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Final
Environmental Impact Statement/ Environmental Impact Report

for the

California Acoustic Thermometry of Ocean Climate Project

and its associated

Marine Mammal Research Program

(Scientific Research Permit Application [P557B])

Volume II

Prepared by

Advanced Research Projects Agency
3701 North Fairfax Drive
Arlington, VA 22203-1714

With the Cooperation of

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources
1335 East-West Highway
Silver Spring, MD 20910

and

University of California, San Diego
Campus Planning Office
108 Administrative Complex
La Jolla, CA 92093

April 1995

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5. FUNDING NUMBERS
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6. AUTHOR(S)
Advanced Research Projects Agency

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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SERDP
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13. ABSTRACT ***(Maximum 200 Words)***

This EIS/EIR presents a detailed description of the proposed project, in addition to other information required by the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA).

The overall Acoustic Thermometry of Ocean Climate (ATOC) project is an international research effort to observe the ocean on the large space scales (3,000 to 10,000 km) which characterize climate, which will enable climate models to be tested against the average ocean temperature changes seen by ATOC over a few years and if, and when, the models prove adequate, use those same observations to "initialize" the models to make meaningful predictions. The basic principle behind ATOC is simple. Sounds travels faster in warm water than in cold water. The travel time is a direct measure of the large-scale average temperature between the source and receiver. Measuring average ocean temperatures is necessary to validate global climate computer models being used and developed to answer the question of whether our earth is warming as a result of the "greenhouse" effect.

14. SUBJECT TERMS
ATOC, NEPA, CEQA, SERDP, Ocean temperatures, global warming

15. NUMBER OF PAGES
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CALIFORNIA ATOC MMRP FINAL EIS/EIR

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APPENDIX G - Mitigation Monitoring Program

APPENDIX D

Scoping Process

SCOPING PROCESS SUMMARY

DATE	SCOPING ACTION
4/29/94	ARPA issues Notice of Intent (NOI) to prepare an EIS on the ATOC MMRP.
5/3/94	NOI is published in Federal Register.
5/3 - 10/1/94	NMFS staff reviews scoping comments received and consults with ARPA and others involved in preparing the EIS to ensure that scoping comments are addressed in the Draft environmental document.
5/15/94	ATOC project team presents the project to the MBNMS Research Advisory Committee.
5/16/94	NMFS conducts a Public Scoping Hearing in Santa Cruz, CA. UCSD announces at NMFS Public Scoping Hearing that the environmental document will be a joint federal/state EIS/EIR, and that UCSD will be the state lead agency.
5/13/94	Dr. Sylvia Earle, former National Oceanic and Atmospheric Administration Chief Scientist hosts meeting at the Airport Hilton Hotel, San Francisco, CA to provide a forum for the ATOC project team and agency representatives to meet with concerned environmental groups (including the Natural Resources Defense Council, Sierra Club Legal Defense Fund, Save Our Shores, Friends of the Sea Otter, and others). At this meeting, input is sought regarding the specifics of the project protocols; refinements and alternatives are discussed and incorporated into the project.
6/2 & 6/3/94	UCSD publishes Notice of Preparation of the joint EIS/EIR for the California ATOC MMRP and notice of a public scoping meeting to be held in San Diego on 6/23/94 in the following newspapers of general circulation: 1) Los Angeles Times 2) San Diego Union-Tribune 3) San Francisco Chronicle 4) Santa Cruz County Sentinel

6/3/94	UCSD distributes Notice of Preparation to various responsible agencies and other interested agencies, groups, and individuals (See Attachment 1), indicating comments would be received through 7/5/94. (Comments were in fact received through 7/20/94, and all comments were considered in determining the scope and content of the EIS/EIR.)
6/23/94	UCSD conducts public scoping meeting in San Diego.
7/19/94	Dr. Sylvia Earle convenes a second meeting between ATOC team members, agencies, and interested environmental organizations. At this meeting, which is held at the California Academy of Sciences in San Francisco, CA, further refinements to the project protocols are discussed.
7/94	ATOC project team conducted national telephone survey of environmental organizations to determine how best to keep them informed and what concerns they had about the project.
9/9/94	Survey questionnaire was distributed at a meeting of the American Cetacean Society in the San Diego area to determine what concerns the members had about the project and to determine how best to keep them informed of activities associated with the project.
1/93 to Present	The ATOC project office has carried out a public information program throughout the planning phase of the project. This effort has increased dramatically as a result of national media attention that began in March, 1994 in response to the program's applications for marine mammal research permits. The program distributes information including brochures, technical materials and children's educational literature to contact lists for environmental groups, government officials, and the general public. Monthly activity reports are available as part of an ATOC Project description on Mosaic via Internet. This medium alone has a monthly readership of 1,000 individuals from educational institutions, government agencies, businesses and other countries. A national telephone survey of target

audiences was implemented in the summer of 1994 to determine the level of awareness and understanding of the program's environmental goals. A media contact list specific to the program has ben generated and contacts are made with the event of new program information. Program scientists have attended speaking events to brief interested groups on the goals and changes to the program. Meeting of concerned individuals and groups have been organized and have resulted in solutions toward more sensitive designs to both the climate research and the marine mammal research programs. A video tape of the program is now nearly completed, awaiting approval of permits and data to tell the results of the experiment.

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June 3, 1994

CERTIFIED MAIL

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4-

NOTICE OF PREPARATION--DRAFT ENVIRONMENTAL IMPACT REPORT (EIR)

Project Title and Number: Acoustic Thermometry of Ocean Climate (ATOC)
Project Location: Approximately 25 miles off shore of Point Sur, California in the Monterey Bay National Marine Sanctuary
County: Monterey (off shore)

Project Description: The Acoustic Thermometry of Ocean Climate (ATOC) project is an international research initiative to measure ocean climate change in which on, initially, a marine mammal research team will operate an experimental system to collect data on the effects of low-frequency sound on marine mammals, sea turtles, and other marine organisms. The initial data gathering period will be of about four to six months duration and will be dedicated entirely to assessing any potential effects the acoustic transmissions may have on marine organisms. During this period, the sound source will be under the control of a team of marine biologists. Following this initial data gathering phase, the acoustic system would be used to measure ocean temperature to gather data on global climate change. Since sound travels faster in warmer water, shorter travel times over a period of time would indicate the oceans are warming. Climate measurements will only begin if, during the data gathering period, the system is determined to be safe for marine organisms.

In compliance with State and University of California guidelines for implementation of the California Environmental Quality Act, this Notice of Preparation is hereby sent to inform you that the University of California, San Diego is preparing an Environmental Impact Report (EIR) on the above-named project. The EIR will be prepared and published jointly with the associated Environmental Impact Statement being prepared by the Advanced Research Projects Agency and the National Marine Fisheries Service pursuant to the National Environmental Policy Act.

As Lead Agency for the EIR, we need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Potential environmental effects are identified in the attached Initial Study.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after receipt of this Notice. Please designate a contact person in your agency and send your response to the address below.

Marilyn E. Cox
Campus Planning Office, 0006
9500 Gilman Drive
University of California, San Diego
La Jolla, California 92093-0006

Sincerely,

Jeffrey A. Steindorf

Jeffrey A. Steindorf
Assistant Vice Chancellor

Attachment

cc: State Clearinghouse w/att.
S. Drown w/att.
J. Zimmermann w/att.

ATOC
NOTIFICATION LIST

1. Ms. Ann Hix
City of San Diego
Environmental Quality Division
1222 First Street, MS 501
San Diego, California 92101

2. California Coastal Commission
45 Fremont Street
Suite 2000
San Francisco, California 94105
(415) 904-5200

3. California Coastal Commission
Central Coast District Office
725 Front Street, Suite 300
Santa Cruz, California 95060

4. U.S. Fish and Wildlife Service
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008
(Field Supervisor Gail Kobetich)

5. Mr. Marvin Plenert, Regional Director
U.S. Fish and Wildlife Service
Region 1
911 Northeast Eleventh
Portland, Oregon 97232-4181

6. Mr. Kenneth E. Sulzer, Exec. Dir.
SANDAG
First Interstate Bank, Suite 800
401 "B" Street
San Diego, California 92121

7. Ms. Deborah Johnston
State of California
Department of Fish and Game
Environmental Services Division
20 Lower Ragsdale Dr., Ste. 100
Monterey, CA 93940

8. Mr. Jonathan Freedman, Chief
Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053-2325

9. Nanci Smith, Public Land Management Specialist
State of California
State Lands Commission
1807 Thirteenth Street
Sacramento, California 95814
(619) 322-7193

10. National Marine Fisheries Service
Attention: Jeannie Drevenak
Office of Protected Resources
1335 East-West Highway
Silver Springs, MD 20910
(301) 713-2289)

11. Monterey Bay National Marine Sanctuary
299 Foam Street, Suite D
Monterey, CA 93940
Attention: Cmdr. Terry Jackson

12. San Diego County Planning &
Land Use Dept.
5201 Ruffin Rd.
San Diego, CA 92123

13. County of Monterey
Robert Slimmon Jr., Director
County Planning and Building Department
P.O. Box 1208
Salinas, CA 93902

14. Director Nick Papadakis
Association of Monterey Bay Area Governments (AMBAG)
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Marina, CA 93933-0838

15. Environmental Protection Agency
Region IX
75 Hawthorne
San Francisco, CA 94105
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16. California Environmental Protection Agency
555 Capitol Mall, Suite 525
Sacramento, CA 95814
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17. National Oceanic and Atmospheric Administration
William W. Fox, Jr.
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National Marine Fisheries Service
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Silver Springs, MD 20910

18. Mr. Tom Loftus
State Clearinghouse
Office of Planning & Research
1400 Tenth Street
Sacramento, CA 95814

19. Advanced Research Projects Agency
Attention: Dr. Ralph Alewine
3701 North Fairfax Dr., Suite 717
Arlington, VA 22203-1714

20. Advanced Research Projects Agency
Attention: Al Cheaure
Center for Seismic Studies
1300 North 7th, Suite 1450
Arlington, VA 22209
(703) 276-7900

21. Los Padres National Forest
6144 Calle Real
Goleta, CA 93117

22. Cherilyn Widell
State Historic Preservation Officer
P.O. Box 942896
Sacramento, CA 94296-0001
(916) 653-9107

23. Regional Water Quality Control Board
Central Coast Region
81 Higuera Street, Suite 200
San Luis Obispo, CA 95414

24. Department of Health Services
Office of Noise Control
2151 Berkeley Way
(510) 540-2356

25. Kathy McGill
American Cetacean Society
Los Angeles Chapter
1101 Seal Way, #B
Seal Beach, CA 90740

26. Rachel Saunders
Center for Marine Conservation
1039 Benito Ave.
Pacific Grove, CA 93950
(408) 375-4509

UNIVERSITY OF CALIFORNIA

INITIAL STUDY

ACOUSTIC THERMOMETRY OF OCEAN CLIMATE (ATOC)

Project Number: N/A
University of California, San Diego

May 31, 1994

Prepared by:

Marilyn E. Cox, Acting Asst. Director
Campus Planning Office 0006
9500 Gilman Drive
University of California, San Diego
La Jolla, California 92093-0006
(619) 534-3860

This statement is prepared in compliance with the California Environmental Quality Act

UNIVERSITY OF CALIFORNIA

INITIAL STUDY CHECKLIST
Date: May 31, 1994

CAMPUS: SAN DIEGO/SCRIPPS INSTITUTION OF OCEANOGRAPHY

PROJECT TITLE: ACOUSTIC THERMOMETRY OF OCEAN CLIMATE (ATOC)

PROJECT LOCATION: The project proposes to install a sound source off Point Sur, California, in the Monterey Bay National Marine Sanctuary. (Figure 1).

PROJECT DESCRIPTION: The Acoustic Thermometry of Ocean Climate (ATOC) project is an international research initiative to measure ocean climate change in which, initially, a marine mammal research team will operate an experimental system to collect data on the effects of low-frequency sound on marine mammals, sea turtles, and other marine organisms. The initial data gathering period will be of about four to six months duration and will be dedicated entirely to assessing any potential effects the acoustic transmissions may have on marine organisms. During this period, the sound source will be under the control of a team of marine biologists. Following this initial data gathering phase, the system would be used to acoustically measure ocean temperature to gather data on global climate change. Since sound travels faster in warmer water, shorter travel times over a period of time would indicate the oceans are warming. Climate measurements will only begin if, during the data gathering period, the system is determined to be safe for marine organisms.

ATOC proposes to use two underwater sources located off the coasts of Kauai, Hawaii and Point Sur, California to transmit sound signals along deep-ocean paths to receivers scattered 3,000 to 6,000 miles away. Two Scientific Research Permits have been applied for from the National Marine Fisheries Service (NMFS) to allow the separate installations in Hawaii and California. Pursuant to the National Environmental Policy Act (NEPA), the Advanced Research Projects Agency (ARPA) and NMFS are preparing separate Environmental Impact Statements for the Hawaii installation and for the California installation. The project to be addressed in this Initial Study is the California installation which is proposed to be located approximately 25 miles off shore of Point Sur, California in the Monterey Bay National Marine Sanctuary at a depth of about 3,000 feet.

The proposed installation will consist of a small (approximately the size of a water heater) low-frequency sound transmitter unit that will project a low-frequency signal centered at 75 Hz with a bandwidth of 35 Hz. This frequency band is near the center of the spectrum of deep ocean ambient shipping noise and is a frequency range that is used by only a few marine mammals. The low-frequency sound source will transmit at approximately 260 watts equivalent to a sound pressure level of 195 dB. The source waveform will be a 27 sec M-sequence, repeated 42 times (a maximal length sequence of approximate 90 degree phase changes), optimized for decoding

at the receivers. It will not sound like a 75 Hz pure tone as it is modulated within the 57.5-92.5 Hz band. A vertical listening array will be installed nearby and connected to shore with a fiber optic data cable during the data gathering period. For measuring ocean temperatures, the transmitted sound will be recorded at about nine different existing receivers which are currently owned and operated by the Navy, but are being made available for purposes of this research through the Strategic Environmental Research and Development Program.

PROJECT SITE: The sound source site is situated on an ocean ridge at a depth of about 3,000 feet within the Monterey Bay National Marine Sanctuary, about 25 miles off of Point Sur, California (Figure 1).

PROJECT OBJECTIVES: The objectives of the proposed project are to collect data on the effects of low-frequency sound on marine mammals, sea turtles, and other marine organisms; and, if the acoustic system is determined to be safe for marine organisms, to collect data on ocean temperature to determine whether global climate change is occurring. One of the ocean's most important impacts is through its influence on weather and climate, affecting almost all of society's activities from agriculture to industry. Over long periods of time the ocean regulates the seasonal and year-to-year variations in weather and climate. The ocean is an important sink for carbon dioxide, the most important greenhouse gas causing global warming. It would be valuable to have an integrated measure of ocean temperature changes. This cannot be done with conventional techniques. Satellites only observe surface ocean temperatures and there are not enough ships or other methods of acquiring this information. The ATOC project is one of the most thoroughly planned and carefully controlled studies to be proposed on global climate warming.

RELATIONSHIP OF THE PROJECT TO THE LRDP EIR: As the proposed project involves an activity of the University of California, San Diego's Scripps Institution of Oceanography which will take place off-campus, the project is not addressed by the 1989 UCSD Revised Long Range Development Plan. In order to fully address any potential environmental issues associated with the proposed activity, an Environmental Impact Report (EIR) will be prepared as described under "Summary" below.

MITIGATION: Any necessary and appropriate measures required to mitigate potentially significant environmental impacts associated with the activity will be described in the EIR for the project.

SUMMARY: Based on the impact assessment appearing on the following pages it has been determined that the proposed project may result in impacts on marine

mammals, sea turtles, and other marine organisms. Therefore, a focused EIR will be prepared. As ARPA and NMFS have notified the public a federal Environmental Impact Statement (EIS) will be prepared pursuant to the National Environmental Policy Act, the EIR will be prepared and published jointly with the federal EIS.

ENVIRONMENTAL CHECKLIST FORM

I. Background

1. Name of Proponent UNIVERSITY OF CALIFORNIA, SAN DIEGO/SCRIPPS INSTITUTION OF OCEANOGRAPHY
2. Address and Phone Number of Proponent Campus Planning Office Mail Code 0006, 9500 Gilman Drive, La Jolla, California 92093-0006 (619) 534-6515
3. Date of Checklist Submitted May 31, 1994
4. Agency Requiring Checklist University of California, San Diego
5. Name of Proposal, if applicable Acoustic Thermometry of Ocean Climate

II. Environmental Impacts

	Yes	Maybe	No
1. Earth. Will the proposal result in:			
a. Unstable earth conditions or in changes in geologic substructures?	___	___	X
b. Disruptions, displacements, compaction or overcovering of the soil?	___	___	X
c. Change in topography or ground surface relief features?	___	___	X
d. The destruction, covering or modification of any unique geologic or physical features?	___	___	X
e. Any increase in wind or water erosion of soils, either on or off the site?	___	___	X
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?	___	___	X
g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?	___	___	X

	Yes	Maybe	No
2. Air. Will the proposal result in:			
a. Substantial air emissions or deterioration of ambient air quality?	___	___	X
b. The creation of objectionable odors?	___	___	X
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	___	___	X
3. Water. Will the proposal result in:			
a. Changes in currents, or the course or direction of water movements, in either marine or fresh waters?	___	___	X
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	___	___	X
c. Alterations to the course or flow of flood waters?	___	___	X
d. Change in the amount of surface water in any water body?	___	___	X
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?	___	___	X
f. Alteration of the direction or rate of flow of ground waters?	___	___	X
g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	___	___	X
h. Substantial reduction in the amount of water otherwise available for public water supplies?	___	___	X
i. Exposure of people or property to water related hazards such as flooding or tidal waves?	___	___	X
4. Plant Life. Will the proposal result in:			
a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants)?	___	___	X

	Yes	Maybe	No
b. Reduction of the numbers of any unique, rare or endangered species of plants?	___	___	X
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?	___	___	X
d. Reduction in acreage of any agricultural crop?	___	___	X
5. Animal Life. Will the proposal result in:			
a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms or insects)?	___	___	X
b. Reduction of the numbers of any unique, rare or endangered species of animals?	___	___	X
c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?	___	___	X
*d. Deterioration to existing fish or wildlife habitat?	___	X	___
6. Noise. Will the proposal result in:			
*a. Increases in existing noise levels?	X	___	___
b. Exposure of people to severe noise levels?	___	___	X
7. Light and Glare. Will the proposal produce new light or glare?	___	___	X
8. Land Use. Will the proposal result in a substantial alteration of the present or planned land use of an area?	___	___	X
9. Natural Resources. Will the proposal result in:			
a. Increase in the rate of use of any natural resources?	___	___	X
10. Risk of Upset. Will the proposal involve:			
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?	___	___	X

*See Attachment A

	Yes	Maybe	No
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X
11. **Population.** Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?	___	___	X
12. **Housing.** Will the proposal affect existing housing, or create a demand for additional housing?	___	___	X
13. **Transportation/Circulation.** Will the proposal result in:			
a. Generation of substantial additional vehicular movement?	___	___	X
b. Effects on existing parking facilities, or demand for new parking?	___	___	X
c. Substantial impact upon existing transportation systems?	___	___	X
d. Alterations to present patterns of circulation or movement of people and/or goods?	___	___	X
*e. Alterations to waterborne, rail or air traffic?	X	___	___
f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	___	___	X
14. **Public Services.** Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:			
a. Fire protection?	___	___	X
b. Police protection?	___	___	X
c. Schools?	___	___	X
d. Parks or other recreational facilities?	___	___	X
e. Maintenance of public facilities, including roads?	___	___	X
f. Other governmental services?	___	___	X
15. **Energy.** Will the proposal result in:			
a. Use of substantial amounts of fuel or energy?	___	___	X

* See Attachment A

	Yes	Maybe	No
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	___	___	X
16. **Utilities.** Will the proposal result in a need for new systems, or substantial alterations to utilities:	___	___	X
17. **Human Health.** Will the proposal result in:			
a. Creation of any health hazard or potential health hazard (excluding mental health)?	___	___	X
b. Exposure of people to potential health hazards?	___	___	X
18. **Aesthetics.** Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view?	___	___	X
19. **Recreation.** Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities?	___	___	X
20. **Cultural Resources.**			
a. Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?	___	___	X
b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	___	___	X
c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?	___	___	X
d. Will the proposal restrict existing religious or sacred uses within the potential impact area?	___	___	X
21. **Mandatory Findings of Significance.**			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or			

	Yes	Maybe	No
endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	___	___	X
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	___	___	X
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each source is relatively small, but where the effect of the total of those impacts on the environment is significant.)	___	___	X
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	___	___	X

III. **Discussion of Environmental Evaluation**

See Attachment

IV. **Determination**

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. ☐

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION WILL BE PREPARED. ☐

I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. ☒

May 31, 1994
Date

Marilyn E. Cox
Signature

For University of California, San Diego

5. The potential effects of the proposed sound source on marine mammals, sea turtles, and other marine organisms will be addressed in a focused Environmental Impact Report (EIR) which will be prepared and published jointly with the federal Environmental Impact Statement being prepared by the Advanced Research Projects Agency and the National Marine Fisheries Service.

6. The proposed project will periodically transmit sound in the ocean environment. An EIR will be prepared to evaluate any potential effects of this sound transmission on marine organisms.

13. The proposed project will result in localized increases in waterborne and air traffic. Any potential environmental effects associated with this traffic will be evaluated in the EIR.

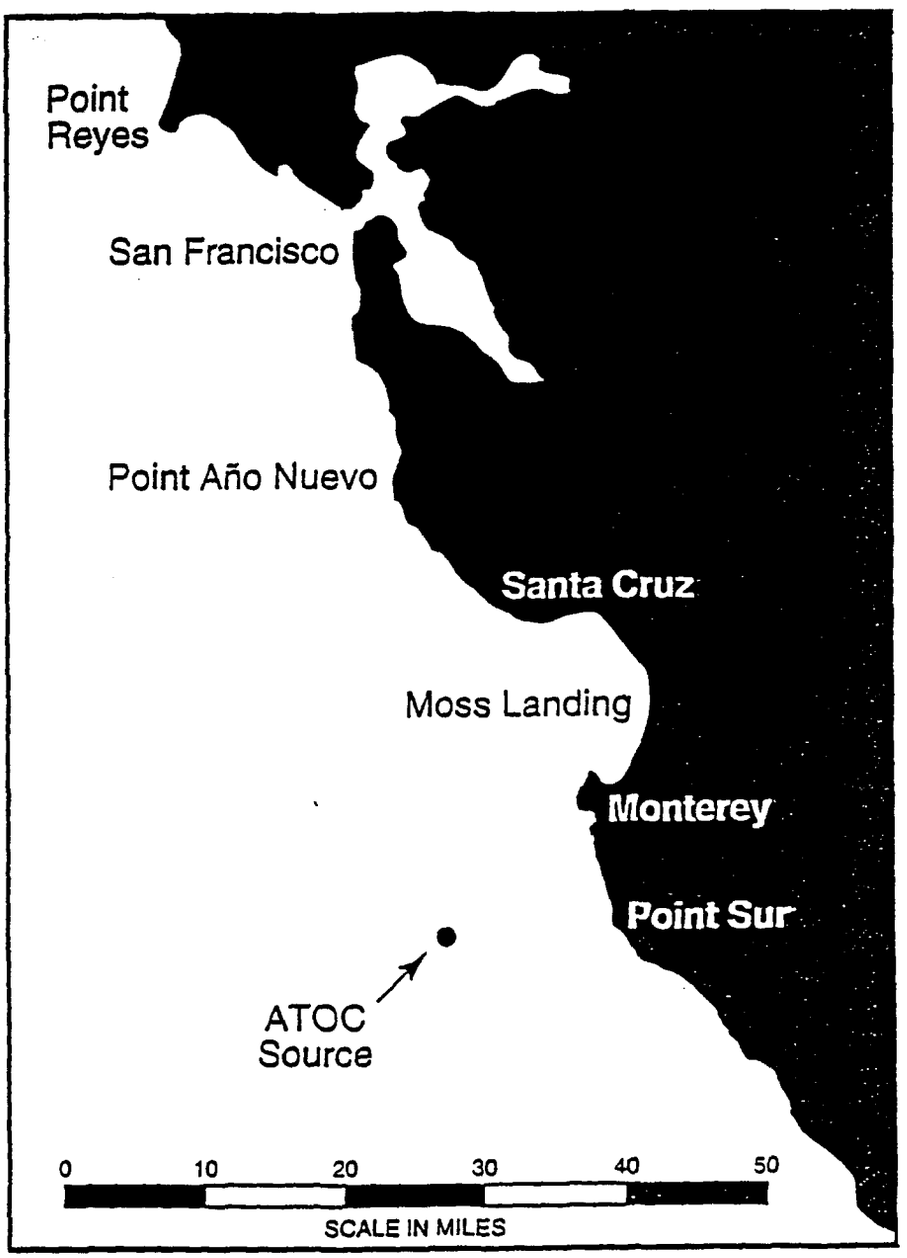

Figure 1. Acoustic Thermometry of Ocean Climate project sound source location.

APPENDIX E

List of Agencies, Organizations and Individuals Consulted in Preparing the EIS/EIR

Appendix E

Ainley, David
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Advanced Research Projects Agency

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Harvey, James
Moss Landing Marine Labs

Calambokidis, John
Cascadia Research

California Coastal Comm.
San Francisco Office

California Dept. of Fish and Game
Morro Bay, Sea Otter Research Project

Calif. Environmental Protection Agency

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Clark, Christopher W.
Mellinger, David
Charif, Russel
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Bioacoustic Research Program

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DeMaster, Doug
Nat. Marine Mammal Lab.

Dept. of Health Svcs.
Office of Noise Control

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Hubbs Sea World Institute

Elliott, Bruce
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Woolley, Barry
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Notthoff, Ann
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APPENDIX F

Responses to Comments Raised by the Draft EIS/EIR

Introduction

This Appendix, Responses to Comments Raised by the Draft EIS/EIR, summarizes the comments received on the DEIS/EIR prepared for the California Acoustic Thermometry of Ocean Climate Project and its associated Marine Mammal Research Program. This Appendix also provides the document's preparers' comments to the public responses in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The preparers' comments are also provided via appropriate expansion, clarification, or revision of the DEIS/EIR.

The Advanced Research Projects Agency received 210 letters during the public comment period from November 28, 1994 through January 31, 1995. In addition, 58 statements were presented at the January 6, 1995 public hearing in Santa Cruz, CA.

These comments contributed to the evolution of the research program that makes up the proposed action. This Appendix clarifies the issues expressed by the commenters, and presents the preparers' final position on actions necessary for the most environmentally conscientious plan to conduct acoustic thermometry measurements and a marine mammal research program.

This Appendix is made up of three parts: 1) preparers' responses to comments raised by the DEIS/EIR, 2) California DEIS/EIR letter issues table, 3) copies of comment letters and public hearing transcript. All comments from incoming letters, and statements from the public hearing were numbered (left margin of comment letters and public hearing transcript) and categorized into major issues and subissues (right margin). Responses to these were then drafted and reviewed for scientific and programmatic accuracy. Where appropriate, the Marine Mammal Research Program Advisory Board was consulted in developing the comment responses.

The California DEIS/EIR letter issues table is a matrix that reflects issues raised by each commenter, either via letter or public hearing. An 'X' is placed next to the commenter's name for each issue they commented on. Following this are copies of the letters received and the public hearing transcript. Where a comment generated a text change (including tables and figures) it is noted as 'T.C.' in the right margin next to the comment. Where it is deemed that the EIS/EIR responds adequately to the comment, the appropriate Section number is noted alongside the comment.

ISSUE 1: FUNDING OF PROGRAM

Comment: The Department of Defense (DoD) has no environmental mission and ATOC is, in reality, a military project, partially "classified", designed to support research into improving military capabilities.

Response: ATOC is funded by the Strategic Environmental Research and Development Program (SERDP). SERDP is mandated by Public Law 101-510 (40 U.S.C. §§2901-2904) to support environmental quality research, development, demonstration and applications programs. As such, SERDP is the Defense Department's principal technology development and transfer mechanism for environmental issues. The SERDP program identifies and develops technology to meet environmental commitments and to foster the exchange of scientific information and technologies. It thus interacts with other programs and applies defense technology to derive more usable and cost-effective approaches for reducing environmental risks.

SERDP is comprised of six Technology Thrust Areas: Global Environmental Change (GEC), Conservation, Cleanup, Compliance, Energy Conservation/Renewable Resources, and Pollution Prevention. The objective of the GEC thrust area (into which ATOC falls) is to focus on research which includes acquisition/organization of data and research results that quantify the total environment at global and regional scales. Integration of new and existing programs in data collection and analysis methodologies, process, study, research and environmental modeling are keystone features. GEC programs focus on improving access to Department of Defense/Department of Energy(DoD/DoE) data bases and facilities, developing DoD/DoE sensing capabilities and technologies. These programs support research into environmental change, process and modeling.

All projects funded by SERDP must survive an intense working group screening process, an evaluation and ranking by an executive working group, and if $1M or greater in value, rigorous review by an independent Scientific Advisory Board. To qualify as a SERDP program, proposed efforts must meet requirements of the law's authorizing language which describes SERDP's purpose, quoted here in part:

> "To address environmental matters of concern to DoD and DoE through support for basic and applied research and development of technologies that can enhance the capabilities of the departments to meet their environmental obligations.
>
> To identify research technologies and other information developed by the DoD and the DoE for national defense purposes that would be useful to governmental and private organizations involved in the development of energy technologies to address ... environmental concerns and to share such research, technologies and other information with such government and private organizations."

As part of GEC and the broader U.S. Global Climate Research Program, ATOC would transmit a signal to be received many thousands of miles away. Accordingly, the use of existing fixed undersea receivers of the Sound Surveillance System (SOSUS), a part of the Navy's

Integrated Undersea Surveillance System (IUSS), which were designed for precision acoustic reception, is completely within the letter and spirit of the SERDP legislation. ATOC's use of these Navy remote sensing capabilities would avoid major program costs. A specially-designed signal processing system installed at selected IUSS sites would "tap off" the uniquely-modulated ATOC signal.

It is true that certain attributes of SOSUS itself remain classified, specifically, exact location of the underwater receivers, or hydrophones, but ATOC project results would be entirely unclassified, since relative, not absolute, travel times are the primary measurement. All climate measurement data would be available to scientists at an unclassified level.

