Cove was a rockfish nursery area prior to construction of the cofferdam. Recent diving observations by DFG have shown a remarkable return in the numbers of fish in the Intake Cove. Most fish are associated with the tetrapod jetty structure and a small *Macrocystis* bed. The remaining portions of the Intake Cove are becoming a silty-bottom type ecosystem.

5.2.2. Foaming in Diablo Cove

Page 5-1

19. The report indicates that a natural foamant, carrageenin, was thought to be responsible for the foaming in Diablo Cove. Who identified the foam-causing material and by what techniques?

Page 5-2

20. Since the giant kelp, *Macrocystis pyrifera*, is a southern California species with higher thermal tolerance than the northern species, we suggest that its use as a thermal tolerance demonstration organism is entirely inappropriate and not capable of offering adequate thermal tolerance predictions for bull kelp, *Nereocystis leutkeana*.

Page 5-4

21. The report suggests that kelp is not abundant outside Diablo Cove because of excessive water depth. Department of Fish and Game biologists believe that further refinement of and elaboration on the statement is necessary. There are several kelp beds just outside the south end of Diablo Cove and a large bed on the north entrance.
22. In the discussion of the increase of bull kelp in Diablo Cove, DFG believes that such proliferation is not only the result of removal of sea urchins and abalones. In order for the kelp to increase at these rates, it has required ideal growing conditions in terms of nutrient availability, temperature, and light.

As we previously indicated, the removal of 10 to 20 acres of bull kelp could have an effect of reduced productivity in algivores, such as sea urchins and abalone. The potential for reduction in biomass of those animals is present, and the report should indicate that there will be an impact to those species that depend on kelp for food or habitat.

Entrainment - Fish Eggs and Larvae

Page 5-5

23. In the discussion of potential loss of fish eggs and larvae to coastal fishery resources, we appreciate the difficulty of making accurate loss estimates. Notwithstanding such difficulty, we cannot concur with staff's assessment of negligible pelagic and nearshore larval fish losses. If staff is unable to predict potential biomass and species composition losses, it suggests that additional study is required. It is our understanding from PGE staff that no influence beyond Diablo Cove is predicted. Should significant losses of larval fish be encountered during plant operation, mitigation for such losses should be discussed in the environmental document.

Summary

Page 5-6

26. We believe that the summary statement should be revised to more accurately reflect DFG study results, collected at Diablo Cove:

" . . . These changes were brought about mainly by the southward migration of the sea otter, increased harvesting of sea urchins, and red tide in the Diablo Canyon area, and by toxicity problems "

The report states accurately that there have been significant declines in abalone and sea urchin populations. Department of Fish and Game however believes that these animals are important in any subtidal ecosystem, and this is relevant to Diablo Cove, despite their population reduction. The potential for the absence of foraging sea otters, with the return of benthic invertebrates in Diablo Cove remains viable in DFG Planning.

8. Adverse Environmental Effects Which Cannot be Avoided

Page 8-1

27. In regard to the Intake Cove siltation, we suggest that the report be amended to indicate that PGE should complete and report upon their investigation of restoration of the Cove to as near original condition as possible.

We believe that the data presented in the Addendum indicates that the plant will have an impact on nearshore fish. It is possible that its significance will not be identified until after plant operation. The report should refer to potential identifiable impacts after startup, and it should discuss ways of mitigating or correcting those impacts.

We recommend discussion of the following unavoidable adverse effects of plant operation:

- a) loss of 10-20 acres of bull kelp and dependent organisms;
- b) effects of continued foaming;
- c) effects of scouring;
- d) effects of copper on benthic sediments, plants, phytoplankton, zooplankton, and animals.

13. Benefit-Cost Analyses

Page 13-1

28. The document discusses the value of Diablo Cove as a viable abalone fishery, and then discusses the relationship of the Cove to the original ecosystem.

We have no way of knowing at this point how Diablo Cove fits into the original ecosystem. It is probably true that at least during the last five or six years, the subtidal populations of red abalone were so small in numbers that they did not contribute in any significance to the commercial fishery. However, the impact of the thermal effluent in the Cove on the kelp, other algae, abalone and urchins cannot be determined at this time, and it is entirely possible that if the sea otters remain outside of the Cove for the next few years, the abalone and urchin populations could return to their former levels of abundance.

Please be advised that even though a viable commercial abalone fishery has decreased significantly in the past several years, the intrinsic value of the rocky nearshore habitat of the Diablo Canyon region is extremely high. Department of Fish and Game is presently conferring with PGE regarding specific aspects of the resource value losses resulting from the plant construction and testing. In the near future, we expect resolution of the mitigation settlement, which could be important in your staff analysis of the present benefit-cost analysis. At the appropriate time, we will be happy to make those data available to your staff.