The ATOC project has no specific military purpose and is not designed to improve military capabilities. However, research that increases knowledge of the marine environment always offers the potential for discoveries that may prove useful for both civilian and military purposes.

ISSUE 2: PROGRAMMATIC EIS

Comment: A programmatic EIS/EIR forecasting and analyzing the environmental effects of the overall ATOC program for at least the next 10 years is required before any ATOC activities occur, including baseline studies providing information for the environmental review process. Alternatively, the process for evaluating subsequent ATOC actions should clearly be explained in the FEIS/EIR, and a programmatic statement should be prepared if the 10-year ATOC program proceeds. The EIS/EIR should evaluate all current project components, including components in New Zealand, Hawaii, and the fixed and drifting receivers. The relationship of the Kauai and California environmental review processes should be clarified. The comment periods for the California and Hawaii EISs should have been concurrent.

Response: The EIS/EIR identifies the reasons why future ATOC activities are too speculative to permit analysis of potential environmental effects at this time. Neither NEPA nor CEQA require speculation concerning future activities. EPA, the federal agency responsible for ensuring compliance with the NEPA guidelines, recommended that: "a broad programmatic EIS be developed for the 10-year ATOC program, should it occur, with tiered NEPA documents for each new sound source."

Both NEPA and CEQA require reasonable development of information necessary to support the EIS/EIR; by definition these studies must take place before the environmental review process is completed. Studies made under existing permits and analyses of available data have provided important information for preparation of the EIS/EIR.

Both the source technologies and source locations that would be proposed for a long-term ATOC effort presently are uncertain. If the ATOC feasibility study proves successful and funds are made available for future activities (both of which must be considered speculative at this time), the range of potential options for ATOC technologies includes: 1) moored autonomous sources with a high degree of siting flexibility and potentially located in very remote locations, 2) bottom mounted autonomous sources at locations in the deep sound channel, with somewhat less siting flexibility or, 3) cable powered sources that generally would need to be located reasonably close to developed land areas.

Autonomous sources, particularly if they are to be buoyed up on a mooring, require substantial engineering work before the capability is demonstrated; the likelihood that this work can be completed before future phases might be proposed is uncertain.

Several factors render speculative any detailed predictions concerning potential future ATOC Project studies, including source sites. First, the importance of avoiding marine mammals should be understood better following the initial MMRP and feasibility study phase. Also pertinent to the location of future sound sources would be the degree to which additional research on marine mammals is considered important as an overall ATOC program goal.

The description of siting criteria set forth in Section 2 of the EIS/EIR provides the currently available information regarding the likely process for selecting any future ATOC

source sites. It is anticipated that from one to several sound sources would be needed in each major ocean basin, but even that factor remains speculative until the results of the initial feasibility study have been obtained. In particular, it is not currently known whether there is a limiting range for the ATOC technology that would require more sources to obtain complete basin-level or global coverage. All of these factors would be considered following the feasibility study phase in developing any long-term program proposals.

The net effect of all these uncertainties is that the location of potential future ATOC sources and their nature and characteristics are currently speculative and the results of any environmental review based upon such speculation would likely be rendered obsolete by future developments in the program.

No proposed sites for additional ATOC sources have been identified. The shift in proposed location for the California ATOC source from Sur Ridge (preferred site) to Pioneer Seamount demonstrates both the flexibility of ATOC source siting decisions and the need to respond to evolving factors in focusing on specific proposals. If autonomous technologies are demonstrated in the future, this source siting flexibility will be even greater.

To the extent that cabled sound sources similar to those proposed for the California and Hawaii ATOC installations are utilized for future ATOC activities, and assuming similar siting criteria, the impacts could be anticipated to be similar to those analyzed in the respective environmental impact statements for the California and Hawaii cabled source operations. If future sound sources are located at more remote sites with lower abundances of marine mammals and other sea life, impacts could be reduced, but continued marine mammal research would likely be severely restricted or infeasible at those locations.

If the MMRP demonstrates any adverse impacts from ATOC sound transmissions or other ATOC activities, and if the ATOC concept proves successful and a long-term study warranted, a programmatic environmental impact statement likely would be required at that time, with tiered site-specific environmental review.

The complete ATOC program, as currently known, consists of the activities described and analyzed in the EIS/EIR for California and the EIS for Hawaii cabled source installations and related activities. These two documents incorporate one another by reference and when combined comprise a complete program-level analysis at this time.

All of the current project components that fall under the jurisdiction of U.S. federal and/or state guidelines or permitting requirements, including the pertinent fixed and drifting receiving arrays, are analyzed in the EIS/EIR. Specifically, the EIS/EIR, in Section 4.2.1.1, concludes that none of the receiving arrays, including those in non-U.S. waters (e.g., Guam, Rarotonga [New Zealand]) will have significant environmental impacts.

The DEISs for California and Hawaii were released as close in time as was practicable. It was determined not to delay release of the California EIS/EIR to permit identical review periods, since not all commenters are interested in both sites and such delay would have unnecessarily

withheld information of concern to the public in California. Commenters interested in any combined effects of the California and Hawaii activities have been able to provide their comments as late as the close of the comment period on the Hawaii document (March 9, 1995).

ISSUE 3: ROLE OF ACOUSTIC THERMOMETRY IN ADDRESSING GLOBAL WARMING

a. CLARIFICATION OF ATOC OBJECTIVES/GOALS

Comment: 1) What is the primary purpose of ATOC? 2) Why bother with the detection of greenhouse warming when we know already that it has taken place? 3) Why not just put a thermometer over the side of the ship and measure temperatures directly? 4) Won't your measurements take too long to do any good?

Response: 1) There is not yet sufficient agreement within the environmental scientific communities on the possible adverse effects of greenhouse warming and the extent that it may be occurring. The primary purpose of ATOC is to make a contribution toward meaningful climate predictions, which are a prerequisite to any effective national and international policy on fossil fuel consumption. In the future, validated climate models will be the primary tools available to persuade governments to adopt new policies toward energy consumption and renewal. Such scientific consensus was instrumental in arriving at the Montreal Protocol regarding CFC reduction/elimination.

2) Greenhouse warming may have been detected in the atmosphere, but has not yet been observed in the ocean. Climate models have been used to examine the ocean's response to greenhouse-induced atmospheric warming. Existing climate models differ widely in their predictions, partly as a result of the treatment of clouds and the so-called "flux correction"(the salt water/freshwater balance in the ocean changes over time. To keep the models in agreement it is necessary to "correct" for these changes). Climate modelers all agree that the ocean plays a vital role. You cannot get the atmosphere right until you get the ocean right. Further, the ocean is important in its own right, for predicting sea level changes, changes in coastal habitats, and changes in circulation affecting marine life globally.

The ATOC role is not to detect greenhouse warming in the ocean, but to test climate model predictions, whether ambient or greenhouse-related. Where we find the models to be inadequate, this would lead to an improved understanding and prediction of climate variability. So our initial effort would be devoted to test and improve ambient climate predictions, and this inevitably would lead to improved greenhouse climate predictions. We do not have to wait for a decade to provide much-needed data. As indicated in the EIS/EIR, "...well before global climate change is evident in the data, ATOC will be able to contribute valuable sea-truth data to the climate-research modeling community, to improve their predictive capability."(Section 1.1.1).

3) The ATOC project provides for a new type of ocean measurement, acoustic thermometry, which complements satellite altimetry observations. These are by no means the only ocean measurements that are or should be taken, but they are unique in viewing the oceans on the scale of climate variability, from 5000 to 10,000 km. Averaging over many hundreds of traditional point measurements can demonstrate climate variability and has, in fact, lead to much of what is now known about ocean climate. But there is an inherent advantage of conducting the ocean observation program on a scale commensurate with the scale of ocean features material to climate predictions.

4) Climate variability can be associated with: a) ambient processes which are not directly related to human activity; examples are the seasonal variation, and El Niño events; and b) variations associated with human activities, such as greenhouse warming. Separation of the former from the latter is not easy and will at best take many years. But by testing and improving the ambient climate models now progress can be made towards greenhouse prediction later. A model that fails to account for ambient variability will fail to properly predict greenhouse variations. Interplay of the observation and model will lead to model improvements and ultimately to model credibility.

Establishing the credibility of greenhouse prediction is an important element toward a rational public policy. Although global warming has been identified by the international climatology community as a very important problem, there is currently no agreement in the environmental scientific community on the extent and possible implications of the greenhouse effect. Acoustic thermometry can make a contribution towards credible model predictions that could go a long way toward fostering agreement among climatologists which, in turn, could enhance the possibility of national and international policy changes with respect to fossil fuel usage.

ISSUE 3: ROLE OF ACOUSTIC THERMOMETRY IN ADDRESSING GLOBAL WARMING

b. POTENTIAL FOR POLICY CHANGES TO CURTAIL GREENHOUSE GAS EMISSIONS

Comment: Since we already know that greenhouse warming is taking place, there is no need for further studies. Instead of spending money on such studies, why not put it into better conservation measures?

Response: Energy conservation measures should indeed be put into effect. Such measures are very expensive, and they have to be mounted on an international scale to be effective. To persuade governments to follow such a course will require clear evidence of the consequences of inaction. There have been numerous studies of the projected consequences (e.g., on agriculture, sea level, etc.). These are not based on the indicated warming by about 0.5°C in the last century, but on model predictions of much more severe future changes. These predictions differ from place to place, and generally point to greater warming in the northern hemisphere, particularly at high northern latitudes; and in some places a cooling is predicted. "There is important need for model predictions to be tested against observations, if the models are to serve as a persuasive basis for policy formulation."(EIS/EIR Section 1.1.1, emphasis added). Also, see previous comment for additional response relevant to this comment.

ISSUE 3: ROLE OF ACOUSTIC THERMOMETRY IN ADDRESSING GLOBAL WARMING

c. ADEQUACY OF COMPUTER MODELS FOR CLIMATE PREDICTIONS

Comment: Adequate climate models already exist. Why spend money on an expensive and questionable ocean observation program?

Response: The majority of the climatology research community do not think existing models are adequate to project future changes.(e.g., McDonald et al., 1994; Ehret, 1994). Among the uncertainties most often quoted are the role played by clouds (which is being intensively studied), the so-called "flux correction"(see Comment Response 3.a.) which needs to be applied to predictions to keep them calibrated, and which can measurably affect the predicted climatic change, and the dominant role played by the oceans.

During the first decade of numerical weather predictions in the early fifties, the predictive skill actually diminished relative to the previous manual predictions. The reason, it turned out, was that weather station observations were not properly assimilated into the computer prediction models. And without such data assimilation, weather predictions become useless after about ten days.

In weather predictions, the ocean plays a minor, passive role. In climate predictions, the ocean plays the major, dominant role. The ventilation of the interior ocean, associated with the formation of intermediate and deep water in the Greenland Sea and around the Antarctic continent, is one of the most important ocean processes. Manabe's climate model predicts the termination in a century or so of this ventilation, as a consequence of greenhouse warming. (Manabe and Stouffer, 1993). Even one year of lack of this oceanic ventilation process would have profound consequences on life on the earth and within the sea. Climate models need to be properly initialized by global ocean observations, and such observations need to be continuously assimilated to keep the predictions from running off track. For example, comparing the predicted seasonal change in upper ocean heat content with the closely related sea-level changes provided by the Topex-Poseidon satellite altimetry measurements reveals "unacceptable discrepancies." (NRL, 1994).

Appropriate ocean measurements are an essential part of any climate prediction. "Global atmospheric climate changes cannot be predicted without understanding global ocean processes. Yet, to date, there are no large-scale observations of ocean temperature to compare with and verify the predictions of existing models."(EIS/EIR Section 1.1.1).

ISSUE 3: ROLE OF ACOUSTIC THERMOMETRY IN ADDRESSING GLOBAL WARMING

d. DOES ACOUSTIC THERMOMETRY PROVIDE USEFUL CLIMATE SIGNALS (TOO DEEP, TOO LATE)?

Comment: The effect of greenhouse warming will take thousands of years to reach the depth of the sound channel, and the information will be too late to be useful.

Response: Many commenters have suggested that ATOC is not useful since it will take too long for the climate signal to penetrate to the depth of the acoustic source (about 1 km). It has been stated that it would take 10,000 yrs to be observable. There are two misconceptions underlying this assertion: 1) The above number is the characteristic time for the warming of the oceans by molecular diffusion but, in fact, heat is carried downward by convective processes, as shown by the penetration of CFC's to 1.5 km depth in only ten years. 2) Acoustic energy in the sound channel propagates, not along straight lines, but along rays which oscillate between the shallow and deep ocean. This acoustic method is sensitive to changes throughout the water column, not just at the source depth. This extensive vertical sampling is the basis of ocean acoustic tomography (a method of using a network of sources and receivers to produce a 3D image of the thermal structure of the volume of the ocean within the networks) and has been demonstrated in many experiments over the last 15 yrs.

Comment: A change in the depth of the sound channel associated with greenhouse warming, and the resulting alteration of ray paths, would cause changes in travel time that could be misinterpreted as changes in ocean temperature.

Response: The depth of the sound channel axis does not remain constant over time, but shifts (at least tens of meters) upward and downward with the movement of major water masses throughout the oceans. In the higher latitudes, where the sound channel is close to the surface, storm activity can cause the axis depth to move vertically in the water column. It has been demonstrated in ocean acoustic tomography on a 1000 km scale that the effects on acoustic travel time due to alteration of ray paths are much smaller than those associated with changes in temperature.

Comment: Changes in acoustic travel time may be more related to earth movements than changes in ocean temperature.

Response: For a typical 5000 km path, plate tectonics predicts changes on the order of 10 cm in 10 yrs, associated with a change in travel time of 10^{-4} sec. During such an interval, the expected change in temperature is on the order of 0.1°C, producing a change in travel time on the order of 1 sec. Therefore, changes in acoustic travel time due to earth movements will not mask changes in acoustic travel time due to global warming, and corrections can easily be made to account for the effect of earth movements.

ISSUE 3: ROLE OF ACOUSTIC THERMOMETRY IN ADDRESSING GLOBAL WARMING

e. ALTERNATIVE METHODS, SUCH AS POINT MEASUREMENTS, SATELLITES

Comment: Why not rely on alternate traditional methods which do not have the potential for interfering with marine life? Further, NASA and NOAA satellites have already proven changes in ocean temperature.

Response: The key problem with traditional point measurements has been noted in numerous scientific publications over the years (e.g., Munk and Wunsch, 1982; Baggeroer and Munk, 1989; Worcester et al., 1991) and was summarized in the EIS/EIR (Section 1.1.5): "...measurements at each point are contaminated by small-scale ocean variability." and "...by acoustically measuring average temperatures across distances extending to 5000 km or more, over extended time periods, short-term regional and mesoscale variations are averaged out, and the predicted global climate warming signal can be detectable."

Infrared measurements from satellites would be the best way of measuring temperature changes in the surface layers. Unfortunately these measurements are badly contaminated due to absorption by water vapor, and are masked by backscatter from clouds. The present precision of about 1° C is inadequate for any observation of global change in a practical time frame. Further, ocean measurements need to include the interior ocean which is not accessible to radiative measurements from above. (What evidence there is indicates that the greenhouse effects have already penetrated beyond a depth of 1 km).

On the other hand, satellite altimetry observations have established an astounding precision of about 2.5 cm in the vertical for measuring the global sea level. This has already proven useful in measuring ambient variability, and will ultimately be useful in measuring greenhouse effects. The ATOC proposal complements a parallel observational program, satellite altimetry, for estimating the heat content of the upper ocean, by using acoustic thermometry to measure the interior ocean.

ISSUE 3: ROLE OF ACOUSTIC THERMOMETRY IN ADDRESSING GLOBAL WARMING

f. PROBABILITY OF SUCCESS

Comment: ATOC scientists admit that they are not certain that acoustic thermometry will work. They should not be permitted to proceed until the method has been established. Since ATOC will lead to global networks functioning for many years, the EIS should be directed at such long-term global networks.

Response: Many comments have been directed at this issue. The ATOC project addressed in the EIS/EIR was originally proposed as a 2 ½ year experiment and, as with most scientific research, the outcome is somewhat uncertain. Two issues are involved, which are discussed below:

First, the principal investigators have developed acoustic thermometry (under the name ocean acoustic tomography) for the last fifteen years, and have established its validity to ranges of 1000 km. Some sparse measurements were carried out to 3000 km. There have been over 20 experiments world-wide. The fact that it is possible, by suitable signal analysis (similar to that used with deep space probes), to detect digitally coded, low frequency transmissions to 18,000 km (almost half way around the earth) was established in 1991 in the Heard Island Feasibility Test. Therefore, the ATOC project is based on solid scientific data. What is new is the attempt to apply the techniques to ocean climate scales, presumably 5000 to 10,000 km. We do not now know, nor will we know until ATOC measurements are carried out, what the geographical limits are.

Second, until these results are known, it is futile to speculate on possible future extensions of such work. It should be noted that the usefulness of ATOC as a contributor towards credible predictions of global climate change does not necessarily demand a global ATOC-like network. The testing of climate models in a few (2-4) key ocean regions (e.g., North Pacific, Atlantic, Indian, Arctic Oceans) might suffice to advance our understanding so that these models can be used globally.

ISSUE 4: ALTERNATE SITE

a. RATIONALE FOR ACOUSTIC SOURCE INSTALLATION IN MBNMS

Comment: There were 27 specific comments (via letter) and 2 specific comments in the 6 January 1995 Santa Cruz Public Hearing testimony referring to the rationale for installing the ATOC source inside the MBNMS.

Response: The proposed source location has been moved out of the MBNMS (Sur Ridge--preferred site) to Alternative 3-1; the alternate site at Pioneer Seamount.

ISSUE 4: ALTERNATE SITE

b. CONSIDERATION OF CONDUCTING MMRP IN AREA RICH WITH MARINE MAMMALS, BUT INSTALLING SOURCE IN AREA DEVOID OF MARINE MAMMALS

Comment: There were 22 specific comments (via letter) referring to the possibility of carrying out a MMRP in an area with large populations of marine mammals, but installing the ATOC source in an area devoid of marine mammals.

Response: If the MMRP and ATOC were carried out in different locations, the ATOC sound source could not be used for the MMRP observations. The MMRP would have to use a different sound source with different characteristics. One of the major benefits of using a stable, calibrated, controlled, monitored low frequency source for carrying out scientific research into the potential effects of low frequency sound on marine mammals is that replication of the signal characteristics is straightforward. Attempts to correlate data collected in the upper water column using a portable acoustic source (most likely with different transmission characteristics, including a lower source level) with a deep, bottom-mounted source could lead to extrapolation difficulties that could render the data unrelatable. What a portable, relatively low-powered low frequency source can accomplish is to establish some baseline measurements into the potential for causing behavioral effects on marine animals. For example, by employing a source off a vessel with a frequency bandwidth in the range of approximately 75-85 Hz, with a source level of about 175 dB, it could be verified whether or not there was any behavioral reaction to the low frequency sound presented in that manner. Although this would have provided data relevant to present discussions about ATOC effects, additional interpretation would be needed before applying that data to what might specifically be expected from the ATOC source. See responses to Issue 6 comments for further discussion of the use of boat-based acoustic playback experiments, and the use of noise from vessels to assess the potential impact of low frequency sound on marine mammals.

By moving the source site from Sur Ridge (preferred site) in the MBNMS to Pioneer Seamount (Alternative 3-1), the estimates for numbers of species have changed. Four of the seven mysticete species are expected to be fewer in number at Pioneer Seamount compared to Sur Ridge, two basically the same, and one stock potentially greater (humpback whale). Three of the seven odontocete species are expected to be fewer in number at Pioneer Seamount, two the same, and two greater (Pacific white-sided dolphin and Dall's porpoise). One of the five pinniped species should have a smaller stock at Pioneer Seamount, three the same, and one possibly greater (northern fur seal). The one fissiped (sea otter) and the four sea turtle species have lower stocks at Pioneer Seamount.

ISSUE 4: ALTERNATE SITE
c. ADDITIONAL ALTERNATE SITES

Comment: At least 5 to 6 sites have convex (slope) configurations unobstructed by nearby bathymetry. The Pacific Coast site, NAVFAC Centerville Beach, is not mentioned. The Navy used this site in part for its desirable subsea acoustic characteristics. Accordingly, this site should either be evaluated on a par with the others, or its omission should be accounted for in the text. Discuss the November AET site as an alternative site for ATOC.

Response: Reasonable bounds were required in selecting site alternatives. This led to the development of a set of siting criteria found in Section 2.2.3 of the EIS/EIR. Many of the siting criteria directly serve an environmental purpose and effectively offset potential adverse effects, and are thereby considered mitigation measures. Accordingly the project undertook a comprehensive review of all feasible acoustic sites and rated them using an aggregated combination of established criteria. No sites that could meet project objectives and that could reduce impacts were ignored.

Two sets of siting criteria were developed; one to achieve the ATOC project objectives and one to achieve objectives of the Marine Mammal Research Program. Certain locations were found to be strong in only one or two criteria (e.g., bathymetry/bottom topography, proximity of Navy equipment, as in the case of NAVFAC Centerville Beach, etc.), while others had insufficient populations of marine mammals on which to base sound and robust marine mammal research. The latter case reflects the situation with respect to the site (Jasper Seamount) selected for the November, 1994, system Acoustic Engineering Test. That site was specifically chosen for its sparse population of marine mammals, as the test did not include any marine mammal study. Based on an Environmental Assessment prepared by ARPA and UCSD, it was determined that there would be minimal, if any, effects from the HX-554 sound source on marine animals (including endangered species) in the vicinity of the AET. Therefore, in accordance with the MMPA, it was determined by ARPA, in consultation with NMFS, that the implementation of the AET would not affect the quality of the human environment, and that preparation of an EIS was not required by Section 102 (2) of the NEPA or its implementing regulations. It was also determined that the mitigation measures (total of six) employed during the AET reduced the potential impacts to a negligible level. Further, based on this EA, no taking (harassment) of marine mammals or sea turtles was anticipated. This site is deemed inappropriate for a combined ATOC/MMRP project. It may, however, be an appropriate site for a future sound source.

As a result of the site screening process, the project initially deemed six locations sufficiently promising for further consideration. A detailed, comparative evaluation of all six sites is presented in Section 2 of the EIS/EIR.

ISSUE 5: ALTERNATIVE METHODS

a. CONSIDERATION OF ALTERNATIVE METHODS AS SUPERIOR TO ACOUSTIC THERMOMETRY

Comment: Instead of directly measuring temperature change in the ocean, why not measure rainfall on land as an indicator of ocean climate change?

Response: The primary indicator of global climate change in the ocean will be temperature, just as it is in the atmosphere. Rainfall is an indirect measure of climate change, and it depends on local and regional vertical convection, condensation nuclei, altitude and other factors, not simply water vapor pressure and temperature. Even if rainfall were a reliable indicator of climate change, there remains the difficulty of obtaining rainfall measurements over the ocean. Land-based rain gauges cover a small fraction of the earth's surface, and despite many efforts over the past 50 yrs to develop a reliable ocean rain gauge, only a few research prototypes exist. Commercially available, reliable, autonomous ocean rain gauges are still in the development phase.

Comment: Why not use a moored autonomous sound source to broaden the range of choice of possible source sites?

Response: The technical and engineering capabilities required to moor an autonomous low frequency sound source in the deep ocean do not currently exist. Higher frequency, smaller sources have been successfully moored in ocean acoustic tomography experiments, but placing a large, low frequency acoustic thermometry source, four times heavier, in mid-water, has not yet been achieved.

Current battery technology would power an autonomous source for only about a year at the 2% duty cycle proposed for the MMRP. The need to replace batteries means that remote locations are impractical. This constraint outweighs any perceived advantage in locating a source in a remote area believed to contain few marine mammals.

ISSUE 5: ALTERNATIVE METHODS
b. ESTIMATE OF XBT WASTE IN THE OCEAN

Comment: How does the addition of copper, etc. to the ocean by XBTs relate to what is there already?

Response: The percentage of copper in seawater, by weight, is $2x10^{-4}$% (or $2x10^{-10}$). By way of example, the values for chlorine and sodium are 1.90 and 1.06, respectively. Thus, the amount of copper in seawater is about 100 millionth that of chlorine. To determine the weight of this natural copper in the worlds oceans, we multiply ($2x10^{-10}$) by the weight of the water in the world's oceans ($2.608x10^{21}$ lbs) to get $5.216x10^{11}$ lbs of copper occurring in the world's oceans naturally.

The amount of copper introduced into the oceans via surface vessel/air/submarine-launched expendable bathythermographs (XBT/AXBT/SSXBT), expendable sound velocimeters (XSV), and expendable conductivity-temperature-depth probes (XCTD) can be estimated as follows. Based on available sales figures from the prime contractors for these systems (Sparton and Sippican), a conservative estimate for the number of expendables launched through 1994 would be about 5 million. This takes into account both U.S. and foreign navies and research efforts. Using the conservative approximation of 2000 ft length per expendable (actual lengths range from the standard ship-launched XBT of 1500 ft to the deep ocean version of 6000 ft) results in the estimate of 1.7 million nm of copper wire (.0035 in diameter) deposited on the floor of the world's oceans. By volume, this equates to approximately 700 ft^3 (20 m^3). To determine the weight of this volume of copper, we multiply (700 ft^3) by 558 lbs/ft^3 (Marks, 1987) to get $3.1x10^5$ lbs of copper introduced into the world's oceans through the use of expendable devices. This equates to about 1/2,000,000 of the natural copper in the ocean.

ISSUE 5 ALTERNATIVE METHODS
c. RESTRICTED SOURCE TRANSMISSION TIMES

Comment: **Why not turn the transmission off when gray whales are migrating and/or blue whales are nearby? Why not use the sound source only when meaningful and comparable MMRP Pilot Study data will be acquired; i.e., during daylight and during periods when tagged elephant seals, large whales or leatherback sea turtles occur in the study area? Why not restrict sound transmissions during important fishing seasons? If ATOC's function is to accurately measure global warming, then why can't measurements be taken once per day or even once per week? Reducing frequency of transmissions would reduce the need for monitoring animals.**

Response: Action has been taken to reduce the duty cycle for ATOC transmissions from 8% to the 2% figure in the EIS/EIR, for most of the study period. A full 2% duty cycle would be 96 hrs long, consisting of one 20 min transmission every four hours for a day (24 hr period), then three days of silence.

As noted in Section 1.2.2. of the EIS/EIR, one of the objectives of the ATOC project is to determine the minimum duty cycle necessary for valid climate data, including the optimum characteristics of the acoustic signal. All acoustic parameters are subject to review for downward revision throughout the course of the experiment. Technical features have been incorporated into source operational control systems to make any needed changes, and source characteristics (intensity, duration, duty cycle) would be reduced to absolute minimums based on the results of the MMRP Pilot Study and early ATOC feasibility operations.

The gray, humpback and blue whale, the northern elephant seal and at least one species of sea turtle, the leatherback, could potentially be affected in the proposed study area. However, the migration routes of the gray whales takes them close to shore and the Farallon Islands, at least 30 km distant from the proposed ATOC source site. Thus they should not be affected by the transmissions at any time of year. The other marine mammal and sea turtle species mentioned, as well as all species of fish, either do not exhibit seasonality or have different, potentially conflicting seasons which, when combined, argue against restricting transmission times on a seasonal basis. There is no season when animals are not present.

Section 1.2.1 cites as an objective of the MMRP to "detect and evaluate potential effects of ATOC sound transmissions on marine animals, particularly marine mammals and sea turtles." The transmission of sound is essential to achieving this objective. Faced with conflicting or unpredictable seasonality of key species, including fish, there is no scientific basis for restricting further the source duty cycle, and seasonal shut-downs would work against this goal. Further, the restriction of transmissions to daylight hours would severely diminish the utility of the observations, in that there would be large gaps in the data, and any differences in animal behavioral patterns, between daylight and darkness would be undetected. Also, any opportunity to collect information on the deep scattering layer (see Appendix C), which rises closer to the surface at night and where many prey species reside, would be curtailed.

The ultimate value of the MMRP depends upon the ability to study animals before, during and after they have been exposed to the acoustic transmissions of the ATOC source. The ability to study effects of low frequency sound on marine animals must be balanced against experimental objectives; i.e., balancing the goal to study effects of low frequency sound on marine animals with available equipment for observations, costs, weather factors, personnel, etc. A regularized operational cycle, particularly at a site so distant from land, is economically sound and optimizes chances of gaining meaningful data irrespective of seasonal variations in animal species composition and abundance.

Sampling the ocean's temperature must be performed throughout the year to avoid introducing a seasonal bias into the results (i.e., summer temperature greater than winter). A low, steady duty cycle throughout the year is statistically and scientifically preferable to a sporadic duty cycle. The MMRP does require sufficient observations of marine mammal behavior during ATOC transmissions as well as at times of no transmissions, to quantify the effects, if any, of the low frequency sounds on marine mammals. As section 2.2.5 of the EIS/EIR states "...since the purpose of the proposed MMRP is to evaluate the potential effects of the ATOC sound source on all marine mammals and sea turtles, and there is no low season where central California offshore waters lack marine animals, there is no scientific basis for restricting sound transmission times by season.

At some stage during the first year of operations, transmissions must be conducted every day, for two months (8% duty cycle), rather than every fourth day (2%) This period will be deliberately chosen to coincide with the occurrence of the smallest number of marine mammals. This brief series of transmissions will enable tidal corrections to be made to all subsequent acoustic travel times.

Comment: ATOC transmissions should occur when good low frequency hearing animals are present, so that the MMRP can maximize its number of observations, including any possible behavioral reactions.

Response: Comment noted; the preparers agree.

ISSUE 5: ALTERNATIVE METHODS

d. MOORED AUTONOMOUS SOURCE POTENTIAL IMPACT ON SPERM AND BEAKED WHALES

Comment: Placing the source in deeper areas far offshore is likely to be less harmful to marine life, including sperm and beaked whales. Moored autonomous sources could be placed in regions with almost no sperm and beaked whales, thereby significantly reducing encounters with those species.

Response: There may be regions of the ocean that are devoid of sperm and beaked whales that would also have the physical characteristics necessary to conduct viable acoustic thermometry (see criteria in Section 2.2.3). Because of the inherent technical and engineering problems that have yet to be resolved for deployment and operation of remote, deep ocean autonomous sources (see Section 2.2.4.1), site selection for acoustic thermometry sources would necessarily be limited in the near-term by the need for frequent servicing, and might not include those remote oceanic regions that exhibit low densities of sperm and beaked whales. Also see response to Issue 5.a above.

ISSUE 5: ALTERNATIVE METHODS
e. POTENTIAL IMPACT ON COMMERCIAL FISHING

Comment: Address the potential conflict between trawl gear and the facilities (sound source, monitor and cables), including potential loss of access to those fish stocks from the physical presence of experimental equipment, the cost of repairs to equipment and disruption of the experiment should an encounter take place . What is the distribution of fishing activities (especially trawl fishing) in the vicinity of the cables and other equipment? How much larger must the "trawl avoidance zone" be to ensure that conflicts do not increase (i.e., how much additional fishing opportunity will be lost)? Address the potential impacts on salmon, their food sources and salmon fishing. Suggest that the action agency monitor impacts on fish on a site-specific, species-specific, real-time basis, with the effort concentrated during the early phases so that project adjustments could be made, if necessary. Could the sound transmissions disrupt the fertilization of spawning female rockfish (Sebastes spp.), or cause a premature release of larvae?

Response: The footprint of the acoustic source on top of the Pioneer Seamount (depth approximately 980 m) would be 4.7 m^2 (out of some 18 million m^2 on top of the seamount). There would be no separate VLA deployed on the seamount; rather, the hydrophones that would be used for marine animal monitoring would be integrated with the source itself and would have a 100 m vertical extension from the source hardware proper. Thus, the potential for any physical conflict between trawl gear and the facilities located on the seamount (and consequently the potential loss of access to fish stocks there) would be remote. Trawling activity on Pioneer Seamount is minimal, mostly due to the potential loss of trawling gear on rough ground.

The power/data cable would be laid on almost a straight line to Pillar Point, skirting north of Pioneer Canyon. In laying the cable, cable suspensions would be avoided, as cable strumming due to bottom currents (mostly tidal) could lead to abrasion and failure at the suspension points. Bathymetric data indicate that there should be a viable cable route where there are no steep ravines (where cable suspension would be most likely to occur) between the seamount and Pillar Point. Cable suspensions would also be highly prone to conflict with bottom trawl equipment and have to be avoided for this reason also. Most trawl fishing off the central California coast occurs in depths <600 m (primarily flatfishes: Dover, Rex, English sole, etc. and rockfishes) but some gill and trammel net fishing does occur at deeper depths. Deeper than 600 m, it is uncommon to catch rockfish (Sebastes spp.), but more common to catch thornyheads (Sebastolobus spp.) (Miller and Lea, 1972). The deepest dwelling fish in the area are Sebastes aleutianus (about 800 m), S. alutus (about 700 m), and S. aurora and S. melanostoma (about 600 m), with the rest living much shallower (Miller and Lea, 1972). Rockfishes in general have well-developed swimbladders and probably hear fairly well. However, thornyheads, which live deeper, have less well-developed swimbladders, which are partially filled with fats and, therefore, are not expected to hear as well. Many deep observations from noisy submersibles and remotely operated vehicles (ROVs) have indicated that they do not respond to low frequency sounds (or lights) (Cailliet, pers. comm., 1995).

Any concern for possible interaction between trawl gear and the cable from Pioneer Seamount to Pillar Point would start at approximately 10-15 km to the east of the seamount. The

cable location would be disseminated to the public via a Notice to Mariners, as with any other hardware laid on the seafloor would be (e.g., telephone cables, power cables, oil/gas pipelines), with no specified "trawl avoidance zones." Any potential loss of fishing opportunity would be expected to be low based on the following: 1) the quantity of fish landed in fishing blocks overlaying the prospective cable route vs. other areas off the central California coast is very small (CDF&G, 1993); 2) traditional trawling techniques should allow the fishing gear to pass over the small (approximately 6 cm diameter) cable on the bottom; 3) bottom currents would cause much of the cable to bury itself within 6-12 months, further minimizing the potential for interaction with trawling gear

Anadromous species, like Pacific salmon, spawn in streams or lakes and migrate to the ocean. Salmoniform fishes exhibit their highest abundances between 40°N and 70°N (approximately 290 km north of Pioneer Seamount) (McDowall, 1987). The only available audiogram data on this species are for an Atlantic salmon (Salmo salar) (Hawkins and Johnstone, 1978), which delineate a hearing threshold of 105 dB at 75 Hz. Provided hearing thresholds are similar for Pacific salmon, coupled with the belief that salmon rarely, if ever, are found deeper than 400 m (Adams, pers. comm., 1995), it is possible that the sound might be audible to any salmon that may be in the area (within 50 km), but it is believed that the potential for incurring TTS is virtually nonexistent. Any potential impact on salmon fishing within 50 km of Pioneer Seamount should be negligible, as the abundance of any of the salmonid fishes (including salmon and trout) is low throughout the area, especially at depths >200 m (Cailliet, pers. comm., 1995). Because of this, any ATOC-like operation would be highly unlikely to have any impact on salmon, trout (including steelhead), or any other fishes in the vicinity of Pioneer Seamount. The commercial exploitation of all these fishes, even thornyheads, is relatively small at the depth of the ATOC source (Cailliet, pers. comm., 1995).

In addition to the above, both swordfish (Xiphias gladis spp.) and opah (Lampsis guttastus spp.) are taken in gill nets set near the surface. They are both epipelagic fishes and neither occur near Pioneer Seamount, nor do they reproduce anywhere near there. Both also have very small otoliths (ear bones) and, therefore, probably do not have the capability to hear low frequency sound well (Cailliet, pers. comm., 1995). Lingcod (Ophiodon elongatus) reportedly occur at a maximum depth of approximately 500 m, and should not be found on Pioneer Seamount. This fish comes inshore to reproduce during the late spring and summer months, where the male makes a nest and attracts the female to spawn, then fertilizes the eggs and protects them. This occurs far inshore where there would be no influence from the sound transmissions.

The MMRP includes the mitigation measure of attempting to evaluate the potential for increased predation on fish, and the potential for impacts to the behavior of fish or invertebrates, relative to ATOC source transmissions, by monitoring fish stock assessments. It is recognized that the time lag for these data is measured in months, if not years. All aerial/vessel survey, observation, and photo-ID efforts would document any unexpected or peculiar activities (examples of these unexpected events could include large numbers of fish seen dead or disabled. Further, there would be periodic contact made with local commercial fishing organizations (particularly at the seaport of Princeton) to ascertain first-hand if their catches in the vicinity of

Pioneer Seamount have increased, remained the same, or decreased. These efforts would be concentrated at the outset of the MMRP, such that any necessary adjustments could be made as early in the program as possible.

There has been no documented evidence in the oceanic environment of low frequency sound transmissions disrupting the fertilization of spawning fish, or causing premature release of their larvae. As noted in the EIS/EIR (Section 4.3.2.2.1), under laboratory controlled test conditions in an aquarium, the viability of the eggs of one species of estuarine carp (Cyprinodon variegatus) was significantly reduced when a low frequency noise source (40-1000 Hz) at 105-120 dB, which was approximately 40-50 dB above ambient noise conditions, was maintained over a number of consecutive days. Although at first it appears that this lab test might be relatable to ATOC source transmissions, it must be noted that there are significant differences between the laboratory test protocols and ATOC acoustic parameters: 1) the test fish were river carp, not found at Pioneer Seamount, 88 km offshore, or along the proposed cable route, 2) the test was conducted in a tank, thus offering the fish no means of eluding the sound stimulus, whereas the ATOC source is in an unconfined area so that species may depart the area if they so choose, 3) the tank test source was transmitting over a number of consecutive days, whereas the ATOC source would be transmitting for the most part 2% of the time (intermittent every fourth day).

Of the 55 species of rockfishes (genus Sebastes) that inhabit California offshore waters, few live deeper than 600 m (e.g., maximum depth for black rockfish is about 100 m, gopher rockfish about 60 m), and only the two species of Sebastolobus are common at that depth (Miller and Lea, 1972). Most (if not all) rockfish in the genus Sebastes are oviviparous, meaning there is internal fertilization, the egg develops inside the mother with maternal contributions of nutrition into a larva, which is then extruded into the plankton. Because these types of rockfish are not expected in the vicinity of Pioneer Seamount, the potential for source transmissions affecting the reproduction process should be minimal. Rockfish of the genus Sebastolobus (thornyheads), could possibly be found near Pioneer Seamount, and they have the same reproduction technique, but send their fertilized eggs in clumps to the surface, where the potential for impact from the source transmissions should be minor.

A 1987 study (Skalski et. al., 1992) addressed the reaction of rockfish (Sebastes) to sound produced by a single percussive airgun. Behavioral changes were evident in rockfish schools located 1.9-20.4 km from the airgun. Their dispersal resulted in a decline in fishing vessel catch-per-unit-effort of 52.4%. It is erroneous to compare the sound produced by a seismic airgun (and its potential effect) with low frequency sound produced by ATOC, as there are some very important differences between airgun "shots" and the proposed ATOC transmissions: 1) airguns are deployed from moving vessels which, over time, would encompass a broad area of potential impact on rockfish habitats, 2) the nominal source level for a seismic airgun is 255 dB which is 1,000,000 times louder than ATOC's 195 dB, and 3) seismic airguns primarily operate in the upper water column, where the majority of fish are found, whereas the ATOC source would be located at approximately 980 m depth.

ISSUE 6: MMRP RESEARCH PROTOCOL
a. POTENTIAL FOR DETECTING HARM TO MARINE MAMMALS

Comment: For the cetaceans the chances of detecting any of the unacceptable effects listed are virtually zero. There are no high-use areas near the source site. Dead animals are rarely observed at sea, and strandings are rare events, so that even if there were sightings of dead animals at sea or strandings it would be impossible to show a statistically significant change in these rates. There are no measures for cetaceans of emaciation, stress, or disease. There are no estimates of calving rates, and population estimates have coefficients of variation (CV's) of around .5 so there is no possibility of detecting even an almost complete and sudden extinction of a species. MMRP cannot determine if the system is 'safe' for marine mammals (as the EIS claims). At best it can fail to determine that ATOC is harmful. Possible physiological effects (most likely via the stress response) have no way of being detected

Response: Although the proposed source site, Pioneer Seamount (Alternative 3-1) does not appear to be a high use area (EPA, 1993), shipboard and aerial surveys have documented the abundance and distribution of marine mammals in the area. If a significant change in this pattern occurs during sound transmission, the MMRP should be able to detect it (based on a statistical power analysis for the MMRP protocol, Appendix C).

While dead animals are rarely seen at sea, and strandings are rare, any such occurrences in the study area will be investigated. A stranding network is in place in Monterey Bay and any stranded animal would be examined.

The potential for physiological effects on most marine animals, as listed in the EIS/EIR is low. Of the cetaceans, it is primarily mysticetes that are believed to hear well in the low frequencies that will be produced by the ATOC source. Of those animals, none are known to dive to the depths (800 m) to within 178 m of the source where the sound could induce a temporary threshold shift in hearing. Sperm whales and elephant seals may have some low frequency capability and can dive > 800 m, so they could theoretically enter the 150 dB sound field where TTS could occur. Beaked whales could also dive to within the 150 dB sound field but are not believed to have low frequency hearing capability.

It is impossible to directly test for emaciation, stress or disease in free-swimming cetaceans. However, behavioral indices of these physiological effects will be measured as feasible, via surveys of distribution and abundance to ascertain quantifiable and substantive changes. It is likely that a stressed animal will leave a non-critical habitat rather than remain in an area that will cause physiological harm. The Pioneer Seamount area is not an important feeding or breeding site for cetaceans and is not considered a critical habitat (EPA, 1993). To test for any change in the abundance and distribution of animals, shipboard and aerial surveys of marine mammals in the area would be conducted.

To further test for changes in behavior that may be associated with stress from the sound source, some elephant seals will be tagged to monitor their diving behavior.

Comment: Except for gray whales, there are no estimates of calving rates...there is no possibility of detecting even an almost complete and sudden extinction of a species.

Response: Some calving rate estimates exist for humpback whales in Hawaiian waters (Herman and Antinoja, 1977; Baker et al., 1987) and California waters (Steiger and Calambokidis, in press). Whale calves will be identified visually and acoustically whenever possible so that distribution and abundance estimates can be compared between the times prior to, during, and after ATOC transmissions. By incorporating the advice and recommendations of marine animal research organizations into the MMRP protocol, the best available detection techniques would be utilized to ascertain any acute or short-term effects in near real-time in the MMRP. Generally speaking, the extinction of a common species could not go undetected; although extinction of an extremely rare species could go unnoticed and unproven for quite some time. However, there is no reasonable basis for hypothesizing that the proposed two-year project could kill any individual marine mammals, let alone result in population extinction; so this is not a research focus.

ISSUE 6: MMRP RESEARCH PROTOCOL
b. ADEQUATE TIME FOR PILOT STUDY

Comment: While the Pilot Study says it will measure short-term behavioral changes and long-term acute changes, the only effects considered 'unacceptable' are long-term effects (abandonment of high use areas, increase in sick and dead animals, decrease in reproductive rates). Since there is no way to determine in the 6-10 month Pilot Study whether these long-term effects are taking place, there is a high probability of reaching an unsubstantiated conclusion of no significant impact. The short Pilot Study period is insufficient to establish the needed baseline data of species population size and distribution, habitat use, and acoustic sensitivities. The types of observations being done may provide some indicators of direct, short-term physical responses to human-generated sounds, but they cannot provide answers to the long-term impacts and indirect effects

Response: The Pilot Study is not designed to determine long-term or subtle changes. It is designed to examine acute and short-term effects (Table C-1). One can only examine long-term effects after the source has been in operation for a long period of time (several years). There is no intention for the MMRP to end after the Pilot Study. The Pilot Study is designed to establish whether animals respond to the operation of the source. If, after the Pilot Study, there would be sufficient results to indicate that the short-term responses of animals are either non-existent or of minimal concern, the follow-on MMRP research efforts would examine potential longer-term effects of the project.

ISSUE 6: MMRP RESEARCH PROTOCOL
c. ADEQUATE TIME TO ANALYZE PILOT STUDY DATA

Comment: The ATOC schedule has only allowed one month to analyze the MMRP Pilot Study data. ATOC's own independent MMRP Advisory Board has stated that it is unrealistic to expect the MMRP to complete a substantive analysis of all types of behavioral reactions, and to prepare a comprehensive report suitable for external review, within one month after the end of data collection; and that site-specific, in-the-field, semi-empirical modeling capability and quick-look analysis will be needed to complete and report on some of the main analyses within the one month time span. To ensure that decisions to proceed with the ATOC project are based on sound science, not solely on vested interests in the project, review of Pilot Study and monitoring program data must be made by a technically qualified group independent of the project, and the independent group's findings must be released for public scrutiny. Continuation of the project, and any modifications to the MMRP, must be contingent on the group's findings, which must be endorsed by NOAA's Sanctuaries and Reserves Division.

Response: The MMRP Advisory Board has recommended that: 1) site-specific, in-the-field, semi-empirical modeling capability and quicklook analysis would be needed, and this is planned; and 2) the types of information and level of detail that would be required to be collected during the MMRP Pilot Study be determined in advance. Site-specific, in-the-field efforts would be more complex at the proposed Pioneer Seamount site (Alternative 3-1) (see Section 2.2.1) vs. the Sur Ridge site (preferred site) (e.g., greater distance from shore, fewer numbers of certain species present, etc.), but would still be the objective. The types of information and level of detail planned for data collection efforts during the Pilot Study are discussed in Appendix C. It is unrealistic to expect the MMRP to complete a substantive analysis of all types of behavioral reactions, and to prepare a comprehensive report suitable for external review in 1 to 2 months. However, should any marine mammal responses falling into the "shut-down criteria" be observed, routine ATOC operations would not begin until they were fully identified and evaluated.

The goal of the MMRP's quicklook, 1-2 months after completion of the Pilot Study, would be to identify and report on any observed acute or short-term effects seen that could be directly relatable to the ATOC source transmissions. Analysis of subtle behavioral responses, not considered to warrant shutdown even if they do occur, would require more time to complete. Indeed, a major objective of the MMRP is to identify whether these subtle effects do occur and, if so, characterize the circumstances. This will require a longer observation period to complete (several years).

Bi-monthly status reports of results of ongoing data analyses and modeling efforts would be distributed throughout the Pilot Study to technically qualified groups independent of the project [i.e., the Marine Mammal Commission (MMC), NOAA's Sanctuaries and Reserves Division (SRD), and the Pacific Regional Scientific Review Group (PRSG)], along with the Marine Mammal Research Program Advisory Board (MMRP AB) and National Marine Fisheries Service (NMFS). All of the independent groups' findings, based on the bi-monthly reports and the quick-look after the Pilot Study, would be available for public release. Continuation of the

project would be contingent on the Scientific Research Permit (SRP) conditions issued by NMFS, who, after the Pilot Study, would assess all independent groups' findings in reaching the decision whether or not to approve continuation of the research, including commencement of the ATOC feasibility transmission schedule.

Comment: ATOC climate-related transmissions should not proceed until the completion of the MMRP Pilot Study final report.

Response: If, at any time, during the conduct of the 6-10 month MMRP Pilot Study, quicklook data reveal any adverse effects (acute or short-term effects [Table C-1]) on marine species attributable to the source transmissions, operations would be suspended pending a review of the MMRP protocol, and decisions would be made as to whether and, if so, how, the study should continue. In the absence of identifiable adverse effects on any marine animals, it likely would be considered appropriate to proceed with the MMRP under the climate-related transmission schedule.

ISSUE 6: MMRP RESEARCH PROTOCOL
d. MINIMIZED EXPOSURE TO SUBSEA SOUNDS

Comment: Increasing the efficiency of the sound transmissions does not "reduce the exposure of marine animals to sound." It reduces the exposure of animals to more intense sound, but as the sound propagates further, a greater amount of ocean, thus life, is affected.

Response: By increasing the efficiency of the sound transmissions, it is possible that a lower source level and/or a shorter duty cycle could be used for the climate-related transmissions. These factors would reduce the exposure and levels of exposure of marine animals to the sound. Required source levels are those that will ensure the minimum level reaches the receivers so that the digital sequences can be combined and stacked for processing. Based on the processing of early receptions, the minimum required source level could be identified.

Comment: Surely a more efficient transmitting sound source can be developed if it is to be mounted in the sanctuary. If the experiment is allowed to proceed, and it is discovered that the output power is too low for reliable reception, will the power be increased?

Response: The proposed source location has been moved out of the MBNMS. The planned location on the southwest end of the top of the Pioneer Seamount should afford some attenuation to the north and northeast, reducing sound levels in those directions. The output power of the source will not exceed the pre-arranged thresholds listed in the research protocol (Appendix C).

Comment: Instead of designing a research program to specifically study the effects of low frequency sound on marine resources, Scripps relegates the subject to an incidental and subsidiary adjunct to the ATOC project. There is a fundamental deficiency in all the proposed protocols of assessing impact on marine resources...all the observations deal only with marine mammals on the surface or very shallow depth.

Response: The MMRP is a prerequisite for conducting any climate study transmissions. Its results would determine whether climate study transmissions would continue. The MMRP protocols have incorporated a number of scientific methodologies to include research and observations on marine animals in the upper levels of the water column, and to the extent feasible, in the lower levels, in proximity to the source. See Appendix C.

ISSUE 6: MMRP RESEARCH PROTOCOL
e. BOAT-BASED ACOUSTIC PLAYBACK EXPERIMENT

Comment: Appendix C cites preliminary observations that suggest that planned methods may not be adequate and that playback experiments may be required within Monterey Bay. The MMRP Advisory Board recommends that boat-based playbacks should be seriously considered for the California area, with source levels near 175 dB suggested. Experimental designs with a moveable source would be much more efficient and less potentially damaging to the environment. A playback study would allow the California MMRP Research Team to be mobile and go where cetaceans, pinnipeds, and sea turtles are in a short period of time, and attain the sample sizes to increase the statistical power needed.

Response: Any playback experiments associated with the ATOC project that may occur within the MBNMS would necessarily have to be authorized and approved via the appropriate federal and state permits. The recommendation by the MMRP AB to conduct boat-based playbacks has been adopted for sperm whales in the Atlantic Ocean (see Appendix C). A boat-based acoustic playback experiment was also planned for offshore of the north coast of Kauai prior to the conduct of any ATOC transmissions off either Hawaii or California. However, this effort was delayed due to local concerns. Boat-based acoustic playbacks are now included in both the revised Hawaii and California MMRP Research Protocols, and the respective SRP applications for those sites.

Comment: Conduct the playback experiment in Hawaii before proceeding with the California ATOC source. The situation in Hawaii provides for a better controlled experiment with shore observations and baseline data on humpbacks. Adverse effects would be easier to determine there; if none are noted, then begin the California ATOC experiment.

Response: Playback experiments are planned for both Hawaiian and California waters; however, the schedules will be dictated by the timing of the permitting process and availability of indicator species. See also response to comment above relative to conducting a playback experiment in Hawaii before proceeding with California ATOC source transmissions.

ISSUE 6: MMRP RESEARCH PROTOCOL

f. USE OF NOISE FROM VESSELS TO ASSESS IMPACT OF LOW FREQUENCY SOUND ON MARINE MAMMALS

Comment: No new source of noise is required to study marine mammals' response to low frequency sound. There are plenty of already-existing sources of noise that could be used for a much more rigorous study than ATOC proposes.

Response: The 1994 National Research Council report on Low-Frequency Sound and Marine Mammals; Current Knowledge and Research Needs states "There is need for planned experiments in which the received level of the sound and the behavior of the animal can be studied together. Such investigations would probably be logistically complex and would require scientific permits...It is the belief of this committee that an accelerated program of scientific studies of the acoustic effects of low frequency sound on marine mammals and their prey (including the studies described in Chapter 3) should be undertaken. These studies should be designed to provide the information needed to direct policies that will provide long-term protection to the species."

The use of existing shipping noise in the ocean to conduct studies of the potential impact of LFS on marine mammals is beyond the scope of the MMRP's charter and would be prohibitively expensive to include in the MMRP Research Protocol. The ship source characteristics (frequency, bandwidth, waveform, duty cycle, source levels) must be known during complex, calibrated studies to verify the experimental parameters that would permit the measurements needed to provide statistically meaningful results on which to base test findings that would be defendable to scientific peer review.

The proposed MMRP will collect ambient noise data using the passive receiver arrays in the vicinity of the ATOC source (hydrophones on the source proper, the Pt. Sur SOSUS HLA, sonobuoys). This would occur during time periods before Pilot Study signals commenced, and before and after each transmission period. MMRP Research Team members would attempt to correlate received levels between ATOC transmissions with known natural and human-produced sources (storms, ships, aircraft) in their efforts to ascertain some of the potential effects of non-ATOC sounds on marine species. This methodology is included in the MMRP Research Protocol (Appendix C).

ISSUE 6: MMRP RESEARCH PROTOCOL
g. SOURCE TERMINATION CRITERIA

Comment: Better defined, objective thresholds for adverse impacts that would result in termination of ATOC signals must be in place, and environmentalists and citizens-at-large must play an important role in defining and implementing those thresholds before ATOC is allowed to proceed further. Criteria that clearly define the kinds and levels of adverse impacts that would result in a cessation of ATOC signals are critical. In addition, the criteria should be flexible enough to allow for appropriate action should unexpected impacts be observed. The DEIS should specify that the criteria used to determine significant effects found in the Pilot Study must be approved by NOAA and must be linked to specific actions regarding further project operations.

Response: The shut-down guidelines defined in the MMRP Research Protocol, Appendix C, now based on an MMRP to be conducted at the proposed Pioneer Seamount site (Alternative 3-1) vice the Sur Ridge site (preferred site) in the MBNMS, reflect discussions with federal and state organizations (NOAA/NMFS, MMC, NMML, MBNMS Advisory Council, etc.) and the MMRP Advisory Board . These termination criteria would be required under a Scientific Research Permit, and could be implemented by the marine mammal biologists conducting the MMRP, with oversight by NMFS. Bi-monthly Pilot Study status reports will be a matter of public record and made available to all interested individuals/agencies upon request. The criteria for shut-down have been formulated to be as flexible as possible, with the *proviso* that the ultimate objective is to ascertain any potential adverse impact of low frequency sound on marine animals.

Comment: A more accurate and less extreme set of criteria must be identified as potential "Acute Responses" for ATOC suspension.

Response: The nature of assessing the potential impacts of low frequency sound on marine animals requires that experienced marine mammal biologists observe the animals' activities in the wild. Previous research has documented that many marine animals, particularly cetaceans, often exhibit random behaviors throughout their normal course of daily activities, in some cases for no apparent reason. Thus, the only way to determine if low frequency sounds may cause acute and/or short-term responses is to observe them occurring, (i.e., their type, time of onset, duration, etc.).

Comment: There is no evaluation of the possible advantages of terminating all sound emissions upon detection (visually or acoustically) of suspected sensitive animals (gray whales, blue whales).

Response: This technique would prove counter-productive as the objectives of ascertaining the potential effects of low frequency sound on marine mammals could not be met. See response to comment above.

Comment: The MMRP should be expanded to include a criteria list to help differentiate between behavior modifications that could be considered minor (e.g., temporary deflection of direction of movement away from the sound source) and major (e.g., sea turtle floundering on the surface during sound transmission) as they pertain to potential modifications in the sound transmission cycle.

Response: Appendix C identifies the criteria to be applied. For example, a floundering sea turtle would fall under behavioral response category 6.b. Short-term Response (Potential injurious behavior [outside known baseline activities]).

Comment: We recommend that the California FEIS/EIR include the protocol for actual decision-making to shut-down, similar to that included in the Hawaii DEIS.

Response: See Appendix C for appropriate text changes that include the decision-making protocol.

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h. USE OF REPRODUCTIVE OUTPUT AS A MEASURE OF LOW FREQUENCY SOUND IMPACT

Comment: What about measuring reproductive output--the most essential indicator of a population's well-being--for invertebrates and other small marine animals that are expected to provide minimal measurable indication of possible acoustic impacts?

Response: The MMRP includes the monitoring of reproductive output, to the extent practicable and feasible, for commercially-taken marine animals (e.g., fish, sharks, some invertebrates, such as squid and octopus) using fish stock assessments (via CDFG-catch-block landing data; LTPY, CPY and RAY data from NMFS, and interaction with the PCFFA). CEQA Mitigation Measures 10-1 and 11-1 refer to fish and sharks, and text changes to Section 4.3.2.3 address invertebrates.

ISSUE 6: MMRP RESEARCH PROTOCOL

i. AGREEMENT WITH MMRP ADVISORY BOARD RECOMMENDATIONS

Comment: Why is only one month allotted for the evaluation of the MMRP Pilot Study data, when ATOC's own Advisory Board has stated that this is an "unrealistic timetable?"

Response: As noted in Table 1.1.2-1 and the MMRP Research Protocol in Appendix C, the goal would be to have a quicklook report available 30 days after the conclusion of the Pilot Study. Data results will be compiled continually during the Pilot Study and disseminated to all concerned through bi-monthly status reports. This will facilitate the rapid turnaround of a quicklook, but it is recognized that it could take up to twice the time (2 months).

Comment: The MMRP Advisory Board's recommendations seem not to be heeded with respect to: 1) consideration of boat-based playbacks, 2) request for additional rationale for selecting a 4-7 day duration for the test periods and a 7-10 day duration for control.

Response: The MMRP Advisory Board's recommendation to consider the use of boat-based playbacks is addressed above. The request for additional rationale for the test period and control durations has been overcome by events in that the proposed site for the project has been shifted from Sur Ridge (preferred site) in the MBNMS to the Pioneer Seamount (Alternative 3-1), well away from the sanctuary environs. See Appendix C for the revised test period and control durations for this site.

Comment: As part of NMFS' duty, it is requested that they call on its qualified scientific statisticians located in Seattle, Washington [NMML] to review the MMRP and confirm whether it can produce statistically significant data, and if it meets the stringent standards required by NMFS in other projects affecting marine animals.

Response: A NMML representative has the status of "observer" on the MMRP Advisory Board and, as such, that NOAA laboratory has always been cognizant of the potential for statistical significance during the development of the MMRP Research Protocol. The proposed MMRP research protocol and the results of the statistical power analyses for the proposed site (Pioneer Seamount), performed by the University of Washington, Cornell University, and the National Marine Mammal Laboratory are found in Appendix C, and have been reviewed and considered adequate by the MMRP AB.

Comment: With respect to tagging studies, the proposed sample sizes for elephant seals, California sea lions, blue whales, and leatherback sea turtles are far too small to have statistical significance. As stated by the Advisory Board, a sample size on the order of ten is "unlikely to be a sufficient basis for meaningful statistical or final conclusions."

Response: This comment has, to some extent, been overtaken by events, in that the MMRP would now take place in the vicinity of the proposed Pioneer Seamount site vice Sur Ridge in the MBNMS. See Appendix C, MMRP Research Protocol, for rationale for statistical significance relative to the proposed tagging studies.

ISSUE 6: MMRP RESEARCH PROTOCOL
k. DETERMINATION OF SIGNIFICANT IMPACT

Comment: In several places in the DEIS/EIR are found variants of "the lack of reliable information justifies the assumption of an unknown impact for purposes of this EIS/EIR, but at a less than significant level." "Less than significant" is based on statements that "exposures to subsea sounds will be minimized whenever feasible," which is vague but indicates that first consideration will go to experimental protocol in situations where impacts are not known in advance. The presumption that impacts to mysticetes, odontocetes, pinnipeds, sea turtles, fisheries, and invertebrates will be either "less than significant" or "not significant" because of the lack of information, the patchy distribution of the species, and the unlikeliness of significant exposure is simply unfounded. CEQA regulations require that evaluation of impacts be based on scientific and factual data. We conclude, on the basis of all information presented, that other than the repeated use of the phrase "presumed to be less than significant", Scripps has failed to make a convincing case for the eventual finding of no significant impact.