Thank you for the opportunity to comment upon the subject document.

Sincerely,

EC Fullerton
Director

Attached: Appendix I

Memorandum

APPENDIX I

Regulatory Docket File

Date: 10 January 1975

To : Rolf Mall, Environmental Services Supervisor,
Long Beach

From : Department of Fish and Game, Water Quality, Monterey

Subject: PG&E Diablo Canyon Nuclear Power Plant - Siltation in Intake Cove - Inspection;
13 December 1974.

INTRODUCTION

At the request of Mr. Bob Wright, Start-up Engineer, I directed a qualitative survey of the results of silt and sand removal at the Diablo Canyon intake structure and cove. Two teams of Department divers were employed: Team #1 - L. L. Laurent, H. L. Thomas, and Team #2 - R. J. Mahon, H. Martin, and (part-time) F. Wendell.

The survey was conducted between the hours of 1400 to 1545. F. Wendell left the survey at 1435. The swell was light, light westerly winds; 14 depth probes using a 3 foot "yardstick" ruler were taken to estimate silt depth. Predetermined compass "transects" were employed to estimate areal distribution of silt and sand. A surface note-taker (M. Martin) recorded information transmitted by the diving teams. Silt data are recorded as Table 1. An independent report describing the extent of the siltation, the effectiveness of dredging, and recommended action was requested from each diver. (Appendix 1).

Map 1 indicates the data sampling points. Map 2 shows the transect line direction, position, and distance. Map 3 is a composite diagram of the results.

FINDINGS

Visibility in the intake cove during the December dive was extremely poor, varying from 1 to 6 inches in the eastern cove to about 6 feet in the western cove near the intake and dredge area. Silt and sand depths ranged from 6 inches to more than 20 inches in several areas. Approximately 1/2 of the cove (eastern) contains silt deposits over the entire subtidal area. Silt depths vary with bottom topography, with greater depths in rock crevices as pictured in Thomas report, Figure 2 (Appendix 1). The deeper water areas have vast, uniform deposits of silt covering many large rocks completely. A small area of the western cove showed dredging had removed much of the silt, although pockets of silt remained in areas protected by rock outcroppings. Most life forms have been adversely affected by silt deposition and limited light penetration.

The only common macro invertebrate in the eastern portion of the cove was the bat star, *Patiria miniata*. Many tests of dead sea urchins and shells of dead abalone were observed. Five black and yellow rockfish were observed in the rock area,

along with a number of unidentified juvenile fish. Benthic frondose algae were present in sparse amounts and only in shallow depths. The western one-half of the cove showed improved light penetration, visibility, and more invertebrate, algal, and fish life forms.

SUMMARY

It appears from the December 1974 limited diving survey that there has been limited clean-up of silt deposited in the intake cove. Divers responses ranged from "little change from a survey performed May 23, 1974," to "no appreciable removal of the silt which had inundated the cove."

TABLE 1. Silt Depth Station Data from December 13, 1974, Dive Survey at Diablo Canyon Intake Structure.

TABLE 1. Silt Depth and Diver Comments, Diablo Canyon Intake Cove -
December 13, 1974.

<u>Station Number</u>	<u>Depth of Silt (in.)</u>	<u>Comment</u>
LT-1	15	Fine silt
LT-2	27	Fine silt
LT-3	24	Sand
LT-4	16	Fine silt
WMB-5	2-6	Transect - fine silt.
WMB-6	8	Hydrogen sulfide - fine silt
WMB-7	8-13	Fine silt
LT-8	16- 6 in pockets	Fine silt
WMB-9	8	Fine silt
LT-10	16	Juvenile rockfish - below 10' - no algae present
LT-11	16	Unusual sand
LT-12	12	Fine silt
WMB-13	17	Fine silt - no living animals
LT-14	18 or deeper	Sparse <i>Gigartina</i> ; numerous sea urchin tests
LT-15	18	Fine silt
MB-16	to 23	Fine silt
LT-17	to 24	Fine silt - up to 50' in diameter
MB-18	10	Fine silt
LT-20	12	Fine silt over coarse rock rubble
LT-21	8-12	Ridges or windrows of fine silts
MB-22	8-13 in wind rows	In front of intake structure
MB-23	24	Fine sediment 150' in front of intake

LT = Laurent, Thomas
WMB = Martin, H.; Mahon, Wendell
MB = Martin, H.; Mahon