Response: Most of the findings in the EIS/EIR regarding the significance of impacts to marine mammals and other special status species are based upon a combination of factors, including the types and degree of potential impacts to individual animals that are anticipated from currently available information, the numbers of animals that might be affected, the portion of the range of those animals that could be affected, etc. Generally, the standards of significance applied for determining the level of an impact on special status species through habitat reduction or impairment are framed in terms of potential impacts from the standpoint of the species as a whole. Many of the comments regarding the significance of impacts fail to distinguish between potential impacts to individual animals as compared to the species as a whole, fail to distinguish minor as compared to major impacts, and fail to relate the impact discussion to the standard of significance.

Since the significance conclusions are based upon a combination of factors, it is important to distinguish the level of uncertainty faced when evaluating each of those factors. Specifically, there is a considerably greater degree of certainty regarding the abundance and distribution of special status species than there is concerning the potential impacts on individual animals of various species at particular noise level exposures. A conclusion that a less than significant impact to the species will result from the project, even where information concerning one or more of these factors is uncertain, can be supported by information regarding the other factors if the combination of factors warrant that conclusion.

In most instances of the type identified in the comment, it is acknowledged as uncertain whether given noise exposures could produce behavioral disruptions, TTS or similar effects on individuals. However, it can still be concluded that potential impacts to those species are less than significant given the low abundances of animals in the study area, the infrequency of close encounters, and the relatively large range of most of the special status animals (and correspondingly small portion of the range affected by the ATOC source transmissions [i.e., 12-18 km radius of 120 dB sound field around source]). For example, even assuming, as calculated in one comment, that approximately one sperm whale would be exposed to 150 dB sounds

during the initial study period, and that this exposure could produce a TTS in that animal, that single event would not constitute a significant impact on sperm whales under the articulated standard.

As stated in the EIS/EIR, the conclusions regarding the significance of impacts for CEQA purposes are not intended to imply that less than significant impacts (i.e., potential annoyance or TTS in individual animals) are unimportant, only that they do not surpass the formal thresholds under CEQA that trigger various additional procedural requirements. In fact, mitigation measures (and a monitoring program) are applied to many of these less than significant impacts even though not strictly required by CEQA or NEPA, in response to the public concern that has been expressed regarding those potential impacts -- a concern shared by the preparers and by the researchers involved in this project.

Comment: The National Research Council concluded that "Although we do have some knowledge about the behavior and reactions of certain marine mammals in response to sound, as well as about the hearing capabilities of a few species, the data are extremely limited and cannot constitute the basis for informed prediction or evaluation of the effects of intense low frequency sounds on any marine species." The DEIS consistently makes the error of concluding that if no evidence for a significant impact exists, the impact must be nonexistent, and in many cases overextends assumptions and inferences drawn from data on other species to conclude that impacts on marine mammals are likely to be less than significant. In may cases, evidence for significant impacts does not exist because no research has been conducted.

Response: See response to comment above. The National Research Council concludes that data in this area are limited, and research on the potential impacts of low frequency sound on marine animals is needed.

In each case of a finding of "less than significant," the EIS/EIR lists assumptions, available supporting data, and analyses for reaching that conclusion. The EIS/EIR considers that a potential impact is deemed to exist only if some evidence clearly exists on which to base that premise, or through the application of prudent scientific reasoning (e.g., the potential for causing TTS in a non-diving seabird must be rated as negligible). The CEQA criteria for significance are cited in the Executive Summary (CEQA Guidelines, Title 14, California Code of Regulations, Appendix G; University of California, 1991), as are the criteria for assessing the potential for non-negligible (acute or short-term impacts [Table C-1, 6 (a and b) and 7 (a-c)]) impacts on marine animals (adopted from MMC recommendations concerning these criteria).

Comment: The MMRP is not a well-controlled study, and cannot discover the most important impacts to the health of cetacean populations.

Response: A broad range of marine biological and acoustic research techniques were considered in developing the MMRP Research Protocol found in Appendix C. The control mechanisms have been thoroughly analyzed by independent scientists in order to optimize, within the limits of available funding and logistical resources, the potential for observing important biological and behavioral effects that cetaceans (and pinnipeds and sea turtles) could

exhibit. Researchers would use visual and acoustic methods to maximize the possibility of discovering any impacts, whether in the wild (vicinity of Pioneer Seamount), in acoustic playback experiments that would be directly relatable to species at the source site, or in threshold testing on captive animals in laboratory situations, also to be correlated with animals at the source site.

Comment: "Leq calculations indicate that less than significant increases in average ambient noise levels will occur..." You have not defined what "significant" means so this is meaningless.

Response: The commonly accepted standard of significance for noise impacts evaluates whether: 1) the project would generate noise that would conflict with local noise ordinances, 2) the project proposes land uses that substantially increase noise levels in areas of sensitive receptors, 3) whether the land use projected by the project is compatible with baseline noise levels, and 4) whether State of California and local guidelines for long-term exposures are exceeded. Since no formal noise standards apply directly to the activity, the applicable criteria is 2, whether there will be a "substantial" increase in noise. The use of Leq averaging procedures is commonly accepted when addressing noise impacts and for that reason conclusions regarding noise increases on an Leq basis are presented to be consistent with common practice.

In addition, extensive discussions of potential noise impacts are included in the EIS/EIR, and they are also evaluated under the criteria for significant impacts to special status species, discussed above.

Comment: The summary on the DEIS discussion of effects of ATOC on mysticetes, in Table 4.3.1.1.3-1 is a study in self-contradiction. On every one of the seven mysticetes listed there appear, under the column marked "Potential Effects", the phrases "Uncertain; however, no acute responses expected." The routine of self-contradiction and multiple caveats continues with the treatment of effects on odontocetes, pinnipeds, fissipeds, and sea turtles. Yet another tactic employed by Scripps on the assessment of impact is the illogical equating of "low rate of occurrence of significant effect" with the conclusion of "less than significant impact."

Response: See response to comment above. Uncertain does not mean unknown. Based on the best possible combination of available data and interpretation of scientific estimates of hearing specialists, marine biologists, and underwater acousticians (section 4.3.1.1), the EIS/EIR concludes that neither acute nor short-term responses (Table C-1) from mysticetes due to low frequency sound transmissions from the ATOC source would be expected. Note that "acute and short-term response" refers to the non-negligible criteria cited previously. This does not rule out the possibility that avoidance or abandonment of a local area of unpredictable radius around the source could possibly occur; this would likely be partial rather than complete (i.e., a reduced density or frequency of occurrence).

The comment on odontocetes, pinnipeds, fissipeds, and sea turtles is difficult to support, particularly in light of the fact that no more that four of these group/species (sperm whale, beaked whales, elephant seal, leatherback sea turtle) are believed to have any measurable possibility of approaching the source close enough to incur a TTS, and the potential for that

occurrence would be expected to be low. Temporary behavioral disruption could occur for those species with good low frequency hearing capabilities (e.g., baleen whales) that were within the 120 dB sound field during sound transmission (mostly 2% duty cycle), but because Pioneer Seamount has not been identified as an important habitat for baleen whales, it would be expected that the whale(s) would depart the area during the 5-min ramp-up if the sound annoyed them.

Comment: The DEIS/EIR states that Atlantic bottlenose dolphins and sea turtles receive sound through other body receptors and not solely with ear structures. Therefore, even if a species has not been documented to have low frequency hearing, it should not be dismissed as not being affected by the sound. The MMRP should have protocols to characterize potential effects to all species observed in the sound source vicinity, not just those with low frequency hearing.

Response: The EIS/EIR does not dismiss the potential for low frequency sound reception other than via ear structures as unimportant. The MMRP research protocols and shut-down criteria are designed to apply to any method of sound reception by the animals that would be under observation.

Comment: It is never made clear in the DEIS/EIR what the consequences to ATOC will be if the results of the MMRP prove inconclusive and it is never made clear that ATOC will not proceed if its transmissions are found to harm marine mammals and cannot be mitigated.

Response: Appendix C and text changes to Section 2.2 and Section 4 include the criteria that "Based on findings of no acute or short-term impacts (Table C-1, 6 [a and b] and 7 [a-c]) to marine animals during the Pilot Study, ATOC feasibility operations would be initiated (in accordance with the schedule provided as Table 1.1.2-1)." Climate-related transmissions would not commence until after review of the MMRP Pilot Study quick-look results by NMFS, MMC, MMRP AB, and PRSG, using the previously discussed criteria (see response above).

Comment: The DEIS uses CEQA terms of "significant" and "less than significant" but fails to offer bridging definitions to relate to federal MMPA terms of "negligible" and "non-negligible." To fulfill environmental impact requirements for both California (CEQA) and NEPA, definitions that bridge this gap must be provided in the joint FEIS/EIR. The FEIS/EIR should provide definitions, which the DEIS/EIR lacks, of terms for effects on marine animals; e.g., significant effect, less than significant effect; minimal effect; adverse effect; unacceptable effect.

Response: CEQA definitions for significance are stated in the Executive Summary. The term "negligible", as related to SRPs, is not defined in the MMPA, CEQA, or NEPA. The dictionary definition of "negligible" is "so small or unimportant or of so little consequence as to warrant little or no attention" (Mirriam-Webster, 1994). Other definitions for the potential effects on marine animals are provided in Appendix B of the EIS/EIR. The EIS/EIR provides criteria for negligible vs. non-negligible that would be utilized in MMRP activities (see response above).

Comment: The document oversimplifies and overstates the section on irreversible environmental changes. While there is no evidence for massive impacts, it is still inappropriate to state that the protective measures in the proposed protocol "will prevent any irreversible harm to marine mammals or other organisms in the affected environment." In fact, the project could kill a variety of small organisms (during equipment deployment on the benthic fauna, through effects on nearby pelagic plankton and fish), but the overall effects on the marine populations are expected to be negligible according to information provided in the DEIS/EIR.

Response: Text changes to the EIS/EIR reflect the response to this comment. However, because mitigation measures (see Executive Summary) are included in the proposed project protocol to minimize any irreversible harm to marine mammals or other organisms in the affected environment, these activities are not expected to result in significant changes to the marine environment. Irreversible harm could occur on a localized basis to some organisms (e.g., lichens, mussels, barnacles, limpets, anemones) that might be physically impacted during equipment (i.e., source, cable) deployment. However, in relation to the approximately 18 million m2 on top of Pioneer Seamount, the acoustic source's footprint of 4.7 m2 is insignificant, as far as physically affecting benthic fauna or flora populations at the source site. The potential for the acoustic transmissions adversely impacting benthic fauna (that could not, or would not, depart the immediate vicinity of the source during the ramp-up period) or benthic flora in proximity of the source, would likewise not be expected to be significant in terms of population effects. Typically at the depth of about 980 m (where the Mesopelagic zone [200-1000 m] changes to the bathypelagic zone [1000-4000 m], there is no light at all (Castro and Huber, 1992), meaning no photosynthesis can take place. Hence, there should be minimal plant life (or herbivorous animals) on the seafloor where the source would be located, and any that would be there would not be expected to have low frequency hearing sensitivity (see Section 4.3.2.2, 4.3.2.3, and 4.3.2.4).

Comment: Although data concerning stock structure and population delineations are incomplete for many if not most of the cetacean species described in the EIS/EIR, there is no discussion of the relationship between the status of population sub-units and potential effects of the proposed project. If the analyses are based solely on cetacean (and in some cases pinniped) density and distribution information cited in the document, it is not clear if the potential for impacts are related to the percentage of individual animals of those that might be present within or pass through the project area over a season, a year, or the course of the project; or if these potential impacts are evaluated against a known population unit. This issue is addressed only in Appendix F where it is clear that the unit of analysis is the species level. In terms of assessing or determining the significance of potentially adverse impacts, it may be more appropriate to use population sub-units or stocks where these are known rather than species.

Response: Because data concerning marine animal stock structure and population delineation are incomplete for many of the protected species addressed in this EIS/EIR, most of the discussions in the section on the potential effects of low frequency sound transmissions (Section 4) deal with the possibility of impact on a particular species, based on that species' pertinent biological and spatial characteristics (i.e., low frequency hearing sensitivity, dive depth profile, distribution and abundance, and known behavioral patterns). The null hypotheses

presented in Appendix C would be tested by conducting the MMRP, which includes the study of both individual animals (e.g., playback studies and audiometric measurements) and groups of animals (e.g., pods of cetaceans via aerial, vessel or acoustic detection).

There is a difference between effects that might occur on a single animal of a large population (e.g., fish) and an individual within a very small population (e.g., minke whale). Thus, the low total number of individuals would make for a lower potential for encounter and possible impact; however, if that impact were to occur to one or more individuals of a relatively rare species (due to unpredicted clumping, age/sex class groupings, etc.), this could be construed as a significant impact. Based on the findings herein, the only documented evidence of good low frequency hearing capability is for baleen whales, none of which apparently dive deep enough to approach the source close enough to incur TTS. Sperm whales, some beaked whales, elephant seals and leatherback sea turtles can dive close to the source depth, but any evidence of low frequency hearing capability among these species is anecdotal to date. Among these, the sperm whale and leatherback sea turtle are federally listed as endangered. However, based on the data presented herein, the proposed action site (Pioneer Seamount) has not been identified as an important marine mammal habitat (i.e., feeding, breeding, migration route or comparable area).

If the MMRP goes forward, by virtue of its designated focused study area around the proposed source site, population sub-units or stocks local to California (or at least the eastern Pacific) would necessarily be the focal animals/sub-units used in assessing the potential for adverse impacts on protected animals. The best available estimates of the stock of marine mammal and sea turtle species that would be expected to reside or pass through the general EIS/EIR study area during the course of the proposed two-year MMRP are listed in Section 3.3.1. MMRP population distribution and abundance data collected would supplement these estimates and support future research efforts that could use population sub-units or stocks as indicator groups for determining the potential for low frequency sound impacts on marine species.

ISSUE 6: MMRP RESEARCH PROTOCOL

1. INDICATOR SPECIES

Comment: Sperm whales, which might be most affected, are not an indicator species? It would make more sense to focus on one (or two) key indicator species that will provide adequate data to make some meaningful conclusions. Focus field behavioral studies on target species, those that may be most affected by the ATOC sound source; limit target species to the top two or three.

Response: The expected low abundance of sperm whales in the vicinity of the Pioneer Seamount makes it infeasible to target that species as an indicator species for the MMRP in that area. However, boat-based acoustic playback experiments with sperm whales are planned for the Atlantic Ocean (off the Azores and/or the island of Dominica) by Dr. Jonathan Gordon of Oxford University.

It is appropriate to focus on key indicator species (see MMRP Research Protocol, Appendix C).

Comment: I would like to see less money focused upon one trophic group (top carnivores). I believe a smaller amount of money could yield more far-reaching results if it were spent on projects such as determining sound behavior in the oxygen minimum zone (OMZ)/deep scattering layer (DSL), local marine fish auditory/lateral line thresholds,...fish behavioral responses to low frequency sounds, and crustacean/cephalopod auditory capabilities/potential impacts.

Response: There is a fairly well-defined OMZ in the oceanic water column at around 500 m, where the amount of oxygen can drop to nearly zero (Castro and Huber, 1992). The DSL, made up of fishes, krill, shrimps, copepods, jellyfishes, squids and other midwater animals, lies at depths of 300-500 m during the day, but at sunset rises closer to the surface. The MMRP Research Protocol (Appendix C) targets those marine species believed to be most susceptible to potential effects of low frequency sound, regardless of their habitat and predicted activity locations within the oceanic water column. Commercially-taken species of fish, crustaceans and cephalopods would be monitored through MMRP actions (see Appendix C, responses to Issue 5 above, and Section 4.3.2.3.1). Direct measurements of the DSL will also be made.

ISSUE 6: MMRP RESEARCH PROTOCOL
m. RAMP-UP TIME

Comment: The proposed ramp-up time of 5 minutes preceding each signal may be too short to allow nearby animals to swim away. How would animals know which direction to swim, if the source is hard to localize?

Response: The 5-minute ramp-up is designed to alert nearby animals to the onset of a transmission. It starts at 165 dB (0.26 W) and increases 6 dB each minute for five minutes. During that five minutes, an animal would have to swim a maximum of 178 m to be outside the 150 dB isopleth (the sound level believed to be the threshold of potential TTS). This is equivalent to a swim speed of 0.6 m/s, which is well within the capability of all marine mammals, sea turtles, and fish.

Humans have difficulty sensing the location of a source of low frequency sound, especially so underwater. Some commenters have therefore assumed that marine animals are similarly handicapped, and might have difficulty determining which direction to swim away from the source. In fact, according to Atena et al. (1988) and Webster et al. (1992) marine animals have evolved specifically to process underwater sound and possess a far superior ability to localize or pinpoint the source of a signal.

One commenter confused the 5-minute ramp-up period with a provision in the Pilot Study MMRP protocol (Appendix C, page C-6) to start with a signal level of 185 dB (26 W) for the first two experimental periods, then increase to 195 dB (260 W) for the following observation periods. This approach is termed "varying the sound source level", not "ramping-up" the signal.

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n. MITIGATION MEASURES

Comment: The mitigation measures proposed in the DEIS/EIR do not ensure avoidance of significant impacts to marine mammals. CEQA requires that mitigation measures avoid even less than significant impacts. Since the MMRP is a part of the project and a study to determine project impacts, it is not a legitimate mitigation measure under CEQA. Monitoring of impacts is not an appropriate mitigation measure. An appropriate mitigation measure would include a provision that ATOC would not proceed unless it us determined by the MMRP that it will not have significant adverse impacts on marine mammals. The mitigation measure wording should be more precise and legally binding.

Response: For the reasons set forth in the EIS/EIR, all of the potential impacts of the project are believed to be less than significant as defined under CEQA, particularly after application of the mitigation measures proposed in the EIS/EIR. In any event, neither CEQA nor NEPA require that mitigation measures eliminate or reduce all potential impacts to a less than significant level. Instead, CEQA requires, and NEPA suggests, that all reasonable and feasible mitigation measures be applied to potentially significant impacts to reduce them to a less than significant level. If potentially significant impacts remain after the application of mitigation measures, CEQA guidelines state that the project may nonetheless be approved if there are "overriding considerations." NEPA also allows projects with the potential for significant impacts to be approved (e.g., the Business Administration Building on the University of California, Berkeley Campus; U.C. Regents, 1990). As to this project, all potential impacts have been determined to be less than significant and additional mitigation measures are not required.

The MMRP, as well as various other project components that serve to reduce the potential for impacts, were identified as mitigation measures for CEQA purposes primarily to respond to concerns that otherwise these measures might not be enforceable. By identifying these project elements as mitigation measures, compliance would be enforced through a CEQA mitigation monitoring program. All of the mitigation measures identified in the FEIS/EIR would be made enforceable conditions of project approval.

The MMRP consists of more than a monitoring program, although observation and monitoring of marine mammal responses to the ATOC sounds would, of course, be part of that effort. The MMRP's principal mitigation value is derived from the feedback of MMRP results into ATOC decision-making, particularly the decision following both the Pilot Study and two-year MMRP research phases concerning whether or, how best, to proceed with any long-term ATOC experiment. The comment that these elements of the MMRP are not clearly articulated has been addressed through revisions to the MMRP Research Protocol at Appendix C. See also response to comment above regarding shut-down guidelines.

ISSUE 6: MMRP RESEARCH PROTOCOL

o. SAMPLE SIZES FOR VESSEL AND AERIAL LINE TRANSECT SURVEYS

Comment: Sample sizes for vessel and aerial line transect surveys seem totally inadequate, considering they are only executed 2 times every month for vessel and 1 time every other month for aerial surveys. The cetacean behavioral observations are designed to be comprehensive; however, the observations planned for before, during, and after ATOC transmissions may be impossible to collect. This protocol relies on finding cetaceans at the appropriate time and being able to track them throughout, despite the low odds of having transmission days and vessel-worthy days coincide at the 2% duty cycle...has a power analysis been performed to optimize this particular aspect of the MMRP? Data gathered from the preliminary baseline period will be used to assess how large a sample size is needed to get statistical power and conclusive results. What is the protocol if the data show that the data set is too small? Early assessment of data collected during the preliminary baseline period [at the Sur Ridge site (preferred site)] indicate that in fact the potential sample size will be small. What changes are likely to be made to assure that the data set is large enough for statistical significance, especially since the conclusions from that data set will advise the commencement and operation of ATOC transmissions?

Response: With the shift of the proposed source site from Sur Ridge (preferred site) to the Pioneer Seamount (Alternative 3-1), modifications to the MMRP Research Protocol were necessary (see Appendix C). This revised protocol has been reviewed by a number of independent marine mammal biologists, acousticians and statisticians in order to maximize the potential for collecting adequate data points and, hence, sufficient statistical power on which to base MMRP Research Team conclusions. The California MMRP Principal Investigator (UCSC) has incorporated the results from the preliminary baseline data collection efforts at the Sur Ridge site into the revised research protocol, and a statistical power analysis has been completed for the research effort at the Pioneer Seamount site to ensure that the data set is large enough for statistical significance (see Appendix C).

ISSUE 6: MMRP RESEARCH PROTOCOL
p. SOSUS ACCESS

Comment: The DEIS/EIR states that acoustic data from the existing U.S. Navy Sound Surveillance System (SOSUS) listening network will be an integral part of interpreting movements and behavioral impacts among marine mammals. To date, these data have not been made available to the MMRP researchers, nor will they be available to researchers lacking the necessary security clearance. The FEIS/EIR should clarify the status and plans for access to the SOSUS data, and if they are limited, explain the consequences on the MMRP's ability to assess short-term behavioral impacts to marine mammals.

Response: There are two elements to responding to this comment. First, what is classified by the U.S. Navy with respect to the SOSUS passive arrays are their specific locations ("love points"), the line of bearing (LOB) of the array, and their detection envelopes (ranges of detection of different acoustic sources based on frequency, source level and aspect of the source, and transmission loss through the water medium). However, processed data that emerges from the ATOC data center (e.g., relative acoustic travel times) will be unclassified and available to the public.

Second, there is the issue of using available SOSUS arrays to monitor vocalizations of marine mammals. This would have been relatively straightforward at the Sur Ridge site (preferred site). There will still be some monitoring capability at the proposed Pioneer Seamount site (Alternative 3-1) from the Pt. Sur SOSUS array (receivers can be "steered" to listen in the direction of Pioneer Seamount), but not equal to that which would have been available for the source at Sur Ridge. The Pt. Sur Naval Facility has been declassified and is accessible to all qualified researchers (e.g., Naval Postgraduate School, Monterey Bay Aquarium Research Institute, University of California at Santa Cruz, Moss Landing Marine Laboratory, etc.). What remains classified are the love points of the array and its LOB. These specifications are needed at the front end of the acoustic data reduction and processing procedure, which will normally be performed by MMRP Research Team members. The processed data desired by most marine mammal biologists (i.e., vocalization parameters, levels, times, durations, locations, etc.) will be unclassified and available to the public.

To make up for the decrease in passive acoustic detection capability from the Point Sur SOSUS array, the MMRP research protocol will employ a variety of supplemental sensors (VLA at the source, vessel-towed HLA, and sonobuoys).

ISSUE 7: SOUND FIELDS

a. NRC FINDINGS REGARDING THE "120 dB" CRITERION

Comment: While 50% of the whales avoided continuous sounds at levels of 117-123 dB, depending upon the stimulus, the most sensitive 10% avoided drill ship sounds at levels of 110 dB. If grays respond to the ATOC source as they do to drill ships, then the most sensitive 1/10 of the 20,000 migrating whales that were within the 110 dB exposure zone during transmission might show behavioral disruption. Monitoring of migrating gray whales and of the actual inshore sound levels is very important, since most of the species migrates relatively close to the predicted impact zone.

Response: The National Research Council, Ocean Studies Board, stated that the "120 dB criterion" refers to a level of sound that has been identified informally as a level above which acoustic effects on marine mammals might occur. They concluded that although the field studies from which this criterion was derived "provided estimates of the sound exposure level in the vicinity of the animals while their behavior was being observed, there was considerable variation with some animals reacting at lower levels and some not reacting at considerably higher levels."

As the commenter noted, "most of the world's gray whales migrate inshore of the ATOC source. Whether the 110 dB contour overlays the gray whale distribution is critical for predicting impact." In fact, the majority of southward-migrating gray whales (94%) stay within 1.6 km of the shore in the area of the sound source and most northward-migrating gray whales stay inside the 183 m depth contour (about 2 km offshore). At this distance from the sound source (88 km offshore), the intensity of the sound field will be substantially below 120 dB, as shown in Section 2. Any gray whales found as much as 15 km from shore would be exposed to levels <110 dB; thus behavioral disruptions of gray whales based on reaction to the source transmissions can reasonably be expected not to occur.

Because gray whales (and other mysticetes) show at least subtle reactions at received levels at or below 110 dB, the MMRP will measure the ATOC sound levels reaching nearshore waters, and initiate work on gray whales (i.e., make them an indicator species) if actual received levels of ATOC sounds in nearshore waters significantly exceed the now-predicted levels.

ISSUE 7: SOUND FIELDS

b. DOCUMENTED MYSTICETE RESPONSES TO 120 dB RECEIVED SOUND LEVEL

Comment: Received sound levels of 120 dB have produced some minor detectable changes in the behaviors of certain marine mammals. The concern is that while these changes are subtle there is a possibility that minor changes may have major consequences to marine mammal populations. The commenter cites a study of the effects of low-level flying fighter jets on caribou which showed that the reaction of the caribou was subtle, yet resulted in significantly increased calf mortality.

Response: This response is based on Murphy et al.'s 1993 report *Behavioral Responses of Caribou to Low-altitude Jet Aircraft*, which was the final report for the period 1989 to December 1993. During three 7-10 day field sessions, the reactions of 268 groups of caribou to 159 overflights by A-10, F-15, and F-16 jet aircraft were recorded. Approximately 50% of the animals showed some degree of overt behavioral response , but only 13% of the overflights caused animals to move. Although one of the conclusions of this study was that cow-calf groups were more sensitive to aircraft disturbances than juvenile/adult groups, there was no recorded evidence of calf mortality associated with any of the overflights (Murphy et al., 1993). Unlike caribou that may be disturbed periodically while traversing their entire migration routes, any low frequency sound-sensitive marine animals (e.g., baleen whales and possibly sperm whales and elephant seals) that may travel in proximity of the ATOC source would be subjected to an individual point source for that specific time that the animal(s) were close enough to it--during the 2-8% transmission cycle-- to hear the generated signals. Comparatively speaking, the ATOC source presents the potential for limited spatial exposure, whereas, aircraft overflying caribou migration paths can potentially cause recurrent disturbance to the animals. As no known migration pattern or reproduction area of any marine mammal species overlays Pioneer Seamount (EPA, 1993), it is unlikely that any possible minor changes in behavior could have significant long-term adverse effects on the animals, or their reproduction activities. Nevertheless, independent long-term studies of whale and pinniped populations by NOAA/NMFS will continue, and through these monitoring efforts any long-term impacts should be recognizable.

ISSUE 7: SOUND FIELDS

c. COMPARISON OF NATURAL AND HUMAN-MADE UNDERWATER SOUNDS (INCLUDING ATOC)

Comment: Natural and human-made levels of noise should not be equated. Marine animals have, over evolutionary time, most certainly become adapted to filtering out natural noise. The same cannot be said for the recent addition of human-made noise.

Response: The section in question (Section 4.3, masking) does not attempt to "equate" natural and human-made noise levels. Masking is a natural and highly variable phenomenon to which marine mammals are well adapted. Hence, marine mammals undoubtedly can tolerate, with few or no negative effects, some [human-made] increase in masking relative to natural levels (Richardson et al., 1991). Discriminatory hearing abilities of baleen whales have yet to be documented, but some other groups of marine mammals (particularly toothed whales) can discriminate intensities, frequencies and directions at levels comparable to or better than those of humans. Bearing this in mind, the hypothesis of Payne and Webb (1971) on the potential hearing abilities of baleen whales is in line with most data on other marine mammal hearing abilities. However, there are few data on hearing abilities of any marine mammal species at the low frequencies generated by baleen whales.

Comment: Figure 4.3.1.1.2-1: This seems to be a ridiculous comparison between a moving and stationary source.

Response: This figure is not meant to portray a supertanker transit lane over the Sur Ridge site (see text change) but, rather, it attempts to make a meaningful analogy between the sound fields of the stationary ATOC source and the sound fields associated with a moving source, like a ship (the primary source of low frequency sound in the world's oceans). See also response to comment Issue 7e below.

Comment: The EIS should be expanded to describe: 1) differences in low frequency sound transmission patterns and dissipation rates from surface vs. deep water sources; 2) possible differences in types and levels of background noises that might mask and affect responses to surface-generated and deep water-generated sounds; 3) possible differences in response to narrow- and broad-band sounds; 4) how the perceptions of and responses to low frequency sounds may vary if the sound source is stationary vs. moving.

Response: Section 2.2.1.1 covers the modeled propagation patterns and transmission losses for the ATOC deep water source. When a source and/or receiver is very close to the sea surface, the surface reflection of the sound can interact strongly with direct sound radiation, creating interference patterns that can cause transmission loss variability of up to twice that of normal spherical spreading. However, in the presence of a well-defined surface duct (at least 10 m deep from the surface), transmission losses can decrease to one-half that of spherical spreading. The ATOC source presents a different type of low frequency sound in the ocean because it is located at such a great depth, compared to most human-made oceanic sounds, which

occur in the upper water column (ships/boats/thrillcraft, oil industry operations, aircraft noise, commercial and Navy active sonar transmissions).

Natural deep-water generated sounds include earthquakes, volcanic eruptions and vents along the edges of tectonic plates. All these natural and human-made noises might mask some signals to and by marine mammals. Some toothed whales seem able to adjust the frequencies of their echolocation calls, within limits, in order to avoid frequencies where background noise levels are high (Au et al., 1974, 1985). See also response above.

Many species can produce both broadband and narrowband calls containing energy at a variety of frequencies or, at different times, produce narrow band calls at varying frequencies. When communication at one frequency is masked by strong human-made or natural noise, the calls or call components at other frequencies may still be audible (Richardson et al., 1991).

The principal difference in how a marine animal may perceive and respond to low frequency sounds emanated from stationary vs. moving sources include the following: 1) if the moving source happens to intersect a migration route or primary marine animal habitat, the animal must make substantial adjustments to its behavioral pattern to elude the source so as to avoid collision, and possibly to reduce acoustic interference; 2) moving sources can produce loud noise levels over a much larger area (see Figure 4.3.1.1.2-1).

Comment: The discussion of comparisons between natural and human-induced noise, and of sound transmission through the water and through the air, including Table 1.1.3-1 ("Natural and human-made source noise comparisons") is misleading.

Response: The EIS/EIR includes changes to the text and Table 1.1.3-1 that address this comment.

Comment: Fully explain the similarities and differences between the ATOC sound source (fixed location, moderate duration, repeated regularly, and deep) vs. those compared in the document (moving ships and drilling rigs), particularly as these characteristics influence the impacts on marine mammals.

Response: With the exception of the question on drilling rigs, this comment is addressed in previous responses above. Richardson et al. (1991) noted that cetaceans apparently avoid stationary industrial activities such as dredging, drilling and production when the received sounds are near-surface and intense, but not when the sounds are barely detectable (e.g., <10 dB above ambient). Some cetaceans do enter areas that are strongly ensonified by stationary industrial operations. For example, some beaked whales behaved normally in some areas ensonified by dredging noises at the construction site of an artificial island in the Beaufort Sea during 1980. Richardson et al. (1985c, 1990b) speculated that this may have meant that the whales habituate to noise from an on-going construction operation even if they are disturbed when they first encounter it. The radius of avoidance around industrial sites is normally considerably smaller than the radius of audibility (Richardson et al., 1991). Whether there is any reduction in utilization of areas that are ensonified but beyond the radius of demonstrated

avoidance cannot be determined from the available evidence. The MMRP would provide valuable information to help resolve this issue (See Appendix C).

ISSUE 7: SOUND FIELDS
d. AIR VS. WATER STANDARD

Comment: The DEIS/EIR...goes on to present Table ES-1 (Relationship of sound level of common sounds in air and water [20-1000 Hz]), which is completely worthless and without factual basis. The purpose of this table is clearly to make ATOC seem less loud to us, compared to familiar, in-air, sounds.

Response: A similar table is presented in the National Research Council's *Low-Frequency Sound and Marine Mammals; Current Knowledge and Research Needs*. All data points in this table are referenced in the EIS/EIR. Note changes to the EIS/EIR version of this table, which also respond to this comment.

Comment: Using a conversion of 61.5 dB (rather than 26 dB) between sound power levels in air and water is unjustified, because we do not know which acoustic stimuli (energy flux or sound pressure) is the important one for hearing loss in marine mammals. The DEIS/EIR neglects to note that the NRC publication uses a conversion factor of only 26 dB, not 61.5 dB. Further, the DEIS/EIR itself uses only a 26 dB conversion factor in Section 4.5.1.1.

Response: Fay (1988) in *Hearing in Vertebrates: a Psychophysics Databook* noted that the commonly accepted term for underwater conditions is "sound pressure" ([particularly for] fishes and marine mammals) and for in-air conditions "sound pressure level, or SPL." He goes on to note that proper comparisons of hearing sensitivity in air and water are difficult to make, but one common method of comparison is to express both air and water thresholds in units of "sound intensity," (i.e., units of power/unit area; e.g., Watts/cm2) which takes into consideration the impedance of the medium. Using logarithmic units for comparison between sounds in air and in water we find that for equal intensity or energy transfer in each that the pressure levels must vary as:

$$10 \text{ Log}[(\rho c)\text{water}/(\rho c)\text{air}] = 35.5 \text{ dB}$$

For years the reference level for sound in air has been 20 μPa, and in water only 1 μPa. These are not air-to-water sound level conversion factors, they are units, just as we measure highway distances in kilometers or miles and people's height in meters or feet. So when, as in the NRC report, we add 26 dB to in-air values, it is only to make the units of both measurements the same. Hence 26 dB should be added to 35.5 dB to derive the 61.5 correction factor between air and water. We have adopted this convention, based on interpretation of the studies and analyses of a number of experienced acousticians (e.g., Potter, Berenak, Ellison).

The NRC publication does, in fact, acknowledge that "The difference in reference pressure level [not energy flux] is one complication in comparing sound in air with sound in water. Another is that, because the impedances of air and water differ, the actual power flow in them differs even if the pressures are the same. For example, a spherical sound source radiating a pressure of 1 dyne per square cm in air generates about 2.5x10-9 Watts per square cm. The

same source in water radiating the same pressure generates about 4.7x10-13 W/cm2--an intensity ratio of about 5,000." This calculation (and Fay's, 1988) produces an intensity ratio of approximately 3550 (35.5 dB); thus, if anything, the estimates in the EIS/EIR are conservative, if compared with those of the NRC publication.

Regarding the comment that "the DEIS/EIR itself uses only a 26 dB conversion factor in Section 4.5.1.1," the calculation in question refers to a minimum human audibility level in water that was referenced to 20 μPa. Because the value was already a water standard, only the 26 dB correction factor need be applied to convert to a reference of 1 μPa.

Comment: Table ES-1 and related text clearly imply that power is the appropriate acoustic feature for perception of loudness and for auditory damage. This leads to a water standard that has much higher pressure levels for comparisons with the air standard. The NRC publication considered this issue, but did not include the intensity correction in such a table, and noted the different relationship between pressure and power in the two media. There are insufficient data on either hearing loss or perception of loudness in marine mammals to justify choice of one feature over another (pressure vs. power). This part of the EIS is not correcting a misconception as much as pushing a particular hypothesis about biological impact that has not yet been subject to empirical testing.

Response: No particular hypothesis is involved, rather the application of standard scientific methods to enable comparison between in-air and in-water sound intensities. See also response above.

ISSUE 7: SOUND FIELDS

e. ACOUSTIC THERMOMETRY SIGNAL LEVELS VS. AMBIENT NOISE LEVELS IN SOUND CHANNEL

Comment: Why are ambient noise levels in the deep sound channel tabulated in the EIS, higher than expected? Why use surface ambient noise levels for comparison with ATOC signals, rather than deep sound channel levels. ATOC's contribution to human-made noise in the deep sound channel must be quite substantial.

Response: There is a common perception that the ocean is much quieter at depth than near the surface. In fact, sound propagates efficiently in the ocean so that ambient (low frequency) noise levels at 4000 m depth are typically only 5 dB less than at 100 m (Morris, 1978). At 1000 m, in the sound channel, ambient noise levels are normally only 2-3 dB less than near the surface (Morris, 1978). At higher frequencies, the vertical variation is even less. Horizontal variation of ambient noise (up to 35 dB) and time variation are both much greater than vertical variation. As stated in Section 3.2.4.3, a good estimate (from 1990-94 IRAS data) of mean ambient noise level at 75 Hz and 120 m depth in the region of the study area would be 74-91 dB. It follows that the corresponding noise levels in the deep sound channel would be approximately 71-88 dB.

Most life in the ocean exists near-surface, in the photic zone (Castro and Huber, 1992) and it is generally appropriate to use near-surface ambient noise levels for comparison with ATOC sound levels. Signals will -- at long horizontal ranges -- be almost as high 100 or 200 m below the surface as at deep sound channel axis depth. As marine mammals are much more abundant in the upper 200 m than at axis depth, it is important to consider ambient noise near the surface. For those animals that dive to the axis of the sound channel and beyond, ambient noise levels are likely to be 2 to 3 dB less.

Section 1.1.3 explains the phenomenon of trapping sound energy in the deep sound channel for great horizontal distances, although the signal level would be below ambient there.

ISSUE 7: SOUND FIELDS

h. 150 dB CRITERION FOR TEMPORARY THRESHOLD SHIFT

Comment: The analysis that TTS occurs at received levels ≥150 dB is extrapolated from human data. Hollien (1993) has stated that lower levels than this may cause TTS, and that it may not be conservative to extrapolate from studies of underwater hearing in human ears (which are adapted for hearing in air) to ears of marine mammals which are adapted for underwater hearing. Terrestrial mammals tend to show TTS when exposed to sounds >80 dB above their hearing threshold. Whether a similar dynamic range is characteristic of ears underwater has never really been tested for marine mammals. Until such data are provided, it may be over-confident to assume no impact to exposures <150 dB. The MMRP Advisory Board provided the following comment: "ATOC documents assume that hearing damage and/or TTS will not occur if received levels of ATOC sounds are <150-160 dB. The Advisory Board notes that this assumption may or may not be true, but that there are no supporting data from marine mammals. This and other auditory parameters may vary widely among the main marine mammal groups."

Response: There are no broad-based, direct, calibrated, quantitative, measurements of marine mammal TTS underwater that have been subjected to lengthy and detailed peer reviews and discussions. MMRP marine mammal bioacousticians therefore sought indirect evidence from research in the field of otology (a medical specialty concerned with the inner ear). Section 4.3.1.1.1 of the EIS/EIR explains in detail the reasoning used to establish 150 dB as the threshold for potential TTS to marine mammals. The EIS/EIR also states: "If a value lower than 150 dB is appropriate, then the received level that would cause TTS could be less than the assumed 150 dB." Conversely, the 150 dB value could just as easily be too conservative, meaning that it would require a value higher than 150 dB for marine mammals to incur TTS. Scientific research always involves some measure of uncertainty, and the MMRP proposed here is no different. A key question is how great is the potential of low frequency sound for causing physical auditory effects on marine mammals? In order to put this question into proper context, the following facts have been considered:

• To perceive sound, all mammals, terrestrial and marine, rely upon the same anatomical reception device, the cochlea (Ketten, 1992). Whales, dolphins and seals have ears like land mammals that are essentially a fluid-filled bony spiral containing a resonating membrane and a series of frequency-pressure-energy detectors. Marine mammals' inner ears are different from land mammals so that they can accommodate rapidly changing pressures encountered in deep dives, and dynamic ranges of acoustic power several magnitudes greater than in air. These adaptations could possibly decrease the potential risk of injury from high intensity underwater noise (Ketten, 1994).

• There is no evidence to suggest that marine mammals have better hearing acuity in water than terrestrial mammals do in air--if they do, the 150 dB value could be too high; if they do not, it could be too low.

• For any marine animal to detect and react to low frequency sound, that animal must exhibit sufficient sensitivity in the appropriate frequency band. In this case the ATOC source

frequency band is 57.5 Hz - 92.5 Hz. Currently available data indicate that there are very few marine animals that appear to have the required sensitivity; among them are the baleen whales, and possibly the elephant seal, the sperm whale, and the leatherback sea turtle.

• Many baleen whales regularly produce low frequency sounds with source levels in the range of 180-190 dB. There is no evidence that this causes self-inflicted injury or TTS (it is unknown if they have an auditory reflex to protect themselves from their own calls), or affects nearby whales in any negative way (there is no evidence whether or not they emit calls at high source levels when conspecifics are nearby); and it is unlikely that the animal calls would be so strong if they did have these types of negative consequences (Richardson, pers. comm., 1995).

• In the course of their life underwater, all marine animals are subjected to low frequency noises from ships, volcanoes, earthquakes, landslides, lightning strikes, polar ice movements, oil and gas exploration and production activities, and most routinely, from storms at sea. These sound sources can generate sound levels of 185-280 dB.

• The National Research Council's *Low-Frequency Sound and Marine Mammals; Current Knowledge and Research Needs* states: "At its typical speed of 15 to 22 kts, the average supertanker produces a source level (calculated at 1 m from the source) having a spectrum level (energy in a 1 Hz band) of about 187 dB at 50 Hz and about 232 dB at 2 Hz.

• In order for any marine animal to encounter the 150 dB isopleth around the ATOC source at the proposed Pioneer seamount site, it must be capable of diving deeper than 800 m. The only marine mammals that are known to have the capability to dive this deep are the sperm whale, some beaked whales, the elephant seal, and the leatherback sea turtle.

• On the rare occasion that an animal happened to be located within the 150 dB isopleth (at >800 m depth) during the 2%-8% of the time that source transmissions would be scheduled, it is assumed that if the animal considered the sound annoying during the 5-min ramp-up period, it would simply depart the area. All marine animals that are suspected of having low frequency hearing capability have adequate swim speed to accomplish this.

• If all the variables happened to coincide (animal is low frequency sensitive, is located within the 150 dB isopleth during the 2%-8% that the source is on, and the animal chooses not to, or is unable to depart the area during the 5 min ramp-up period, and remains within the 150 dB isopleth for most or all of the 20 min transmission) a TTS could be incurred by the animal. It should be noted that a single or occasional mild TTS would not be life-threatening, and would have no long-term effects on hearing ability (Richardson, pers. comm., 1995). It is expected that repeat exposures, necessary for injury beyond TTS (i.e., PTS), would be very rare given the small size of the sound fields compared to the range of exposed animals.

ISSUE 8: BIOLOGICAL ENVIRONMENT
a. MARINE MAMMAL REFERENCES

Comment: "... there is no evidence that whales respond to one another over ranges greater than about 20-25 km." I believe SOSUS data have shown that blue whales change course to avoid Bermuda at ranges greater than 20-25 km, which may mean they are listening to far away acoustic clues.

Response: Until any data that supports this belief is processed, analyzed, and subjected to peer review, it must be stated that there is no evidence that whales respond to one another over ranges greater than about 20-25 km (Watkins, 1981b). Furthermore, reactions to conspecifics vs. possible reactions to a huge inanimate object (Bermuda) are not comparable phenomena (Richardson, pers. comm.,1995).

Comment: Section 3.3.1 is sloppy. There are good primary references to many of the points made, rather than the secondary, tertiary or personal communications that are cited.

Response: Many of the secondary, tertiary and personal communications references have been replaced in the EIS/EIR by primary references.

Comment: Tables 4.3.1.1.1-1 and 4.3.1.2.1-1 could be made more useful by adding a column indicating the known or presumed biological functions of the vocalizations listed in the column titled "Signal Type."

Response: The few data that are available are, either included in the text of the document, or available in the references cited. The addition of this information in these tables is beyond the scope of the document; moreover, much of what would have to be included would be of a speculative nature.

ISSUE 8: BIOLOGICAL ENVIRONMENT

b. POPULATION ESTIMATES (INCLUSIVE OF DIVING ANIMALS AND MULTIPLE TAKES)

Comment: It is noted that short-finned pilot whales essentially vanished from southern California waters (cause unknown, perhaps El Niño). This raises an important question: "if one or more species show a population change during this two-year study and there is an El Niño or other "extrinsic" event, how will "blame" be assigned?" For example, could the MMRP's conclusions be disputed on the grounds that local boat traffic had increased above some unknown threshold during the period? I see this as insoluble, and it vividly illustrates the need for more basic research on the natural history of marine mammals so that we understand, or at least can quantify, non-anthropogenic population fluctuations.

Response: The MMRP Research Protocol emphasizes the ability to detect any acute or short-term effects (Table C-1) on a marine mammal that could be related to ATOC source transmissions. The EIS/EIR explains the methodologies available for the MMRP to determine if there may be any other short-term effects from exposure to the signals (i.e., behavioral disruption and habituation), or long-term effects (i.e., displacement, stress, masking), or indirect effects (i.e., impact on the food chain). If one or more species would show a measurable population change (via aerial survey techniques) during the proposed ATOC operations, all known and quantifiable extrinsic oceanic events (natural and human-made) would be included to the greatest extent feasible in the final analysis of the MMRP Research Team to attempt to ascertain the most likely reason for the change.

There is indeed a need for more basic research on the natural history of marine mammals.

Comment: The statement in the Executive Summary that "estimates of the numbers of animals that could be affected were high because NMFS recommended including estimates of populations for the entire eastern Pacific stocks of most species as "worst case" or "upper bound" scenario" is deliberately misleading. The reason that entire eastern Pacific stocks of some species needed to be included is that the whole of these populations could (were thought to) migrate within the area influenced by ATOC (Zone of Influence). Also, the estimates may very well not be high--may even be low, since multiple takes of the same individual are not considered in the estimates.

Response: As noted previously, in the absence of data on the potential effects on marine mammals, it is not possible to accurately estimate the numbers that could potentially be harassed by low frequency sound transmissions. Thus, NMFS recommended including estimates of species/populations for entire Pacific stocks. However, it is inconceivable that the entire population of any animal species could migrate within the area influenced by the ATOC source transmissions (particularly if the zone of influence were established as the 120 dB sound field--see Section 2.2.1 sound field plots). Source sound levels (and ambient noise levels) in the deep sound channel are addressed above in Issue 7. Theoretically, animals could be exposed during each source cycle "on" period; exposures which would be considered multiple takes. However,

because the proposed site is not believed to be a highly sensitive habitat (i.e., feeding, breeding, migration route or comparable area) the potential for multiple takes is expected to be minimal.

Comment: In Section 4.3.1.2.1, there is a calculation of the number of sperm whales likely to come within the 150 dB contour. When calculations are carried out correctly (including the whales missed when diving, the proportion of time at depth, the tidal sampling and the mean speed of movement of whales), the number of sperm whales affected is increased by more than a factor of 100.

Response: That calculation is in error in the DEIS/EIR, and it is corrected in the EIS/EIR. Based on best available data and information from NOAA (NMFS/SWFSC, 1995), the number of whales that could potentially be affected is increased by a factor of 1.5 (i.e., 1.5% of the total N. Pacific population vice 1% in the DEIS/EIR).

Comment: Are population estimates corrected for diving animals being missed on surveys (table 3.3.1-1)? If not, numbers of sperm and beaked whales will have been serious underestimates.

Response: Sperm and beaked whales are underestimated in the DEIS/EIR as no correction factors were applied. The EIS/EIR applies appropriate correction factors for these species (1.5x vice 1.0x for sperm whales, 2.0x vice 1.0x for beaked whales) based on information from NOAA (NMFS/SWFSC) (Barlow, pers. comm., 1995).

Comment: The population estimates for the proposed sound source area seem unusually low. The numbers are compounded by calculations of average densities in the study area (e.g., less than 1 sperm whale per 1000 km2). Most of the marine mammal species do not travel singly, so this evenly spread distribution does not reflect the patchy nature of marine mammal populations. Where the probability states that 1 animal may be affected, the actual number of affected animals is likely to be somewhat larger (e.g., small cetaceans, pods may be counted in hundreds or thousands; California sea lions also travel in groups, as do sperm and other whales).

Response: Most marine mammal species do not travel singly. However, in attempting to use pertinent statistics to illustrate the potential for an animal, or animals, being in proximity to the source during transmission, it is inherently difficult to account for the patchiness of populations. Thus, in order to ensure conservative calculations, one or more of the variables have been increased to account for the possibility of multiple animals and the patchiness of populations (e.g., it is assumed that sperm whales spend 10-20 % of their time at depths >800 m, when in actuality they probably spend less then 5% of their time below 800 m [Lockyer, 1978]).

Comment: How will researchers detect, observe, and monitor distant marine animals avoiding the project and sound source area? What about those that are not at the surface, but at depth? And, those that cannot be acoustically tracked because they are not vocalizing?

Response: Although the 1994 NRC report downplays the use of 120 dB as a criterion for a level of sound that has been identified informally as a level above which acoustic effects on

marine mammals might occur, the MMRP has chosen to use that value as an outer sound field boundary for dedicated observation and monitoring efforts. Section 2 gives the estimates for the radius and areal extent of this sound field, which delineates the region that the MMRP must focus upon.

Animals that are not at the surface during visual survey (approximately 40 km x 40 km box centered on the source site) and observation efforts, and do not vocalize while underwater in the local area, will necessarily have to be accounted for using the best available correction factors (NOAA/NMFS/SWFSC, 1995). Animals that vocalize while below the surface will be monitored acoustically (see Appendix C for estimates of acoustic coverage for all passive hydrophone arrays expected to be used during the MMRP).

ISSUE 8: BIOLOGICAL ENVIRONMENT

c. SUMMARY TABLE OF POTENTIAL IMPACTS AND MITIGATION MEASURES (TABLE 4.1-1)

Comment: This table is riddled with problems, and seems to ignore or downplay cited, relevant research. Also, increased stress, etc. from lower sound levels than would cause hearing loss is ignored. The results from Bowles et al. (1994) seem to be ignored when arriving at the less than significant impact for some marine mammals. Also, to state that minimal impacts are expected just because a species' distribution is patchy is flawed. The reasons species have patchy distributions is often because there are preferred areas of high productivity--the proposed site is one such area. To say minimal impacts are expected on fish and invertebrates, in light of the Banner and Hyatt (1973), and Lagardere (1982) studies is astounding. What we know about the effects of noise on these groups is cause for concern. What if a large mass of eggs is ensonified? This may affect a whole population. When little or nothing is known of an organism's reaction to noise, the general approach of the EIS/EIR is to conclude that impacts will be minimal. This is a very disturbing approach to take.

Response: All conclusions and findings in the EIS/EIR are based on whatever data are available from thorough review of all cited, relevant research, direct discussion with many of the authors of that research, and initial results of baseline MMRP studies.

The potential for increased stress is addressed within the framework of long-term effects for all species covered in the EIS/EIR (see Sections 4.3.1.1.1, 4.3.1.2.1, 4.3.1.3.1).

The results from Bowles et al. (1994) are not ignored, but are cited, discussed, and incorporated into conclusions made in Section 4.3.1.2.1.

The reference to the Banner and Hyatt (1973), and the Lagardere (1982) studies has been addressed in Issue 5 responses; the possibility of affecting a whole population of fish or invertebrates due to ensonification of a large mass of eggs is considered to be negligible (Cailliet, Moss Landing Marine Laboratory, pers. comm., 1995) (see Issue 5 responses above and revised text, Section 4.3.2.3.1).

The EIS/EIR incorporates the text changes on patchiness. However, the comment on the proposed site being an area of high productivity has been addressed, in that the proposed source site has changed from the Sur Ridge (preferred site) in MBNMS to Pioneer Seamount (Alternative 3-1) which is not considered an area of high biological productivity (EPA, 1993).

Comment: Presuming Less than Significant impact - with Mitigation measures identified (LSM) for mysticetes, odontocetes, sea turtles, and fish is unfounded.

Response: These potential impact levels are based on standard, conventional, commonly accepted criteria for levels of significance (CEQA Guidelines, Title 14, California Code of Regulations Appendix G; University of California, 1991). See also responses to Issue 6

comments above that take into account criteria for determining the potential for non-negligible impacts.

Comment: The County of Santa Cruz does not agree with the assignment of "less than significant" impacts to commercial/recreational/potential fisheries (Table 4.1-1). Avoidance or other behavioral changes can be expected and will result in changes in habitat utilization and loss of traditional fishing grounds. This, in turn, could cause additional problems from increased fishing pressure in other areas.

Response: The assignment of a "less than significant" impact level in Table 4.1-1 remains valid. Based on all available pertinent data (see Issue 5 responses above), there is no evidence to expect that at sound levels <150 dB (outside 178 m radius of the source) avoidance or other behavioral changes by fishes would result in changes in habitat utilization and loss of traditional fishing grounds, or cause additional problems from increased fishing pressure in other areas. As noted previously (see response to Issue 5.e), fish stocks would be monitored.

ISSUE 9: POTENTIAL FOR PHYSICAL AUDITORY EFFECTS

a. CRITERIA FOR POTENTIAL PHYSICAL DAMAGE AND FOR PERMANENT THRESHOLD SHIFT (PTS)/ TEMPORARY THRESHOLD SHIFT (TTS)

Comment: Is 150 dB the appropriate level above which physical damage will occur? Commenters dispute Ketten's calculations of levels which produce a TTS, and suggest that TTS could occur at levels of less than 120 dB. Further, commenters estimate that such levels could be encountered as far away as 40 km or more from the source.

Response: It is acknowledged that Ketten's figures are estimates, based upon extrapolations from other mammals. Thus, it is possible that TTS may occur at levels somewhat different from those calculated. However, the following points are relevant:

1) Ketten chose the 150 dB level as the limit for TTSs because TTSs have been produced in humans with underwater sound sources at levels of 150-180 dB for frequencies between 700 and 5600 Hz, the most sensitive range of human hearing. It is, however, stated that TTS could occur in mysticetes at levels less than the 150 dB level. Hastings (1991) has stated that, within the 50-2000 Hz frequency band, received levels below 150 dB should not cause physical harm to fish.

2) For permanent damage to occur, the animal must either be near the damaging sound level for a prolonged period of time, or the level must be far above that at which slight TTS is first evident. In humans, the "80 dB above threshold" criterion for the likely onset of PTS applies to 8 hours/day of exposure for something on the order of 10 years. In humans, the received level must be far more than 80 dB above threshold in order for PTS to occur as a result of a single exposure.

3) It is important to put some context into the level of sound (both natural and non-ATOC human produced) encountered daily by marine mammals in order to better examine whether TTS or PTS is likely to occur. A number of natural, physically-produced ocean sounds have broadband energy levels in excess of 120 dB (e.g., ocean storms, volcanic eruptions, and earthquakes) (Section 1.1). The dominant calls of blue and fin whales (10-30 Hz) have source energy levels of about 160-188 dB (Cummings and Thomson, 1971; Watkins, 1981). It is unlikely that the animals would be producing sound at levels which would damage their own hearing. In addition, several common human-produced sounds have energy levels which exceed 120 dB (e.g., geological exploration devices, recreation vessels, container ships, supertankers, offshore oil rigs). Thus, marine mammals regularly encounter or produce sound levels which may exceed the 120 dB level.

ISSUE 9: POTENTIAL FOR PHYSICAL AUDITORY EFFECTS
c. SPERM WHALE DIVING PATTERNS

Comment: The statement that sperm whales make deeper dives in deeper waters and therefore would not reach the ATOC source (referenced to Rice [1989]) is wrong. Sperm whales cannot dive below the ocean floor (sic), but in shallower waters (e.g., ca 850 m), they will often dive to it.

Response: The DEIS/EIR did not imply that sperm whales make all of their deep dives in deeper waters, thus not reaching the ATOC source. Watkins et al. (1985) reported that long dives by sperm whales are exceptional. Lockyer (1977) observed that 99.5% of all dives are less than 45 min long, and 96.7% are less than 30 min. Lockyer also reported that 99.9% of all dives are less than 1000 m deep, 88.3% less than 600 m, and 77.1% less than 500 m.

Rice (1989) stated that these animals generally make dives >800 m in much deeper water, and that crustaceans (on the bottom) are rarely eaten. However, it is believed that sperm whales sometimes do grub for food along the sea bottom (Leatherwood and Reeves, 1983) in shallower water (<850 m). The EIS/EIR also acknowledges that sperm whales off Dominica in the Atlantic Ocean appear to commonly dive almost to the bottom (Watkins et al. [1993]), where shallow water (<200 m) is found from 2-10 km offshore. However, because sperm whale dive depths no doubt depend on local food availability, depth-of-dive data from other parts of the world are only indirectly relevant.

The fact that the proposed source site has been moved from Sur Ridge (preferred site) in the MBNMS to Pioneer Seamount (Alternative 3-1) means that the source will be even deeper than originally planned (980 m vice 850 m) and major communities of squid, octopus, salmon, rockfish, lingcod, or skate (primary sperm whale prey items) are not expected to be found on Pioneer Seamount. (CDF&G, 1993).

Based on Lockyer's data, it appears that sperm whales reach the depth of the source's 150 dB isopleth (>800 m) less than 6 out of every 100 dives. This, coupled with the requirement that the animal would have to be almost directly over the source to encounter the 150 dB isopleth, leads to the conclusion that the possibility of this occurrence is quite low.

ISSUE 10: POTENTIAL FOR BEHAVIORAL DISRUPTION

a. POTENTIAL FOR ATTRACTION OF LARGE NUMBERS OF MARINE ANIMALS TO THE ACOUSTIC SOURCE

Comment: If animals were curious about the ATOC sound, wouldn't they be attracted to the source site, disrupting their normal behavior?

Response: As noted in the EIS/EIR (Section 4.3.1.1.1), when recordings of humpback whale sounds were played back to other humpbacks, they were attracted to the sound source. (Mobley et al., 1988). However, in all other cases of noise exposure (Section 4.3.1.1.1), baleen and toothed whales were not attracted to the source of the sound but, rather, exhibited some level of avoidance or simply ignored it (Richardson et al., 1991). Various whales apparently are attracted to boats (mainly whale-watching vessels) after the animals have become habituated to them (Watkins, 1986). There are also other references to "ship-seeking" in minke whales (Joyce et al., 1989); Borchers and Haw, 1990) and the "curious whale" phenomenon in gray whales (Swartz and Jones, 1981; Jones and Swartz, 1984, 1986). Whether these phenomena are relevant to ATOC is unknown at this time

ISSUE 10: POTENTIAL FOR BEHAVIORAL DISRUPTION
b. POTENTIAL FOR MODIFYING MARINE MAMMAL MATING HABITS

Comment: Could marine mammals be psychologically affected by ATOC sounds, thus disrupting their mating habits?

Response: Despite a significant increase in human-made noise in the ocean over the past 50 years, the numbers of marine mammals, especially whales, have generally increased in response to cessation of whaling. That the population has increased despite the introduction of many novel sounds into the ocean, suggests that the addition of two sound sources probably should not hinder their mating activities, and consequent recovery. If a reliable method of measuring the psychological well-being of marine mammals were developed, then many marine mammal researchers would apply such an instrument to their studies. Today, no such method exists. See Sections 4.3.1.1.1, 4.3.1.2.1, 4.3.1.3.1, and 4.3.2.1.1 in the EIS/EIR.

ISSUE 10: **POTENTIAL FOR BEHAVIORAL DISRUPTION**
c. MIGRATION PATTERNS

Comment: Could ATOC's signals disrupt marine animals' migration patterns?

Response: This question has been addressed in detail in Section 4 of the EIS/EIR. Some temporary change in swim direction, typical of object avoidance behavior, has been noted during several acoustic playbacks of human-made sounds on migrating marine mammals. There is no evidence that a minor change in an animal's track could have a significant impact on its migration pattern (Richardson, pers. comm., 1995). Migrating bowheads seem to avoid drillships and their associated support vessels by at least 10, and sometimes 20 or more, km (LGL and Greeneridge, 1986). Although source levels of those vessels are roughly similar to those of ATOC, any comparison must take into account the fact that the ATOC source is at 980 m depth and its duty cycle is 2-8%. Nevertheless, if the ATOC source were located in proximity to any marine animal's migration path or corridor, it could cause an adverse impact. However, based on the best available data (Ainley and Allen, 1992; Jones and Szczepaniak, 1992) it appears that the closest point of approach for any humpback whale migration route is approximately 17 km east of Pioneer Seamount, and for gray whales approximately 41 km to the northeast (Ainley and Allen, 1992). No other whale migration patterns are known well enough to comment on.

ISSUE 10: POTENTIAL FOR BEHAVIORAL DISRUPTION
d. ASSESSMENT OF BEHAVIORAL DISRUPTIONS AND AVOIDANCE/ ABANDONMENT

Comment: Behavioral changes generally are detected at sound intensities higher than the levels at which the sounds would be barely detectable--we do not know what levels are barely detectable to whale species, nor are we likely to detect anything but the most gross behavioral changes. Data collected during the preliminary baseline period by the MMRP [at the Sur Ridge site (preferred site)] indicate there are no high-use areas near the source and observed densities are relatively low. How could avoidance and abandonment be observed under such conditions?

Response: The MMRP has adopted the MMC recommendations concerning criteria for ascertaining any non-negligible effects (i.e., acute or short-term effects) on marine mammals and other sea life (see Executive Summary, Section 4, Appendix C, and responses to Issue 6 above). All available marine mammal abundance and distribution data from aerial and ship surveys (Bonnell et al., 1983; Dohl et al., 1983; Ainley and Allen, 1992; Forney, 1993; Forney and Barlow, 1993; Barlow, 1993a; Barlow, 1993c; Calambokidis, 1995) have been incorporated into the revised MMRP Research Protocol for the proposed Pioneer Seamount site. These data sets and the results of the statistical power analysis completed for Pioneer Seamount (Appendix C) provide the starting point for assessing any potential for avoidance and/or abandonment during and after ATOC acoustic transmission periods (both for the MMRP Pilot Study and for the proposed MMRP follow-on research related with ATOC feasibility operations).

ISSUE 11: POTENTIAL FOR HABITUATION

a. MARINE ANIMAL'S PERCEPTION OF THREATENING SOUNDS (RELATIVE TO FEEDING ACTIVITY) AND POTENTIAL FOR HABITUATION DUE TO HEARING LOSS

Comment: Since the ATOC sound is novel, the reaction of marine mammals to the sound cannot be predicted. Physiological damage as a result of habituation to a sound source could occur. If there is behavioral habituation to intense sounds, animals might, to their detriment, re-enter regions with dangerously high sound levels, thereby risking additional hearing loss. Finally, while marine mammals have the capacity to leave the area during the ramp-up period they may remain in the area if engaged in a critical activity, such as feeding.

Response: In the case of baleen whales, those that have been studied often show avoidance reactions to steady low frequency sounds at received levels well below those speculated to cause TTS and far below those that might, upon brief exposure, result in PTS. Even for a near-surface source, it seems very unlikely that baleen whales would suffer hearing damage as a result of failure to move away from a strong sound source. This is even more unlikely in the case of a source that is so deep that it is doubtful baleen whales could dive deep enough to enter the area where TTS is a possibility.

Although the ATOC sounds may be novel, the reactions of whales to other novel sounds have been documented (Section 4.3). One response is habituation to those sounds that are not linked with harmful events. The ATOC signal would not be directly linked with any adverse stimuli; e.g., periodic or recurrent harassment from boats, or airplanes. MMRP aerial observations and surveys would be conducted both during source transmission "on" and "off" periods, so would only be circumstantially related to the ATOC signals. Thus, it is possible that whales, if they chose to stay in the area, could habituate to the ATOC sounds.

However, habituation is also only one possible response to the sound source. Given the relatively short duration of the sound (20 min), the warning or ramp-up period, and the ability of the animals to leave the area, habituation may not be the most likely option. Habituation would probably be more likely if the sound were being produced continuously in a critical habitat. Since the proposed site is not a critical habitat (i.e., feeding, breeding, migration route, or comparable area) (EPA, 1993) the animals are not expected to be 'tied' to that area.

ISSUE 12: POTENTIAL FOR LONG-TERM EFFECTS

a. METHODOLOGY FOR MEASUREMENT OF ANY LONG-TERM EFFECTS

Comment: There are a number of potential long-term effects that, while subtle, may be important to marine mammals. Effects may occur at the individual level through hearing loss and stress-related responses. They may also occur at the population level via reproductive and survival rates or by shifting marine mammal distribution from areas that are important habitats for certain activities, such as feeding and breeding. Impacts that are individually minor may be collectively significant over time. The ATOC project does not have a specific program that can adequately monitor these potential long-term responses to the sound source.

Response: Based on current knowledge of the natural history of the animals in the study area, we do not expect exposure to the sound source to have any major adverse short or long-term effects. The proposed area to be ensonified is relatively small in relation to the animals' known home ranges. The structure of the proposed duty cycle allows a ramp-up period in which animals that are sensitive to the sound can avoid the area. The Pioneer Seamount has not been demonstrated to be a critical habitat for any marine animal species (EPA, 1993). It is expected that any extreme effects would be prefaced by some change in the behavior of the animal. The MMRP will monitor the distribution, abundance and behavior of animals in the area to attempt to detect these changes.

In addition, independent long-term monitoring of elephant seal (LeBoeuf and Stewart) and harbor seal (Hanan, California Fish and Game), sea lion (Boving, NMFS), sea otter (FWS), gray (NMFS), blue and humpback whales(Cascadia Research) populations is occurring at present, and will continue. From this information, we will be able to detect any large changes in population size, and possibly pupping and calving rates. By utilizing an established stranding network in the central California area, we will also be able to detect a higher incidence of stranded animals and assess the cause of death.

The main effect one would expect to find, if animals were affected by the sound, would be a temporary change in the abundance/distribution in the area during the times of transmission. There is no reason to believe that an animal would opt to stay in an area that is stressful/painful if other options are available. The number of animals potentially exposed, and sensitive to these sounds is small and the alternate habitat is expansive.

Given the low probability that an individual animal will be exposed to the sound, the limited sensitivity of many animals to the frequency and level of sound produced, and the ability of all animals to leave non-critical habitat, we suspect that the cumulative effects of the sound source will be low. If no adverse short-term effects are detected during the Pilot Study, and the project continues, the population health will be monitored by the previously mentioned ongoing longer-term research.

ISSUE 12: POTENTIAL FOR LONG-TERM EFFECTS

b. POTENTIAL FOR PHYSIOLOGICAL STRESS AND EFFECT ON IMMUNE SYSTEM

Comment: Virtually the entire effort is dedicated to detecting the effects of physical damage to the auditory system, or disruption of normal behavioral patterns. Mention is made of possible physiological effects (most likely acting via the stress response), but they receive little attention. It is not that such effects might not be important, but that we would have no way of detecting them. Stress responses may well be phylogenetically conservative, but I note that based on my own ca. 15 years studying a variety of nonhuman primates, what is [behaviorally] stressful varies greatly between species. I see no *a priori* reason to assume that, for example, if ATOC sounds do not bother humpbacks they will not devastate right whales. There is not much we can do about such possibilities other than remain alert to them. Why are effects such as psychological/physiological stress given such short shrift in this EIS/EIR, and not factored in when conclusions of "minimal impact" are made? There will be no measures, for cetaceans, of emaciation, stress, or disease. It is impossible to gauge the irreversible effects of high decibel, low frequency sound on marine mammals such as damage to reproductive and immune systems.

Response: It is extremely difficult to monitor any potential stress effects on marine animals, and that behavioral stress probably does vary greatly among the different marine species. Stress is the physiological response of the body to a demand made upon it by one or more external stimuli, the "stressors" (Selye, 1973). Many studies of terrestrial mammals, including humans, have looked for evidence that chronic noise exposure causes stress. Some studies have provided evidence of noise-induced stress, but the majority have been inconclusive or have shown no such evidence (Kryter, 1985; Majors and Myrick, 1990 in Richardson et al., 1991). Marine mammals exhibit some of the same stress symptoms as found in terrestrial mammals, judging from the few species studied (Thomson and Geraci, 1986; St. Aubin and Geraci, 1988), but there has been virtually no study of noise-induced stress in marine mammals. The one exception is cited in Section 4.3.1.1.1, but the significance of this one study on white whales must be stated as unknown, particularly in light of the short durations of noise exposure (Richardson et al., 1991). Thus, it is not that the EIS/EIR gives short shrift to psychological/ physiological stress, but that there are no data points with which to establish any baseline for assessing whether low frequency sounds might cause stress in marine animals. Nevertheless, some, or all, of the revised criteria that would be used in the MMRP Research Protocol (Appendix C) to determine the potential for acute and/or chronic effects of low frequency sound could be stress-related (e.g., avoidance or abandonment of high-use areas, increase in emaciated or diseased animals, etc.).

It is difficult, but not impossible, to gauge potential effects of low frequency sound transmissions such as damage to reproductive and immune systems. The MMRP has adopted criteria including "decrease in calving/pupping rates and/or total population size" and "increased incidence of emaciated animals and stress and associated diseases." However, it will be impractical for MMRP researchers to evaluate reproductive, stress and immune effects, that could be related to ATOC source transmissions, in any detailed way. See Section 4, Appendix C, and responses to Issue 6 above.

Comment: While the EIS prefers to concentrate on animals around the sound source, the [stress] effects on animals in the sound channel receives much less attention even though those animals will be even more profoundly damaged.

Response: The deep sound channel axis is nominally around 800 m depth in the vicinity of the Pioneer Seamount (Alternative 3-1), although individual profiles show the channel is broad, extending from about 500 m to 1000 m (Section 1.1.3). Section 3.3 and 4.3 discuss the species of marine animals believed to be able to dive deep enough to enter the deep sound channel, including fish and invertebrate species which may live there. Section 1.1.3 explains the phenomenon of trapping sound energy in the deep sound channel for great horizontal distances, although, based on FEPE model calculations, the signal level should be below ambient (see responses to Issue 7 above) at approximately 100 km seaward of the source. Animals would not be subject to more profound damage in the deep sound channel.

ISSUE 12: POTENTIAL FOR LONG-TERM EFFECTS
c. CUMULATIVE EFFECTS (INCLUDING COMBINATION OF CALIFORNIA AND KAUAI SOURCE SOUNDS)

Comment: What about the cumulative impacts of ATOC? The DEIS/EIR fails to list present, past, and anticipated future projects, including those inside and outside the agencies (sic) control, or to summarize the expected environmental effect of those projects. There is no talk in the DEIS of cumulative impact of the ATOC project as a whole (Kauai, California and New Zealand). The DEIS notes that only two sound sources are currently proposed...and it is proposed to operate these sound sources 2-8% of the time (silent 92-98% of the time). The DEIS does not indicate whether the sound sources would be operated concurrently and, if not, whether marine mammals, sea turtles, fish, etc. in areas between the two sound sources could be exposed to sound from these sources for more than 2-8% of the time as indicated.

Response: The potential cumulative impacts of the ATOC low frequency sound source are addressed in Sections 4.2, 4.3, 4.4, 4.5, and 4.6. Section 4.6.8 specifically addresses the potential cumulative impacts of the Kauai and Pioneer Seamount ATOC sources. These sections cover all known present, past, and anticipated future projects (inside and outside the agencies' control) that are believed could realistically interact with the ATOC source transmissions to produce a cumulative effect. There is no cumulative factor from the two VLAs deployed along the radial between Pioneer Seamount and Rarotonga as they are strictly passive listening devices (for the one at approximately 6000 km range, the received level in the sound channel should be on the order of 80-83 dB). The sound sources at Kauai and Pioneer Seamount are not planned to be operated concurrently, but the minimum range at which a group of animals or an individual animal might be exposed to both source transmissions sequentially would be 1850 km from either source. At that range the received sound level should be 85-88 dB, which is within the range of ambient noise conditions the animal would normally be subjected to at that location. (see responses above and Section 4.6.8 and Issue 7).

Comment: What projects are proposed to assess the effects of ATOC signals on harbor seals and California sea lions? These experiments should be fully evaluated in this EIS/EIR as related projects, producing potentially cumulative impacts.

Response: The revised MMRP Research Protocol (Appendix C) no longer includes harbor seals or California sea lions due to the low potential for ATOC source transmissions ever interacting with those species at the proposed Pioneer Seamount site, and their demonstrated low sensitivity to low frequency sound.

Comment: Can the long-term and cumulative effects of the ATOC program be calculated during the [MMRP Pilot Study]? The DEIS discussion [of cumulative sound potential] is unacceptable, in failing to relate the degree to which ATOC sound energy would so markedly increase the total sound impacting marine mammals, who are already affected by very loud container ship traffic. The FEIS should include an expanded cumulative impact analysis which evaluates the potential ripple effect caused by the loss or reduction of prey species and the affect of other activities such as commercial fisheries, recreation, commercial shipping, and general

harassment. [The DEIS/R] fails to...discuss the cumulative impacts of the Hawaii/California feasibility study with the planned follow-on, long-term global ATOC project.

Response: The MMRP Pilot Study is designed to determine whether low frequency sound might cause acute or short-term effects (Table C-1) to marine animals. Any possible long-term and cumulative effects would be addressed in the follow-on MMRP research phase during the ATOC feasibility operations. The potential cumulative impacts of the ATOC low frequency sound source (including merchant shipping and other vessel-related activities) are addressed in Sections 4.2, 4.3, 4.4, 4.5, and 4.6. Also see responses to Issues 6 and 7 above. The EIS includes cumulative impact analysis of the potential for loss or reduction of prey species (Sections 4.3.1.1.1, 4.3.1.2.1, 4.3.1.3.1, 4.3.2.1.1, 4.3.2.2.1, 4.3.2.3.1), and the potential affect of other activities, such as commercial fisheries (Section 4.3.2.2, and see responses to Issue 5 above), recreational water activities (Sections 4.3.1.1.2, 4.3.1.2.2, 4.3.1.3.2, 4.3.2.1.2, 4.3.2.2.2, 4.3.2.3.2), and commercial shipping (see above). General harassment is addressed through discussion of marine and near-shore construction and resort operations, aircraft operations, and research activities that could add cumulative noise stimuli to the marine environment (Sections 4.2, 4.3, 4.4, 4.5, and 4.6). Any attempt at quantifying potential cumulative impacts of the proposed Hawaii and California ATOC operations with a possible follow-on global ATOC project is speculative and infeasible at this time (see responses to Issue 2 comments above).

Comment: Discussion of these combining effects (cumulative effects of oceanographic events such as El Niño) should be included in some form within the final EIS/EIR. Describe and evaluate the potential cumulative impacts of increased low frequency noise pollution, when added to that generated currently by other known sources of acoustic research and/or military activities (e.g., GAMOT project, anti-submarine operations, etc.). More fully address the relationships between the California and Kauai ATOC projects, and specifically evaluate the potential for cumulative impacts on species common to both sites (e.g., humpback whale).

Response: El Niño refers to changes in the distribution and depth of warm equatorial waters, ocean currents along the coasts of Chile and Peru, and changes in rainfall patterns from Australia to North America. It is correlated with changes in the atmospheric Southern Oscillation, which refers to a trans-Pacific relationship in atmospheric (barometric) pressure (Ramage, 1986). When the pressure is high over the Pacific Ocean, it tends to be low over the Indian Ocean, and vice versa. Because El Niño and the Southern Oscillation are both part of the same general phenomenon, they are now usually referred to by one name; ENSO. El Niño-Southern Oscillation (ENSO) is part of a complex interaction of ocean and atmosphere that affects a major portion of the planet. There is no known oceanographic, acoustic, or physical basis for linking ATOC low frequency sound transmissions to cumulate with pan-oceanic thermal discontinuities such as El Niño. ATOC's acoustic thermometry would be capable of detecting the temperature signature of El Niño events, and would most likely provide valuable new data on the phenomenon.

Sections 4.2, 4.3, 4.4, 4.5 and 4.6 describe and evaluate the potential cumulative impacts of increased low frequency noise pollution when added to acoustic research and/or military activities. There are no low frequency source operations currently underway, or planned, within

the framework of the GAMOT project, that could possibly cumulate with the proposed ATOC acoustic source transmissions from Hawaii and/or California.

ISSUE 13: POTENTIAL FOR MASKING

a. POTENTIAL FOR MASKING ACOUSTIC SIGNATURE OF SEA TURTLE NATAL BEACH

Comment: I would think that masking the acoustic signature of a turtle's natal beach, to which it returns for nesting, could be very serious indeed!

Response: Lenhardt et al. (1983) stated that bone-conducted hearing appears to be a reception mechanism for marine turtles with the skull and shell acting as receiving surfaces, and that turtles are capable of receiving the low frequency spectrum of the natal beach, which may serve as one of the cues in nesting returns. As the DEIS/EIR stated, there is no documented evidence to this effect and, consequently, must be considered speculative at this time. The concept of sound masking from human-made low frequency sounds (e.g., shipping traffic) in sea turtles has not been studied and the phenomenon, in fact, is difficult to apply to these animals. If sea turtles do use the reception of low frequency sounds from their natal beach, it is theorized they are using surf noise, which is somewhat higher in frequency than the ATOC source. Wilson et al. (1985) identifies the primary frequency band for surf noise as 100-700 Hz. This, coupled with the low duty cycle of the proposed source transmissions, and the lack of proximity of the proposed Pioneer Seamount source site to sea turtle nesting beaches, leads to the conclusion that the potential for masking the acoustic signature of a sea turtle's natal beach is minimal.

ISSUE 13: POTENTIAL FOR MASKING
b. POTENTIAL FOR MASKING ACOUSTIC SIGNALS IMPORTANT TO MYSTICETES

Comment: The ATOC sound source may mask communication signals of marine mammals, particularly mysticetes.

Response: The function of low frequency sounds produced by mysticetes is not clear, and it must be recognized that one potential function may be long-distance communication. Some elements of these communications might be masked during the ATOC transmissions. The EIS/EIR recognizes this, and points to present levels of human-produced sounds which mysticetes are presently exposed to and apparently coping with. The ATOC duty cycle would create a situation where masking could possibly influence some cetacean communications between 2% and 8% of the time (depending upon the duty cycle); however communications would not be expected to be totally eliminated. Vocalization rates of cetaceans measured acoustically (via the VLA, SOSUS HLA and sonobuoys) before, during, and after duty cycling during the MMRP Pilot Study should provide information on the potential level of interference with mysticete communication due to masking.

Masking communications in odontocetes and pinnipeds should be less significant as almost all species in these groups employ higher frequency sounds in communication (little overlap with ATOC-produced signals), and due to the increased attenuation of higher frequency sound in water, it is unlikely that the higher frequency sounds produced by odontocetes and pinnipeds are being used to communicate over long distances. In support of this theory are a few circumstantial observations indicating that most odontocete sounds may be detectable by humans with hydrophones over ranges no greater than hundreds of meters, perhaps up to a maximum of 1 km.

ISSUE 13: POTENTIAL FOR MASKING

c. POTENTIAL FOR MASKING ACOUSTIC SIGNALS IMPORTANT TO ODONTOCETES

Comment: Studies must be undertaken to determine if masking will impact sperm whale behavior and communication before ATOC can be given a clean bill of health. Despite the difficulty of undertaking this work, sperm whales must be included in the MMRP as an indicator species. Currently no provision in the DEIS/EIR or the MMRP is made for the study of ATOC on odontocetes, the species most likely to be impacted by its noise. To presume that [potential masking] impacts are less than significant because of the lack of conclusive data is not logical, reasonable, or remotely protective of marine mammals likely to be affected by masking.

Response: Most sperm whale communications (clicks) are in the 2-4 kHz and 10-16 kHz bandwidths (Backus and Schevill, 1966; Levenson, 1974; Watkins, 1980a). Significant masking only occurs for frequencies similar to those of the masking noise (Richardson et al., 1991). The potential for masking sperm whale signals with a 75 Hz acoustic transmission is considered minimal. See responses to Issue 6 above relative to including the sperm whale as an indicator species. See Appendix C for MMRP Research Protocol activities that include the study of the potential effects of low frequency sound on odontocetes. Sections 4.3.1.1.1, 4.3.1.2.1, 4.3.1.3.1, 4.3.2.1.1, 4.3.2.2.1, and 4.3.2.3.1 discuss the rationale for each case where the potential impact for masking was deemed to be less than significant. Further, the burden of assessing the significance of this potential effect was established by the requirement for setting standards of significance under CEQA guidelines (see Section Executive Summary). The MMRP has adopted MMC recommendations concerning criteria for assessing non-negligible effects, and boat-based acoustic playback experiments with sperm whales are planned in the Atlantic Ocean (Azores, Dominica). See also responses to Issue 6 above.

ISSUE 13: POTENTIAL FOR MASKING
d. POTENTIAL FOR MASKING LOW FREQUENCY SOUND USED BY SHARKS TO LOCATE PREY

Comment: The DEIS/EIR also admits that sharks use low frequency sound to detect prey yet it fails to give serious attention to potential masking caused by ATOC in this regard. [The MMRP]...must examine the potential effects of ATOC masking of low frequency sounds on salmon and sharks.

Response: The EIS/EIR references all available pertinent studies relative to the potential masking of sharks that could occur due to the introduction of low frequency sound in its habitat. For marine mammals, it is believed that masking effects would be most significant for those marine species that have critical bandwidths at the same frequencies as the potentially interfering source, and that do not use other frequency bands (Richardson et al., 1991). This may or may not be true for non-marine mammal species such as sharks. Given the low duty cycle of the ATOC source (usually 2%), any masking effects would be anticipated to be minor and temporary (i.e., usually 98% of the time a shark would have no possible interference with its perception of low frequency prey sounds), and effective masking could occur only for environmental sounds shorter than the 20 min source transmission period, that happened to fall within that 20 min window. For the three species of sharks that audiograms are available (see Section 4.3.2.2), hearing thresholds at 75 Hz ranged from 99-130 dB, equating to potential masking areas of radius 5 km to approximately 300 km.

Potential effects of low frequency sound on salmon are addressed in responses to Issue 5 comments above.

ISSUE 14: PROCESSING OF EIS

a. INADEQUATE TIME FOR COMMENTS

Comment: The public comment period on the California EIS/EIR should be extended. The FEIS/EIR should be released more then 30 days after the close of the public comment period.

Response: Both NEPA and CEQA require only a 45 day public comment period; in this case the comment period was extended one third again as long as the minimum required. The number, degree, scope, and sophistication of the comments indicates that the public comment period was adequate. In particular, comments were received from a number of expert agencies, organizations and individuals with specialized and detailed knowledge in the field. Most commenters did not object to the length of the comment period. It is anticipated that most, if not all, of the additional comments that might have been made by the commenters requesting additional time were raised by others and responded to here. However, in the event that this assumption is incorrect, and although not required by NEPA, comments received on the Final EIS/EIR up to 30 days after notice of its availability in the Federal Register will be addressed in the lead agency's respective decision document for the project (record of decision under NEPA).

This Final EIS/EIR was released more than 30 days after the close of the public comment period.

ISSUE 14: PROCESSING OF EIS
b. SCOPING COMMENTS

Comment: The DEIS/EIR failed to incorporate the concerns of hundreds of individuals who attended the three scoping hearings. The DEIS/EIR ignores the hundreds of comments offered by the public at the three hearings in Hawaii and California.

Response: Numerous comments from the public and from public interest groups were received during the three scoping hearings. Pursuant to NEPA and CEQA requirements, these were aggregated into key issues and addressed in the development of the DEIS/EIR. The EIS/EIR has been prepared to respond to public concerns identified through both the federal and state public scoping processes, in addition to issues identified by the federal and state lead agencies.

Key scoping issues identified during the EIS/EIR development process include:

- Requirement for a programmatic EIS.
- Combining the Kauai and California sites in a single EIS.
- Consideration of alternatives, both locations and technological.
- Expansion of the treatment of biological resources to include, in addition to mammals, sea turtles, sea birds, fish, and invertebrates.
- Addressing the scientific uncertainty surrounding marine mammal response to low frequency sound.
- Justification of the MMRP, especially to determine if it is appropriately designed to resolve the scientific uncertainty.
- Articulation of standards of harm and delineation of source suspension criteria.
- Addressing adverse impacts on biological resources which could indirectly impact on tourism and fishing.
- Ensuring consistency with the California Coastal Management Plan and the Monterey Bay National Marine Sanctuary Management Plan.

Each of these issues, as well as a large number of others, was explored in detail in the EIS/EIR. The level of critique concerning the MMRP resulted in a substantial modification of the ATOC/MMRP program, including a dedicated Pilot Study and change in location.

Section 1.4.3. contains the EIS/EIR overview of scoping issues and identifies specific locations in the document where each issue is treated in detail. In addition, Appendix D contains

a detailed chronology of the scoping-related events and actions which preceded issuance of the EIS/EIR, strictly complying with the prescribed NEPA and CEQA guidelines.

ISSUE 14: PROCESSING OF EIS

c. FEDERAL AND STATE CONSISTENCY ISSUES (INCLUDING WHALE AND SEA LION RECOVERY PLANS)

Comment: The proposed location of the sound source at the Sur Ridge site is inconsistent with the Monterey Bay National Marine Sanctuary (NBNMS) Management Plan since it would damage the marine environment.

Response: Both the National Marine Sanctuaries Act (NMSA) and the MBNMS Management Plan specifically include research activities as appropriate uses of the Sanctuary, although protection is the primary mandate. Protection of Sanctuary resources is carried out partially through the promulgation of regulations which prohibit specific activities. A Sanctuary permit is required to conduct an otherwise prohibited activity. Although the analysis in the EIS/EIR concludes that no significant impacts on marine animals (including marine mammals and other Sanctuary resources) are expected to occur, SRD has asserted that uncertainty of the potential for impacts from the proposed ATOC project make it unlikely that the regulatory threshold for permit issuance could have been met to allow the sound source to be located within the MBNMS. Therefore, the acoustic source will be located outside of the Sanctuary.

Comment: The Humpback Whale Recovery Plan prohibits research on the response of humpbacks to low frequency sounds if that research would involve the use of new acoustic sound sources.

Response: The Humpback Whale Recovery Plan does not prohibit research on the acoustic response of humpbacks using new sound sources. It is believed that statements cited by the commenters simply recognize the potential impacts from low frequency sounds and the general need to reduce acoustic disturbances; they do not prohibit increases in noise, nor do they prohibit the types of research contemplated by this project. By adding to the much-needed knowledge base in this area, the MMRP could assist in the identification and development of sub-sea noise controls.

Comment: Since the 120 dB sound fields from the ATOC source overlap with migration routes of gray whales, gray whales should have been made a subject of the MMRP.

Response: The 120 dB sound fields will not overlap with gray whales migration routes. Gray whales will be observed, together with all other marine mammal species that are the subjects of the MMRP.

Comment: The FEIS/EIR should clarify and correct various statements in correspondence outside the EIS/EIR process regarding the California Coastal Commission's review of this project for purposes of the Coastal Zone Management Act, as discussed in a January 27, 1995 letter from the Office of Ocean and Coastal Resource Management (OCRM), attached to comments of the Sanctuaries and Reserves Division of NOAA.

Response: The comments in OCRM's January 27, 1995 letter are noted. Most of OCRM's comments do not address the presentation on this issue set forth in the EIS/EIR, but instead respond to letters addressing various legal and factual questions sent by the applicant and by the California Coastal Commission to OCRM . The applicant and the California Coastal Commission staff are working toward a cooperative resolution of the consistency review question; the applicant has certified the consistency of the project with the California Coastal Management Program while reserving objections to the threshold application of consistency review, and the California Coastal Commission will be reviewing the project based upon this certification. Locating the proposed sound source at the Pioneer Seamount alternate site (Alternative 3-1) will approximately double the distance of that source from the California coastal zone, as compared to the previously proposed Sur Ridge site (preferred site), further reducing any impacts within the coastal zone.

ISSUE 15: INSUFFICIENT KNOWLEDGE OF LFS EFFECTS ON MARINE MAMMALS

Comment: It is impossible to estimate the effects of high decibel, low frequency sound waves on marine mammals. The DEIS/EIR acknowledges that "available information on subsea noise and its biological impact ranges from incomplete to nonexistent," yet in the absence of this information, it repeatedly defaults to a conclusion of no expected significant impact, concluding that adverse behavioral impacts are expected to be minimal and less than significant. There is no adequate scientific basis set forth in the DEIS/EIR for these conclusions.

Response: See response to comments in Issue 6.j. It is certainly true that data on the effects of low frequency sounds on marine mammals are scarce. But it is not accurate to state that such data are universally non-existent or that reasoned judgments based on available data on the potential effects of low frequency sound on marine mammals cannot be made. NEPA guidelines address this very point (40 C.F.R. S1502.22), offering specific directions on how to proceed in the event there is incomplete or unavailable information. The EIS/EIR has followed these guidelines. It acknowledges the lack of information, links its relevance to the analysis, summarizes existing evidence and evaluates the impacts based on available information.

Moreover, the inability of project scientists to state unequivocally that there will be no or little impact (again based on scarce data) does not logically lead to the opposing presumption; i.e., that the impacts will be significant.

Available oceanographic and marine biological data provided in the EIS/EIR is taken from existing scientific literature. The EIS/EIR analyzes these data in arriving at its appraisals of the potential impacts of low frequency sound on marine animals. These analyses are based on the evidence supporting the hypothesis that impacts will be negligible and reflect the project scientists' understanding of the literature and their knowledge of ocean physics, acoustics, and marine mammal physiology. In response to MMC recommendations that the proposed criteria for judging possible non-negligible impacts on marine mammals should be brought forward from Appendix C to Section 4 of the document, the following has been added: "If the study results indicate that the sound transmissions are likely to have short-term-effects (Table C-1), they will be used to design a long-term monitoring program to verify that the operational ATOC project has negligible long-term effects. The following would be considered non-negligible long-term effects; 1) avoidance or abandonment of previous high-use areas, 2) increase in at-sea observations of dead animals or strandings of either live or dead animals in association with sound-caused hearing damage or other trauma, 3) increased incidence of emaciated animals and stress and associated disease, 4) decrease in calving/pupping rates and/or total population size."

In its report, *Low Frequency Sound and Marine Mammals: Current Knowledge and Research Needs*, the National Research Council's Ocean Studies Board strongly endorses expanded study and research on this subject. It specifically addresses the issue of acoustic oceanography as a valuable potential source of data on deep-diving marine mammals and prey.

Other issues of concern to the OSB on which the MMRP is designed to collect data include measurements of received sound pressure levels, behavioral responses to human-made acoustic signals, and effects of sound on migration and other movement patterns of marine mammals.

ISSUE 16: GENERAL
a. OBJECTIVITY AND NEUTRALITY OF EIS

Comment: The DEIS/EIR is not an objective and neutral evaluation of the proposed project but instead is impermissibly skewed in favor of the project to support a decision that already has been made. The laying of cable at the Sur Ridge site predetermined the site location and exposes the discussion of alternative site locations as a sham.

Response: An extensive review of available literature and other information sources, including consultations with numerous experts in the field, as well as initial baseline research at the Sur Ridge site, was undertaken in conjunction with the preparation of the DEIS/EIR. The potential environmental effects of the project and substantive comments concerning those potential impacts have been fully considered (see Issue 6 comments and responses above). The proposed selection of the Pioneer Seamount alternate site (Alternative 3-1) identified in the DEIS/EIR demonstrates that the Sur Ridge site (preferred site) selection was not predetermined by the laying of cable, or made before release of the DEIS/EIR.

ISSUE 16: GENERAL
b. NULL HYPOTHESIS DERIVATION

Comment: The MMRP should adopt a null hypothesis that assumes there is an adverse effect, and then should be required to disprove this, rather than the other way around.

Response: Selection of the simplest, or minimal, assumption (which is that there would be no adverse effect from exposure to the ATOC acoustic sound) is an appropriate scientific technique, starting with a hypothesis that is often referred to as the *null hypothesis* (H_o) (Chapman and Schaufele, 1970). Chapman and Schaufele discuss the basic philosophy underlying this type of testing, outlined as follows. In most practical problems, a claim is made that a product is better or a procedure will have a particular outcome. Following the argument that such claimants be required to furnish statistical proof before we believe them, we set up the null hypothesis that the product is not better or, in this case, that the procedure (ATOC source transmissions) will not have the particular outcome (adverse effects on marine animals). To reject this null hypothesis would amount to acceptance of the claim that these low frequency sounds would adversely affect marine species. The emphasis is on rejecting H_0 and tests are normally chosen so that we will not reject H_0 unless the evidence is very strong.

ISSUE 17: ATOC/MMRP RELATIONSHIP

Comment: The MMRP is officially recognized as being associated with ATOC and is funded by ATOC (so) that the results of its research may bolster the argument that ATOC will not exert significant impact on marine mammals. The MMRP objective is stated before the ATOC objective, giving the impression that marine mammal studies are the driving force behind the ATOC program. The information produced by a properly constructed MMRP must be used to inform decision makers regarding the ATOC proposal. The MMRP is valuable in informing project designers "how" rather than "whether" to proceed with the ATOC Phase. Thus a permit for a legitimate MMRP should be issued first.

Response: At the time of its initial funding and startup, the ATOC project included a major Marine Mammal Research Program. The linkage between these aspects of the overall effort has been openly recognized throughout and led to the filing of scientific research permit (SRP) applications over a year ago. It is not inappropriate that these two efforts proceed jointly, as the combined efforts of ATOC and the MMRP offer long-term (1+yrs) access to technology, and a demonstrated scientific methodology to measure the effects of sound, sound levels, and sound travel times--critical factors in achieving the scientific objectives of both programs.

The discussion here is whether each of these projects should proceed independently and sequentially. By restructuring its original proposal, the ATOC effort takes a sequenced approach. The revised MMRP protocol (Appendix C), developed as a key mitigation measure in response to public debate, requires a six-month, independently managed MMRP prior to commencing any ATOC feasibility operations. Criteria for reacting to marine mammal and sea turtle responses, including termination criteria if adverse effects are noted, have been developed and clearly presented. If ATOC feasibility operations transmissions are allowed to start, both ATOC and the MMRP would proceed jointly for the remainder of the project. During this phase, the MMRP would continue to collect and provide information on marine mammals, as well as serve a protective function by continuing to monitor for any adverse impacts of the source transmissions. Plans also include audiometric measurements on captive cetaceans and one or more acoustic playback experiments.

As the EIS/EIR states, the goals of the ATOC project are to make a contribution toward more meaningful climate predictions, and demonstrate the feasibility of the acoustic thermometry technique for future global ocean climate monitoring programs. The objectives of the MMRP are to evaluate potential effects of low frequency sound on marine animals, particularly marine mammals and sea turtles. The overall scientific research permit application has a built-in condition; i.e., that ATOC feasibility operations efforts would not commence if the system is determined to adversely affect marine animals, particularly marine mammals and sea turtles. The condition in essence functions as a permitting "gate" and obviates a requirement for separate or added permitting.

ISSUE 18: SOCIAL ENVIRONMENT
a. DIVER ISSUES

Comment: The dive tables that we as divers use to calculate our available bottom time will be affected by ATOC transmissions.

Response: The official U.S. Navy Dive Manual does not list any corrections to dive decompression requirements based on exposure to underwater sound. The increased intrathoracic pressure, as discussed in the EIS/EIR, refers to the resonant enhancement of the sound pressure wave as it passes through the intrathoracic cavity of a fully submerged mammalian body, such as a human swimmer or diver. As a sound wave passage is composed of compression and relaxation of the medium though which it passes, the intrathoracic pressure increase is quickly followed by a similar pressure decrease, then a return to the "before sound wave" ambient pressure. Therefore, there is no net affect on the pressure a diver experiences, nor on "bottom time" determinants such as nitrogen, or other gas absorption rates, or tissue saturation. Consequently, "bottom time" limits and associated decompression requirements (due to blood gas saturation for example) will not be affected by the ATOC sound source.

Reference: U.S. Navy Dive Manual, 15 February 1993, sections 2 and 7.

Comment: There appears to be a very high state of interest from divers as to whether they will be able to hear/feel the ATOC transmissions.

Response: The EIS/EIR provides sound fields that are based on the predicted propagation of the sound source's energy. The source itself will be located 88 km out to sea on the Pioneer Seamount at a depth beyond recreational diving (980 m) As part of the mitigation procedures, the output level and received levels of the ATOC source will be monitored. Additionally, the sound source signal will be slowly increased before each transmission to allow humans and animals to depart the area if they are annoyed. It is expected the source may be able to be heard by human divers underwater at distances up to approximately 30 km. However, at 2% duty cycle (for all except 2 months of the project), the source would transmit for 20 min every 4 hrs for a day (24 hr period), and then be silent for three days (72 hr period). This provides an off-duty quiet time of 98%. Although unexpected, the report of any verifiable observation of adverse effects on human divers will be immediately investigated, and if any significant adverse effects are attributable to the source, shut-down procedures would be implemented.

Comment: The effects of vibrating lungs would be very invasive and definitely annoying to all the species that will be subjected to this experiment.

Response: Physical vibration of the lungs is an effect that is highly dependent on matching a resonant frequency of the cavity in a very high level sound field (i.e., very close to the source). The sound field radius for which this phenomenon could possibly occur is believed to be inside the zones that could affect hearing and are thereby covered in the EIS/EIR. Further, as the EIS/EIR states, at (or near) the surface, 20 Hz appears to be the critical frequency for

potential intrathoracic resonance; at 30 m depth, 40 Hz; at 50 m depth 50 Hz. Given these data, and the fact that the ATOC source energy is spread across a 35 Hz bandwidth (not concentrated in a narrowband tone, as experimental data [referenced in the EIS/EIR] were), it is reasonable to conclude that the potential for ATOC source transmissions causing resonance in any diver air-containing cavity is negligible.

Comment: The ATOC EIS/EIR is devoid of hard data concerning the effects of SOFAR transmissions on sea life (including human divers).

Response: The fact that the Sound Fixing and Ranging (SOFAR) channel is a very good sound guide and that ATOC transmission effectiveness is based on the relative position of the ATOC source to the SOFAR channel has been considered in calculating the sound fields around the ATOC source. The lack of hard data on the potential effects of SOFAR acoustic transmissions on marine animals and humans is recognized--the MMRP proposed would help reduce this data shortfall.

Comment: ATOC noise will be impossible to avoid unless you decide not to dive during transmission times. Not a pleasant thought, to say the least, and possibly a violation of divers rights.

Response: The ATOC source transmissions may well be audible to human divers for 30 km around the source site. However, the effect of hearing the sound at the levels expected (where human divers could be expected to be located) is highly subjective and dependent upon an individual's underwater hearing sensitivity. Maximum received levels at known diving sites (estimated to be $\leq$ 105 dB) are expected to be inaudible (assuming 108 dB is the hearing threshold in humans for 75 Hz) for the 2-8% of the time it is actually on.

Comment: There may be involvement of the ATOC scientists with the transmission of the "Monterey Mystery Noise" heard by at least one diver on separate occasions in August, September, October, and December, 1994.

Response: ATOC did not have an acoustical source in the water during the period of the "Monterey Mystery Noise" occurrence. One potentially plausible explanation may be the unknown low frequency source estimated to be in the vicinity of 54S, 140.5W. This has been addressed in a Smithsonian Institution Bulletin of the Global Volcanism Network (Vol. 16, No. 3, March, 1991).

Comment: A more fair comparison of the noise of a whale-watching boat compared to the sounds expected near the shore from the ATOC transducer would be to locate the whale-watching boat at the same distance from the receivers as the ATOC source vice showing it directly overhead, as presented by Prof. Jim Miller at the Santa Cruz Public Hearing of January 6, 1995.

Response: The comparison presented by Prof. Miller at the Santa Cruz public hearing was to discuss the sound heard at near-shore diving locations, not to directly compare the output

of the ATOC source to a whale-watching boat. The ATOC source was clearly stated to be a more powerful source. Its positioning, far from shore and near the SOFAR channel, was also explained to have been done to achieve the required transoceanic transmission distance with the smallest source possible. This location also minimizes effects in the near-shore areas, where marine life is more concentrated.

ISSUE 19: FACILITY CONSTRUCTION AND REMOVAL

Comment: Describe the current plan for removal of ATOC facilities, including schedule and factors which might impact the removal. How does the removal of the ATOC facilities mitigate the impacts of installation? What constitutes "economically and practically feasible?"

Response: The physical installation of the cabled source is judged to be generally benign to the marine environment. Any physical alteration of the sea floor would be minor. The ATOC facilities have been designed with recovery in mind. The VLAs are moored with an acoustic release which, when activated, separates the array from its anchor (approximately 1724 kg) of iron railroad wheels, allowing the array to rise to the surface for recovery. The iron left on the bottom will eventually decompose through oxidation. The acoustic source would be deployed with a recovery line attached to a float with an acoustic release. Once released, the float takes the line to the surface, where it is recovered, attached to a winch and used to haul up the source. Both the VLA and the source have small "footprints" on the bottom, so removal of these units will have minimal impact on the seafloor, and will basically reverse the negligible effect of their installation.

The subsea cables can be retrieved at the same time as the recovery of the VLA and acoustic source units, as the cables are physically attached to them. Recovery of these cables is a relatively major undertaking, mainly due to the fact that over time the cable would tend to bury itself in the soft bottom of the seafloor, and where not buried would have become encrusted by marine organisms. The cable, and its intertidal encasement, is a benign system and would have virtually no impact if left unrecovered. However any effects of laying a cable on the seafloor in terms of breeding site alteration, or bottom habitat changes would be short-lived and the removal of the source cable and the return of the sea floor to its natural state would offset any short-term effects.

Every attempt would be made to remove the cable and the acoustic source from the seafloor. Nevertheless, there are some factors that could make removal "economically and practically infeasible." These might include loss of the source itself, extended unfavorable weather and sea conditions, or unexpected sharp increase in removal costs. The latter could result from increases in ship leasing costs; expanded costs for offloading and dry (on land) storage of the cable, or could result from expenditure of project funds for emergency or higher priority activities. Finally, removal of the ATOC equipment might be forestalled by the takeover of the system by another approved project or a follow-on experimental program.

CALIFORNIA EIS/EIR LETTER ISSUES

Name	Letter C Number	1 Funding of Program	2 Program EIS	3 Role of Acoustic Therm.	4 Altern. Site	5 Altern. Method	6 MMRP Protocol	7 Sound Fields	8 Biologic. Environ.	9 Physical Auditory Effects	10 Behavior Disrupt.	11 Potential for Habituat	12 Long-Term Effects	13 Potential Masking	14 Process of EIS	15 Insuff. Knwldge of LFS	16 General	17 ATOC/ MMRP Relation.	18 Social Environ.	19 Facility Const. & Removal	20 Text Change
Mr. Charles B. All	128	X											X								
Mr. Jeffery B. Allen	194												X								
Ms Arlene Q. Allen	114															X					
Ms Dolly Alley	136																				
Mr. Andrew Allison	15			X																	
Ms Kelly Allman	62			X				X					X	X							X
Ms Susanne Altermann	10	X																			
Ms Susanne M Altermann	14			X			X						X								
Ms Lisa Anderson	125																				
Mr. Sean Anderson	205						X														
Mr. Chuck Barbieri	97																				
Mr. James P. Barry	18															X					
Mr. Brian S. Beneke	79	X										X									
Mr. Jeffery R. Benoit	210				X	X	X	X	X				X		X					X	X
Mr. Jeffery R. Benoit	173				X																
Mr. Alan H. Berger	162			X		X							X								
Ms Mary L. Beyer	198					X															
Ms Nancy Black	191						X														X
Ms Nancy Boyd	31															X					
Ms Janet Brennan	8																				X
Ms Nicole S. Buckbery	196				X	X															
Mrs. Veronica Burns	109			X																	
Ms Chris Busby	123																				
Ms Gwyn Cadenhead	143	X																			
Mr. Gregor M. Calliet	38																				
Ms Elaine Capogeannis	12	X														X					
Mr. Michael Bugard	95	X											X								
Ms Geard V. Carey	206																				

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Mr. Cecil Carnes	9	X																			
Mr. Peter J. Carr	116	X																			
Mr. Francesco Casini	199	X																			
Mr. R. Peet/Ms S. Castro	13																				
Mr. Jon Challender	189	X																			
Ms Sharina Cheney	192			X																	
Mr. Ray Chuan	56		X	X			X								X			X			X
Mr. Phillip J. Clapman	181						X								X						
Mr. Paul N. Clarke	105	X											X								
Mr. Dave Clewett	39																				
Mr. Derek Cole	40			X			X														
Ms Helen Conklin	146				X											X					
Mr. Corey J. Conn	98	X		X																	
Mr. John Coon	55					X															
Mr. Tad Cuford	124																				
Ms Lynn Cumiskey	187	X		X																	
Mr. Ira Cump	155																				
Ms Marilyn Czech	131	X								X											
Mr Damon/MsTonnenaere	11						X														
Mr. Sean Dawson	69																				
Mr. Bob Debolt	37	X		X												X					
Mr. & Mrs. T. DeDore	113			X																	
Mr. Mark Delaplaine	170				X		X														X
Mr. John Delta	32	X											X		X	X					
Ms Natalie dePasquale	41	X																			
Mr. D. Dilworth	179			X														X	X		X
Ms Virginia L. Dollar	71	X																			
Mr.Dooley et al	182	X																			

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Mr. Mike A. Dunn	67																				
Mr. Steven J. Durkee	111	X											X								
Dr. Sylvia A. Earle	203				X																X
Ms Jill Earsing	110	X											X		X						
Mr. Case Edwards IV	87	X																			
Ms Torri J. Estrada	204		X	X	X	X	X	X	X	X	X	X	X	X	X						X
Mr. David J. Farrel	174		X	X		X	X						X								X
Ms Ellen Faurot-Daniels	177				X		X														X
Dr. Hillary Feldman	190			X			X		X				X								X
Mr. Patrick Finn	73																				
Mr. Matthew Fought	117																				
Mr. Byron Franklin	74																				
Mr. Julian Friedland	202					X										X					
Mr. Rodney M. Fujita	24				X		X						X								
Ms Barbara Gibson	25	X			X																
Mr. James Jay Gibson	23	X			X																
Ms Melissa Gibson	22	X			X																
Mr. Gary Ginzberg	139	X													X						
Ms Jane Gire	119	X											X								
Mr. Kevin C. Gleeson	152																				
Ms Tracy Gorton	91	X											X								
Ms Julie Greiner	142	X																			
Ms Jo Guerrero	58					X	X							X							X
C. L. Haker	121	X											X								
Ms Virginia Handley	165	X	X	X									X								
Ms Stephanie Hardin	51	X											X								
Mr. B. R. Harms	19	X			X				X												
Mr. Michael Harris	134																				

CALIFORNIA EIS/EIR LETTER ISSUES

Name	Letter C Number	1 Funding of Program	2 Program EIS	3 Role of Acoustic Therm.	4 Altern. Site	5 Altern. Method	6 MMRP Protocol	7 Sound Fields	8 Biologic. Environ.	9 Physical Auditory Effects	10 Behavior Disrupt.	11 Potential for Habituat	12 Long-Term Effects	13 Potential Masking	14 Process of EIS	15 Insuff. Knwldge of LFS	16 General	17 ATOC/ MMRP Relation.	18 Social Environ.	19 Facility Const. & Removal	20 Text Change
Dr. Christopher Harrold	185																				
Mr. Matt Heilmann	54	X		X																	
Mr. Eric Henson	127			X																	
Dr. Manfred M. Holl	65			X																	X
Ms Rebecca Ivy	70	X														X					
Ms Barbara Jackson	157																				
Mr. Bill Jackson	42														X						
Mr. Fred Keely	159					X			X										X		X
Mr. Kevine E. Johnson	115																				
Ms Nancy A. Johnson	126	X											X								
Mr. Robert Johnson	83			X																	
Ms S. & Mr. P. Kaplan	17															X					
Ms K. Strasser Kauffman	4																				
Ms K. Strasser Kauffman	64		X		X		X														X
Mr. Paul Keegan	99																				
Mr. Alexander F. Key	5												X								
Mr. Kevin Kelly	102	X																			
Mr. T. R. Kieckhefer	183						X							X							X
Ms Teri Koop	78	X		X																	
Mr. Rahul Krishnaswamy	156																				
Ms Marilyn A. LaRosa	178																				X
Mr. Jim Lawrence	72	X																			
Mr. Blake T. Lecount	33			X		X															
Mr. Peter Leipzig	130					X															
Mr. Alvin R. Lenoir	100	X		X																	
Mrs Y & Mr. S Lessmann	120														X						
Mr. Laurence Lipken	82														X	X					
Ms Lynne Lowe	207																				

CALIFORNIA EIS/EIR LETTER ISSUES

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Rev. Dr. Benet Luchion	21	X		X																	
Ms Helen Maher	208																				
Mr. L. Manley	145																				
Ms Bobbi Marchand	59																				
Mr. Michael Mathews	188	X												X							
Mr. C. J. Mayhew	140	X											X								
Mr. Dann McCright	112																				
Mr. R. J. McGuire	92	X													X	X					
Ms M. Miller-Henson	175						X						X								
Ms Jane Mio	147			X																	X
Ms Uza Mmueuer	197														X						
Ms Adele A. Mockevicius	107			X																	
Ms Debby Molina	52				X	X							X		X						
Ms Debby Molina	180			X	X								X								
Mr. Peter Molitor	57				X	X	X	X	X				X	X							X
Mr. Jim Moore	6						X		X			X	X								X
Ms Chris de Morselle	195	X				X															
Mr. Gerry Mundy	89																				
Ms Kerry B. Murnane	118														X	X					
Mr. Jay R. Murray	61			X															X		
Ms Rena Nayyar	7			X	X											X					
Ms Laura Neviro	86	X														X					
Ms Vicki Nichols	176			X	X		X											X			X
Ms Laura Nie	172																				
Ms Notthoff/Mr Reynolds	169				X	X												X			X
Ms Janice O'Brien	132					X	X						X								X
Mr. Dean Obersre-Lehn	60			X	X		X				X		X								X
Mr. Curtis W. Overacre	108															X					

CALIFORNIA EIS/EIR LETTER ISSUES

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Mr. Dan Overmyer	43	X														X					
Ms Margaret Owings	44										X		X								
Mr. Lesley Paddock	149																				
Ms Terry Palermo	193																				
Mr. John Pamperin	138				X		X								X						
Mr. Nicolas Papadakis	129																				X
Ms Cori Papamehaul;	103														X						
Ms Katharine Payne	16		X				X						X								X
Mr. John Pearse	45																				
Mr. Patrick Perkins	106															X					
Mr. Jerry Perry	1	X				X	X				X										
Mr. B. Peterson	167				X	X	X						X								X
Mr. A. Petrovich, Jr.	161					X	X														X
Ms Jane Podesta	29	X		X																	
Ms Genna Potter	137	X																			
Ms Kirsten Reed	104																				
Mr. Peter B. Reich	166	X				X															
Ms Laurel Robertson	26						X														
Ms Michelle Roffman	88	X											X								
Dr. Naomi A. Rose	163				X		X								X						X
Ms Nicole Roskos	46	X																			
Mr. Douglas H. Ross	150																				
Mr. Daniel Rudie	80	X																			
Ms Sheri Russell	77	X																			
Mr. David Salmond	101	X																			
Ms Dawn S. Sare	34	X			X								X								
Mr. Dave Schroder	47																				
Mr. Bryon Scott	144																				

CALIFORNIA EIS/EIR LETTER ISSUES

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Mr. Sam Schikowitz	209																				
Dr. Normam T. Seaton	168		X	X		X															
Ms Semida Sferdian	151																				
Mr. M. R Sherwood	2																				
Mr. Michael R. Sherwood	184	X	X		X	X	X	X					X		X		X	X			X
Ms Cynthia Simon	93	X											X		X						
Ms Mariana Simpson	186	X																			
Ms Amelia Slayton	3																				
Mr. Barkley Smith	148	X																			
Ms Danna Smith	84			X											X	X					
Ms Elaine Sohier	35	X		X	X										X	X					
Mr. Bill Sparks	94														X	X					
Ms Jeri Spehar	28																				
Ms Pamela Spehar	20															X					
Mr. D. Spinak	96						X				X		X								
Ms Freda Sprietsma	48				X	X															
Mr. Shawn Stenshol	68	X		X																	
Ms Eliza Stoker	85																				
Mr. Paul Stuart	63																				
Ms Karen Susag	49	X																			
Ms Christal D. Swift	201	X											X		X	X					
Mr. L. K. Swift.	135																				
Ms Shirley Tayler	171																				
Mr. Michael Teller	200						X						X								X
Mr. Kenneth Thompson	75	X		X																	
Mr. Chad Tickebary	90	X																			
Ms Vivian Traugot	50	X											X								
Mr. John R. Twiss, Jr.	133			X				X	X							X					
													X								X

CALIFORNIA EIS/EIR LETTER ISSUES

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Mr. Peter L. Tyack	158				X		X	X								X					X
Ms Barbara Utter	153																				
Ms Nicole J. Walthall	160	X	X	X	X		X	X					X		X					X	X
Mr. Michelle Waters	36	X				X	X				X		X	X							
Mr. Steven K. Webster	30																				
Dr. Weilgart/ Whitehead	27			X	X	X	X	X	X	X	X	X	X	X			X				X
Ms Anna Weinstein	53			X	X		X						X			X					X
Ms Pamela Wellner	154																				
Ms Dorris Welch-Burman	164																				X
Ms Ann C. White	81	X																			
Ms Jean Widaman	66						X											X			X
Mr. Thomas Willard	76																				
Mr. James Wilson	141																				
X0XX00X	122																				
Public Hearing		X		X	X	X	X						X		X			X			

C-1

546 W. Julian St.
San Jose, CA 95110
(408) 292-5488
December 2, 1994

(Please consider saving miles of these pages - paper recycling!)

RECEIVED 12-8-94

Advanced Research Project Agency
Attn: Mr. Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

This is with regard to the Draft Environmental Study/Environmental Impact Report for California's Acoustic Thermometry of Ocean Climate (ATOC) Project and its Associated Marine Mammal Program.

I wish to join the chorus of scientists and engineers opposed to the test method publicized in the San Jose Mercury News Today. Perhaps it a matter of misquoting, for it's quite well-known that there are superior methods for making the desired measurements without transmitting such high powered pulses as described in the reference article. However as best as I can ascertain from the material presented there, aquatic life such as the porpoise or sea lion could, otherwise, be seriously harmed, based on what little I know about them. For I understand such animals are quite curious about such unusual phenomena, so much so that they would be inclined to gather in large numbers about such a high energy sound source putting such unusual sounds far out into the ocean. This could make them quite vulnerable to capture by hostile fishermen or poachers or the like, unless the surrounding area were heavily defended against such would-be menaces. It might even modify the mating habits of such creatures - which could be harmful if the sounds are not artfully constructed - much as the way fear-inspiring jungle drums disturb mating habits of many jungle fauna of higher intelligence. On the other hand, it could also possibly have a positive influence - such as the revelation of Victor Hugo's love letters among the more poorly informed regarding such matters, or the publication of Dickens' "Christmas Carol" among so many hard-hearted financiers and the like in the heart of London, England during this day as they were apparently!

Since we don't know what the particular signalling waveform in this case will make the marine creatures involved do, at least as far as I've been able to determine thus far, I suggest a method (probably, along with many others having similar knowledge) that's far less apt to produce any noticeable effect at all, pro or con. It's well known to electrical and electronic communication engineers as "Spread Spectrum Technology", wherein a low powered pseudo-random signal is transmitted. Then received by cross-correlating the received signal with the delayed replicas of the transmitted signal. By so doing, one can obtain the ~~auto~~ cross-correlation function of the received signal ~~—~~ a function of the delay between the transmitted signal and its delayed replica produced at the receiving terminal.

I-3d

I-5a

I-6a

I-10a

I-10b

I-5a

The desired spectral response is then easily obtained by computing the Fourier Transform of the measured cross-correlation function.

As mentioned earlier here, the technology is really old hat, in fact the US Navy was using it at what was then called The Naval Electronics Laboratory in San Diego, CA back around 1958 or 1959 as best as I can recall. However that project, whose name escapes me, was highly classified, and for all I know may still be - though I should certainly hope not, judging from the amount of literature published in the IEEE proceedings every so often ever since then (I've noticed) this highly relevant to the subject. Still, one never knows but what the specific application that was then involved is not still an important matter worth maintaining secret in the interest of national defense. I-1

One excellent article (or series of them) has been published in the Proceedings of the IRE (before it became the IEEE) c. 1954 concerning the RAKE receiver developed by the Research Laboratory of Electronics at MIT (I believe, although it might have been Lincoln Labs). Here, the technique I've described was employed for communication in the presence of multiple paths in the High Frequency region of the RF spectrum for long range point-to-point communications. I don't recall any need there to determine the frequency spectrum of the signal received, which was most easily measurable at that time using conventional

C-1

spectrum analyzers, long before the use of Fast Fourier Transform (FFT) methods became in vogue. However the technique used in the RAKE receiver for computing the cross-correlation function is very well described, as well as methods for handling multiple multipath phenomena, which might also be very helpful in the current project under discussion.

Please excuse the crude materials and poor handwriting, but time, money and my present circumstance will permit little more to justify this small contribution, if any, to your effort, which I consider most worthwhile as a whole for the benefit of science.

Yours truly,

Terry L. Perry, MSEE*, BSEE**
Engineering Consultant

P.S. By all means, please forward a copy of this to Ms. Marilyn Cox at Scripps Institute, if you think it worthwhile doing so. Would also appreciate a copy of the subject study from her, if it's convenient for her to send me one. Also - best wishes to you and she - along with a Merry Christmas.

* Southern Methodist University, Dallas, TX; 1956
** Massachusetts Institute of Technology, Cambridge, MA 1954
*** Post Grad Work at UCLA (Incomplete PhD work)

SIERRA CLUB LEGAL DEFENSE FUND, INC.

The Law Firm for the Environmental Movement

180 Montgomery Street, Suite 1400 San Francisco, CA 94104-4209 (415) 627-6700 FAX (415) 627-6740

RECEIVED 12-9-94

December 5, 1994

Rolland A. Schmitten
Assistant Administrator for Fisheries
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910

Dr. William W. Fox, Jr.
Director, Office of Protected Resources
National Marine Fisheries Service
1335 East-West Highway, Room 13130
Silver Spring, Maryland 20910

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Re: Request For Extension of Time For Public Comment On California Component of ATOC DEIS and For Scheduling of Public Hearing After Comment Period Has Ended

Gentlemen:

On behalf of a coalition of environmental organizations concerned with the potential adverse impacts of the proposed Acoustic Thermometry of Ocean Climate (ATOC) project[1], I hereby request that the time for public comment on the Draft Environmental Impact Statement/Environmental Impact Report for the California Acoustic Thermometry of Ocean Climate Project and

[1] The coalition includes: Save Our Shores, Natural Resources Defense Council, Center for Marine Conservation, The Fund for Animals, Great Whales Foundation, Greenpeace, Humane Society of the United States, In Defense of Animals, Earth Island Institute, Friends of the Sea Otter, International Wildlife Coalition, Surfrider Foundation, Surfers' Environmental Alliance, People for the Ethical Treatment of Animals, Hawai'i's Thousand Friends, Life of the Land, Sierra Club, Animal Rights Hawai'i, Hawai'i Audubon Society, Citizens Against Noise, Save Our Surf, Kaua'i Friends of the Environment, and the Hawai'i Fishermen's Foundation.

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Its Associated Marine Mammal Research Program (DEIS) be extended 45 days, from January 16, 1995 to March 2, 1995, and that at least one public hearing be scheduled after that date.

Your agencies have been hard at work preparing the DEIS on this extremely controversial proposal for over nine months. The DEIS, which I received on December 2, 1994, is over 300 pages long and crammed with highly complex technical data and information. It is unreasonable to expect the public to be able to comment intelligently on this massive DEIS within the absolute legal minimum of 45 days that you have allowed, especially when the Christmas holiday season falls right in the middle of that 45-day period. A 90-day comment period would ensure that the public has a meaningful opportunity to comment (and consequently would better assist the concerned agencies in making the fully environmentally informed decision whether to allow ATOC to proceed that the law requires).

There should be at least one public hearing after the comment period has run so that the public can have the full time for preparing their written comments in which also to prepare any statements or testimony they wish to give at the public hearing. Because of the extraordinarily complex and controversial nature of ATOC, more than one public hearing is certainly appropriate, and we would not object to the scheduled hearing on January 6, 1995 so long as at least one additional hearing after the public comment period ends is also held.

Very truly yours,

Michael R. Sherwood

MICHAEL R. SHERWOOD
Staff Attorney

cc: Dr. Walter Munk,
Scripps Institution of Oceanography
Alan Waltner, Esq.
Dr. Ralph W. Alewine, III
Director, Advanced Research Project Agency

C-3

GREENPEACE SANTA CRUZ

1112-B Ocean Street, Santa Cruz, CA 95060 (408)429-9908

December 16, 1994

RECEIVED 12-22-94

Clayton H. Spikes
Advanced Research Project Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes:

There is growing concern in the Santa Cruz area about your proposed Acoustic Thermometry testing in the oceans. At the Santa Cruz office of Greenpeace our main activity is public outreach. We regularly receive feedback about environmental issues, and over the past six months we have heard more from the public about ATOC than any other issue. We are very concerned that the majority of the people in this community do not fully understand the purpose and potential impact of this project.

It takes time to circulate available information to the public, and it takes time for the public to digest this information and respond to it in an intelligent manner. Considering the volume of information now available since the release of your 300 page draft EIR/EIS, we strongly feel that the amount of time given for community input at the public hearing is inadequate.

A public hearing is the ideal forum for the public to voice their concerns, share information, and reach a better understanding of this issue. We at the Santa Cruz office of Greenpeace request an extension of the January 6 public hearing date by at least 30 days, or the scheduling of a second public hearing at least 30 days after the January 6 hearing.

Sincerely Yours,

Amelia Slayton

Amelia Slayton
Greenpeace Santa Cruz

C-4

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Monterey Bay National Marine Sanctuary
299 Foam Street, Suite D
Monterey, California 93940

SANCTUARY ADVISORY COUNCIL

December 20, 1994

RECEIVED 12-27-94

Mr. Clayton Spikes
Marine Acoustics, Inc
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

I am writing on behalf of the Monterey Bay National Marine Sanctuary Advisory Council. The Council is an active, federally appointed working group that meets monthly in open public form to help address a variety of Sanctuary related issues. One of the issues the public is very concerned about is the ATOC experiment.

In our last meeting, we had a presentation of the Draft EIR/EIS by Dr. Andrew M. G. Forbes. We look forward to having our three working groups (Education, Conservation and Research), along with the Council as a whole, provide comments. We appreciate the extension until 31 January for the written comment periods, as we feel this is a well written document that was the result of a lot of work by a variety of people and deserves a comprehensive review.

We will submit written comments to you in the future.

Sincerely,

Karin Strasser Kauffman

Karin Strasser Kauffman
Chair, Monterey Bay National
Marine Sanctuary Advisory Council

C-5

RECEIVED 2-1-95

To Clayton H. Spikes:

I am writing to express my opposition to the ATOC project.
I feel that the Draft Environmental Impact Statement is in adequate to allow the ATOC project to proceed.

I will make this letter short and to the point. The ATOC project is invading in an ecosystem that is not fully understood. There is increasing evidence that the cetacean population is highly evolved socially. This project could potentially create such effects as deafness and damage to reproductive and immune systems.

1 126

Basically, I will ask you how would you feel if something placed a large high decibel source above your city or town. A source that would create sterility in yourself and loved ones, and make you immune system weaker thereby making you susceptible to disease.

Please conduct further analysis before this project proceeds.

In Sorrow,

Alexander F. Key

C-6

UNIVERSITY OF CALIFORNIA, SAN DIEGO UCSD

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DEPARTMENT OF ANTHROPOLOGY, 0101
FAX: (619) 534-5946

9500 GILMAN DRIVE
LA JOLLA, CALIFORNIA 92093-0101

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington VA 22202

RECEIVED 1-5-95

28 Dec 1994

RE: ATOC/MMRP Draft EIS/EIR

Dear Dr. Spikes,

Let me begin by saying that I am very pleased to see the expanded MMRP described in the Draft EIS/EIR, especially as it refers to the potential use of data collected for evaluation and regulation of non-ATOC marine noise pollution. The MMRP looks like it will appreciably advance the state of the art for assessing marine animal responses to human activity and, weighed against the need for better understanding of global climate change, the risks to marine mammal populations seem acceptable; I am in favor of going ahead with the proposed Project.

That said, I have a number of comments about aspects of the MMRP which basically boil down to simply this: it is very unlikely that we would be able to detect a variety of significant negative impacts of ATOC sounds on cetaceans, and it is both intellectually dishonest and arrogant to pretend otherwise. This inability stems in very large part from the absence of good longterm natural history data on the affected taxa and populations--for example, we don't even know whether odontocetes "hear" low frequency sounds using skin mechanoreceptors (p. 4-44). I think it is somewhere between laughable and tragic that we stand to learn so much about cetacean populations and biology as a spinoff from a physical oceanography project rather than as the result of funding targeted for work on marine mammals themselves, and I hope that in addition to improving global climate models this whole ATOC experience will focus funding agency attention on the need to support research on the natural history of marine animals.[1]

[1] This is a good point to note that while I am a member of the Society for Marine Mammalogy and am interested in cetacean behavioral ecology, I am trained and employed as a biological anthropologist (PhD Harvard University, 1985) and have no personal financial motives here.

What are the odds of detecting harm to marine mammals?

Page ES-3: the ATOC project "will only begin if the system is determined to be safe for marine mammals and other sea life." This is either laughably naive or is based on an unusual definition of "safe", as a moment's reflection on the regulatory difficulties daily faced by e.g. the FDA should make clear. At best, we can fail to determine that ATOC is harmful. 1 I-6a

A good illustration of the problem appears to be the issue of blue whale numbers. If I understand correctly, on p. 3-17 the blue whale population off central California is estimated as 2,198 (which may or may not include a handful present in winter/spring); on C-19 the estimated California population is 1,000 (with 600 individually identifiable). If a 1996 MMRP survey reports 1,000 blue whales, can we conclude safely that there has been no change, or has the population plummeted to half its original abundance?

2 A second illustration: on 3-27 it is noted that short-finned pilot whales essentially *vanished* from southern California waters (cause unknown, perhaps related to El Niño). This raises an important question: if one or more species show a population change during this two-year study *and* there is an El Niño or other "extrinsic" event, how will "blame" be assigned? E.G., could the MMRP's conclusions be disputed on the grounds that local boat traffic had increased above some unknown threshold during the period? I see this as insoluble, and it vividly illustrates the need for more basic research on the natural history of marine mammals so that we understand, or at least can quantify, *non-anthropogenic* population fluctuations. I-8b

In this context I note with some concern that although no quantitative estimates of required sample sizes (and corresponding effort) are presented in Appendix C[2], preliminary observations suggest that (1) planned methods will *not* be adequate, and (2) consequently the researchers are *considering* shifting to playback experiments within Monterey Bay (C-63-64)[3]. 3 I-6e

If we cannot assign universally accepted risk estimates to smoking or airport noise exposure (both *vastly* more tractable, for obvious reasons)

[2] I assume that existing data could be used to estimate *approximate* effort needed to document *population* changes given reported densities--the Southwest Fisheries Science Center has been working for about 2 decades on the problem of estimating changes in ETP dolphin populations, and surely their techniques/experience could be applied to central California whales.

[3] A question: will a separate EIS/EIR be needed before ATOC-level playbacks can be used for research within the Bay? If not, why not, since such siting is not discussed in this document?

then the odds of demonstrating serious but non-catastrophic biological impacts of ATOC are remote, and to believe otherwise stems from an intellectual arrogance I find deeply troubling. It is our best guess that there will not be any such impacts so I am in favor of proceeding, but let's not kid ourselves that we are in full control. 4 I-6k

What sort of harm might be done to marine mammals?

Virtually the entire effort is dedicated to detecting the effects of physical damage to the auditory system, or disruption of normal behavioral patterns. Mention is made of possible physiological effects (most likely acting via the stress response), but they receive little attention (cf. 4-26, 4-28-30, 4-36). It is not that such effects might not be important (p. 4-30), but that we would have no way of detecting them. I raised this issue in a letter to Marilyn Cox dated 24 June 1994 which includes some discussion of relevant findings from human and nonhuman primate studies[4]. In that letter I stated

> *I strongly urge that the Advisory Board being assembled by Dr. Costa include someone from the environmental health/noise research community. When I sent an enquiry to HUMBIO-L (internet human biology list) on this topic, several people suggested I contact Dr. Lawrence Schell (Depts. of Anthropology and Epidemiology, SUNY Albany, Albany NY 12222). cf. Schell (1991). Perhaps he could advise the Project re a suitable expert.* 5 I-12b

I still believe such expertise is very much needed.

Along these lines, I was fascinated by the description of noise effects on shrimp (4-102)--depressed growth and reproduction, with increased aggression and mortality. While very general, these responses are similar enough to some of the reported effects of e.g. airport noise on humans to suggest that such effects are very general--and hence to be expected in marine mammals as well, at least under comparably intense ensonification levels. Stress responses may well be phylogenetically conservative, but I note that based on my own ca. 15 years studying a variety of nonhuman primates, what is [behaviorally] stressful varies greatly between species. I see no *a priori* reason to assume that, for example, if ATOC sounds do not bother humpbacks they will not devastate right whales. There is not much we can do about such possibilities other than remain alert to them.

Note that on 4-28 habituation is defined as "the development of reduced response [to a repeated stimulus] when the stimulus is not accompanied by anything that the animal 'perceives' as threatening." Can we realistically expect marine mammals to *perceive* the evolutionarily novel ATOC sounds as threatening, even if they produce negative 6 I-11d

[4] reviewed in Schell, L. M. (1991). Effects of pollutants on human prenatal and postnatal growth: noise, lead, polychlorobiphenyl compounds, and toxic wastes. *Yrbk. Phys. Anthropol.* 34: 157-188.

physiological consequences? Failure to cope adaptively with novel stimuli is commonplace among humans: abundant salt and sugar (scarce during pre-technological human existence) create various health problems, and the health effects of 'urban stress' (including, significantly, noise) are matters of much concern. This is literally textbook knowledge in biological anthropology[5].

How many individual marine mammals will be affected?

On 4-22 and 4-50 calculations are presented indicating that there is <1% chance of a single blue or sperm whale being exposed to the 150 dB sound field during the two year project. 150 dB was chosen as it is the level at which physical damage to the ear might be expected to occur. It is worth noting that mysticetes apparently tend to show negative behavioral responses to sounds in the 120 dB range (4-25-27); the picture for odontocetes seems less clear (4-51-52), with perhaps 130 dB being a comparable behavioral stimulus level (though it is reported that sperm whales may react to 100 dB sounds, albeit at higher frequencies). I did some crude back-of-envelope calculations of the number of blue and fin whales likely to be exposed to the 120 dB sound level over two years using the 2% duty cycle and figures on pp. 3-17 & 4-27; as I make it, there is about a 100% chance of an individual being exposed to the 120 dB sound field at least once.

7 TC

Thank you very much for your attention; please do not hesitate to contact me if any of the above is unclear or if there is anything else I can do. I very much appreciate both the effort that has gone into this Draft EIS/EIR, and the system that makes widespread scientific participation in such matters possible.

Sincerely yours,

Jim Moore

Jim Moore
Assist. Prof.
jjmoore@ucsd.edu
(619) 534-5572

5 see Jurmain, R. & Nelson, H. (1994). Introduction to Physical Anthropology (6th edition). St. Paul: West Publishing (chapter 6); also, Eaton, S. B. & Konner, M. (1985). Paleolithic nutrition: a consideration of its nature and current implications. *New England Journal of Medicine*, 312: 283-289.

RECEIVED 1-4-95

C-7

271 Seely Ave
Aromas, CA 95004
Dec. 28, 1994

Dear mr. Spikes,

Please do all you can to prevent underwater devices from being located in the Montery Nat'l marine Sanctuary to measure global warming. I am especially concerned that

1 our newspaper on 12/2/94 stated that project scientists released a study saying that the sonar devices would have an insignificant impact on sea

2 life while later admitting that little is known about the effect of loud noise on marine life. As a result, the risk to marine life due to the noise is in direct conflict with the purpose of our sanctuary, and outweighs the benefits of the study. Furthermore, we already all know that

3 the risk of global warming, as well as pollution and dependence on foreign energy resources, can be reduced by using less energy. It would be much more efficient to develop and implement additional energy conservation measures and less destructive alternative energy sources.

I-4a I-15 I-3b

Sincerely,
Sara Nayyar

MONTEREY BAY
Unified Air Pollution Control District
serving Monterey, San Benito, and Santa Cruz counties

INTERIM AIR POLLUTION CONTROL OFFICER
Doug Quetin

24580 Silver Cloud Court • Monterey, California 93940 • 408/647-9411 • FAX 408/647-8501

December 28, 1994

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

RECEIVED 1-3-95

SUBJECT: DRAFT EIR/EIS FOR CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT

Dear Mr. Spikes:

Staff has reviewed the Draft Environmental Impact Report/ Statement for the California ATOC project, a two-year demonstration that would produce acoustic soundpaths in the ocean's sound channel to measure average ocean temperatures. This would include locating a 260 watt output acoustic sound source 21.5 miles off of Pt. Sur at a depth of 3,000 feet and installing equipment in a deeper offshore location to monitor sounds for research purposes. Staff has the following comments:

1. Page 4-130, para. 2. The analysis should state how many vessels and aircraft would operate during a worst-case scenario and conclude whether their emissions would exceed 150 lb/day of ROG or NO_x, the criterion of significance for ozone precursors within the North Central Coast Air Basin.

1 Text Change (TC)

2. Page 5-18, para. 5. The EIR/EIS should note that the ATOC project is exempt from the federal general conformity rule.

2 TC

Thank you for the opportunity to review the document. If you have any questions, please do not hesitate to call Douglas Kim of our planning staff.

Sincerely,

Janet Brennan
Senior Planner, Planning and
Air Monitoring Division

cc: Nicolas Papadakis, AMBAG
File: 3442
PAM/dk

CHAIR: Fred Keeley, Santa Cruz County
DISTRICT BOARD MEMBERS
VICE CHAIR: Alan Styles, Salinas
Jack Barlich, Del Rey Oaks
Edith Johnsen, Monterey County
Oscar Rios, Watsonville
Larry Cain, San Juan Bautista
John Myers, King City
Simon Salinas, Monterey County
Curtis Graves, San Benito County
Tom Perkins, Monterey County
Walt Symons, Santa Cruz County

RECEIVED 1-11-95

1/5/95

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics
4 Crystal Park - Suite 901
2345 Crystal Dr.
Arlington Va. 22202

Dear Mr. Spikes:

I intend to be at the ATOC meeting tomorrow in Santa Cruz as I am concerned what
1 this testing is ultimately to I-1
accomplish. I believe this test is to learn more about the global warming, but as it seems to be a fact why is the testing actually pursued by the Dept. of Defense?

408-425-5949
Wayfarer Station / Lemon Yellow Farm
111 Vine Hill Road, Santa Cruz, CA 95065

C-9

What is the ultimate motive? A public meeting needs all the facts.

I seems to me there is no difference in the intensity of sound in this less mos. study than the original proposal set forth in the May meeting here in Santa Cruz last year. The hazards still exist.

Perhaps I will hear you at the upcoming meeting. In any case, perhaps you will respond to this letter.

Sincerely,
Cecil Cornes

C-10

Dear ARPA: 1/5/95

I'm very concerned about the proposed "ATOC" tests in our oceans. I understand that the Draft Environmental Impact statement is inadequate. It just isn't worth the risk. No EIS should make me change my mind. Please do everything possible
1 to stop these tests and any other actions that risk life in our oceans. You don't scream at a baby to see if it's affected by loud noises in its adulthood. What obscurity! Also, the military has no business messing with whales or my tax payer money.

Susanne Altermann

C-11 Jan. 5, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes,

We are very concerned about the sound emissions associated with the California Acoustic Thermometry of Ocean Climate project. We understand the need for research regarding global warming, but polluting the oceans with additional man-made noise is an unacceptable means to that end as far as we are concerned.

The Draft EIS/EIR states that the effects of the sound emissions
1 on marine mammels and turtles will be monitered, but in our opinion to even consider bombarding ocean creatures with sound in a world where sounds are the basis of communication and survival for these creatures is a mistake. Whether it is 2% of the time or 8% of the time, we are opposed to intentional, systematic emission of sounds (of any frequency) being emitted into the Pacific Ocean.

Sincerely,

Matthew S. Dawn

Jennifer Tollenaere

1/3/95

C-12

Elaine L. Capogeannis
P.O. Box 3486
Saratoga, Ca. 95070

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Va. 22202

RECEIVED
1-8-95

Dear Friends,

Why does the ATOC committee want this sound channel so much? They are like someone persistantly yelling in another's ear, "Are you deaf? Are you deaf? Are...?" Eventually the victim is too deaf to say "No". So the two sound channels send out their waves for twenty minute interludes every four hours for two months straight (ten years if that test "passes"), messing-up communities in the ocean. Is this grand scale destruction worth a discovery of the exact temporal increase in our global atmosphere? Hey! We know we're destroying our world, do we have to know what exact degree we are doing it in?

The January 3rd article's claim that the damage to marine life will probably be too subtle to detect. So the ATOC committee cries out, "...it is impossible to predict the effects of low-frequency sound on most marine mammals". Yet this does not mean the possible resulting damage is thus insignificant. If we have trouble detecting the major effects this could have on marine life, note the extent to which the harm would have progressed by the time it is possible to detect them. 1 I-15

My greates wonder is whether our comments to this event would even sway ATOC's strive? The military is funding ATOC, which shows an already stable income - and a stable income sires a strive to continue. It's wood for a hungry fire. ATOC said they would stop their research altogether if the transmissions are found to hurt wildlife. I think not. If all this money and time goes into such a project, the workers would need more than a handful of facts to get them off their study. That's what scares me. 2 I-1

C-12

Half the project has been noted to "...give them a chance to collect data on the effects of noise on animals" anyway. This further supports ATOC's passive reaction to obverse affects; it is all part of the study to them. Collect the data from the effects of the boats and submarines we are presently using; do not create the damage to study! Do the more profitable study of how our everyday living is affecting our environment - of which many are presumably working on.

So the question now is not only, "Is this right or wrong?" Truly the wrong outweighs the right given the info. by the previous article. But now there is the added element of "Can we stop this?" Is this just a place in the newspaper to vent our rage (or rejoice as the case might be)?

A past English teacher of mine once warned me "You can find anything you're looking for in any book or person, for every idea can ultimately be manipulated in your mind into what you want to believe." If ATOC wants this info badly enough, disastrous results could be shrugged off as mistakes in calculations or shoved aside as insignificant incidents. That is reason enough to stop and take a serious counter-look at this project.

Thank you for your time.

Sincerely,
Elaine L. Capogeannis

C-13

The North Shore Animal League serves abandoned dogs and cats, and finds them new homes.

POST CARD

1-7-95

Mr. Spikes: We are adamantly FOR the ATOC Project. Do not let the Santa Cruz Marxists stop this important work.

We are property owners on the Monterey Bay:

Ronald Peat
Sandra Castro
1181 Wanda Ave.
Seaside, CA 93955

Old Glory

RECEIVED 1-10-95

TO:
Advanced Research Projects
% Clayton H. Spikes, Marine Acoustics Inc.
4 Crystal Park #901
2345 Crystal Dr.
Arlington, VA 22202

GCPC-45 PUFSQUEAK PRODUCTIONS ART BY MARY BADENHOP

C-14

RECEIVED 1-12-96

Susanne M. Altermann
332 Market Street Santa Cruz, California 95060 (408) 426-2607

January 7, 1995

Dear ARPA:

I attended last night's public hearing on the proposed ATOC project. I heard people speak for and against the project, and I read portions of the draft EIS/EIR Executive Summary. I saw a mixture of misinformation, self-interest (especially finacial), and emotion on both sides. I make no complaint about this.

I do not intend to fully study the EIS/EIR to determine each major oversight or provision worth appreciation. The most important things to say about the proposed project are already obvious to me:

1 1) A study of global warming of this type is not needed. I-3b
2 2) The risk to marine mammals CANNOT be adequately assessed in six months I-6b before the rumble experiment begins, and the project poses irresponsible and unnecessary potential risk to organisms. in the long term.
3) I do not want my tax payer money spent in this way in the first place.

I do not think that marine mammal research is an antidote to the potential risks. In the EIR/EIS I see an emphasis placed on the "riskiness" of comparing human hearing to whale hearing -- and then it goes on to do precisely that, only with I-12a scientific compensations for air versus water hearing! My point is that you do not
3 know and cannot know the long term effects on living things until after the fact. Even then, you will probably not know exactly how or what the reasons are. Many ideas, later found to have unexpected deleterious effects, were supported in the initial stages by reasoning very similar to that which I find among proponents to this project.

Whale hearing, for example, and the affect of low sounds on all living things is a mystery. Just because it's a mystery does not mean that the risk of experimenting with it is "negligible." Negligible to you, not to the whale.

I understand that many people have contributed a great deal of time, money and effort in support of this project and in support of improving it. I know it's hard to let go. Individuals supporting the project may have life-honoring intentions, but I feel that OUR priorities must be reexamined. Marine biologists should not have to support themselves (and be pitted against "environmentalists") off research which threatens the very source of their interest. Marine mammal research should be independent of research which threatens ~~it~~ marine mammals. By this, I do not mean that marine mammal research should be antagonistic with other types of research necessarily. In any case, I ask that everyone supporting this proposal honor life in our oceans in another way. Find another way. Make no loud sounds where the whales pass.

Sincerely,

Susanne Altermann

cc: Congressman Sam Farr
CA Assemblyman Bruce McPherson

C-15

Andrew Allison
25420 Via Cicindela
Carmel, CA 93923
Tel:408/626-4361
Fax:408/626-4362

January 7, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics Inc.
4 Crystal Park, Ste 901
2345 Crystal Drive
Arlington, VA 22202

RECEIVED 1-13-95

Re: ATOC

The argument raised by environmentalists that in the absence of evidence that it will not harm marine life ATOC is at best immoral and, given that it is proposed for a marine sanctuary, probably illegal is unassailable. However, that argument fails to address the real issue, which is that the experiment itself is quite obviously a scam.

First, it is my understanding that vertical circulation in the ocean is quite limited and that it takes well over a decade for the effects of changes in surface
1 temperature to reach the 3000 foot depth of the proposed experiment. In other words, the experimenters will be measuring what happened at the surface roughly ten years previously. Meanwhile, the government is measuring global temperature in real time by means of satellite observations. I-3d

Second, the experiment is being conducted within the sphere of influence of El
2 Niño, a long-standing but unpredictable natural phenomenon that causes water temperature and climatic changes far greater than those being sought by ATOC. Until the effects of El Niño are understood, the results of ATOC will be meaningless. I-3d

In short, there is simply no way that this experiment can contribute anything useful to the search for the global warming will-o-the-wisp.

Sincerely,

C-16

CORNELL LABORATORY of ORNITHOLOGY
159 SAPSUCKER WOODS ROAD • ITHACA, NEW YORK 14850-1999 • (607) 254-BIRD

RECEIVED 1-17-95

To: Advanced Research Projects Agency
c/o Clayton Spike
Marine Acoustics, Inc
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Va. 22202

From: Katharine Payne

Re: ATOC Draft EIS/EIR

Date: January 7, 1995

I am grateful for the effort that has gone into this huge and thorough document.

I would like to make a few suggestions in emphasis, organization, and judgement. Until they are attended to I find the document a bit biassed.

1) Emphasis. I find an under-emphasis of those potentially negative impacts on marine life that cannot and will not be measured. These are mentioned in various places but are never summarized, which makes them seem like a few small scattered points, while for a few of ATOC's critics they are a real enough problem to throw the whole program into question. What I am especially referring to is long-term impacts on species that will be monitored, and all impacts on species that will not be monitored. Perhaps the best reference to the former is the sentence starting on the bottom of page 4-13: ". . .the
1 presence of marine mammals in an ensonified area does not prove that the population or individual therein is unaffected by the noise as they may stay in area despite the presence of noise disturbance if there are no alternative areas that meet their requirements (I add -- or if it is not in their behavioral repertoire to move) . . . Most of the impacts from the ATOC source are anticipated to fall in this category."

I-12a

If *most of the impacts* from the ATOC source are anticipated to fall in this category, these impacts should be given emphasis. A separate title section should be devoted to the immeasurable potential long-term impacts that will not be scientifically addressed within the time-scale of the proposed project.

2) Judgement. In several places we find variants of the following: " the lack of
2 reliable information justifies the assumption of an unknown impact for purposes of this EIS/EIR, but at a less than significnt level." "Less than significant" is based on an earlier statements that ""exposures to subsea

I-6k

sounds will be minimized whenever feasible". "Minimized whenever feasible" is vague but indicates that first consideration will go to experimental protocol in situations where impacts are not known in advance. This is just what critics of the program are worrying about.

There are various other "less than significant" statements that seem careless.
3 The CEQA Impact 10 for fish (page 4-88), which points out that injured fish will be easier to catch and therefore their injury will be advantageous to predators, is odd. With that kind of logic anything is justifiable. TC

3) Finally I feel that the long-term ATOC project insofar as it can be sketched out should actually be described in the section called "Long-term ATOC Program Plans". At present the message of this section has little to do with its title and is just a disclaimer: "the data necessary to sport a programmatic EIS
4 do not exist at this time, and without these data no basis exists for the proposal/approval of a long-term program." It is difficult for reviewers to comment on a feasibility study with some probable negative impacts without a clearer sense of exactly what the main, follow-up study might consist of should the feasibility study prove successful and harmless. The details of the way ATOC measurements would be used, presently described in the "Global climate models" section of the "Alternatives" section of the report, really belong up front where readers will get a sense of how the long-term ATOC data would enhance a global monitoring plan. I-2

Respectfully submitted,

Katharine Payne

Katharine Payne

January 7, 1995

RECEIVED 1-19-95

Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
Arlington, Va. 22202

Dear Mr. Spikes:

After listening to the presentations for and against underwater sound transmission at the Santa Cruz Civic Auditorium on Friday evening, January 6, 1995, we can only conclude that the possibly for harm to marine life from such research has not been adequately
1 assessed. Until that information is more complete the underwater transmissions should be put on hold. I-15

Global warming is definitely an important issue for the survival of our planet but the harm to all types of marine life is just as important a consideration. How can we justify the potential suffering until we know about the extent of the consequences involved.

Sincerely,

Susie and Phil Kaplan

Susie and Phil Kaplan
Paradise Park #553
Santa Cruz, Ca. 95060.

C-18

M B A R I

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE

January 9, 1995

RECEIVED 1-12-95

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics Inc.
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Va 22202

Dear Committee Members,

I would like to comment on the ATOC project. I am very strongly in favor of this project, which is considered by experts in the field, including members of the National Academy of Science (a very prestigious academy), one of the most valuable and promising methods of monitoring global changes in ocean temperature. Although public opinion for such projects is very important, it seems highly questionable to place equal importance on the opinions of the public and scientific experts, when considering a permit to continue this project. It is ludicrous to think that uneducated, but well-meaning, citizens unfamiliar with ocean physics, sound transmission in water, behavior and physiology of marine mammals, fishes, and invertebrates, and other information relevant to the ATOC proposal, should outweigh the highly informed and carefully considered views of experts in these fields. I realize that the public, perhaps especially conservationists, are concerned with the impacts of the project to marine animals. However, nearly all marine scientists share this concern and love for the ocean and marine fauna and flora that conservationists (who seem to think scientists are the opposition) express.

An important problem seems to be the inability of scientists to state that there will be no impact to marine animals. Withholding this statement seems to be interpreted by non-scientists as stating the opposite - that there will be *impacts*, and probably significant impacts to marine life. This interpretation is entirely unwarranted, and reflects a clear difference in perspective between scientists and non-scientists, which seems to be the heart of the public misunderstanding of this issue. Scientists, unlike the lay public, are much more careful in their interpretations of evidence for or against the impacts of the ATOC project. While the evidence supports the hypothesis that impacts will be negligible, there presently exists too little information on the topic to state emphatically (with high statistical probability) that impacts will not occur. Nevertheless, ATOC experts predict that the impacts will be small, based on their knowledge of ocean physics and marine mammal physiology. The public, however, has concern for marine life, but bases their opinion that ATOC will have negative effects on very limited, or NO understanding of physics and physiology. As an example, ATOC impacts are expected to be less than the present impacts of ship traffic, which so-called conservationists don't seem worried about, simply because they assume it is negligible. In both cases, the opinions of ill-informed conservationists are unwarranted and probably incorrect. In contrast, the opinions and advise of highly informed conservationists, like the scientists proposing this study, are based on fact rather than emotion, and should be heeded. Although public opinion is important, it should carry little weight for advisory committee. If

1 I-15

we ask accountants, lifeguards, lawyers, dentists, truck drivers, store clerks, and other non-experts to decide what to do about the ATOC project, perhaps we should likewise consider their opinions as important as heart specialists next time we have a heart problem!

Instead of weighing public opinion in terms of the value of the project, I suggest we focus instead on the real problem - educating the public concerning this matter. Let scientists decide on the importance and potential impacts of the project.

Sincerely,

James P. Barry
Assistant Scientist

RECEIVED 1-13-95

Advanced Research Projects Agency
c/o Clayton H. Spikes, Marine Acoustics Inc.
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

1/10/95

Dear Mr. Spikes:

I'm writing to voice the strong opposition of my family to the proposed ATOC project. We are outraged that such a proposal is even in the works.

Ever since we learned that the Department of Defense is behind this project, we've been extremely skeptical that measuring global warming is the real reason for it. There are other agencies, such as NASA, that are already engaged in this work via satellite. It seems far more likely that ATOC is actually a military experiment, probably designed to improve submarine detection. If so, why not say so? Doubtless because the public wouldn't see the necessity of it and would be in strong opposition. 1 I-1

Well, we're in strong opposition to such a scheme for measuring global warming, if that is it s real purpose. Don't the marine mammals of the world have enough problems with the noise already in the ocean without adding to it for a most dubious experiment? 2 I-8L Our rare blue whales, for example, already have some difficulty in contacting each other because of shipping noises. Why should we make it even more unlikely that they can find each other for mating, companionship, etc.?

We totally oppose this project, primarily because of its unknown effects on our important marine life. Moreover, no such project should even be considered in our newly established Monterey Bay National Marine Sanctuary. What is a sanctuary for, if not to protect the marine life within it?? 3 I-4a

We urge that ATOC be abandoned.

Sincerely

B. R. Harms

(B. R. Harms)
26500 Val Verde Drive
Carmel, CA 93923

RECEIVED 1-17-95

Advanced Research Projects Agency
C/O Clayton H. Spikes
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Pamela Spehar
315 Redwood Drive
Boulder Creek, CA. 95006

Re: Acoustic Thermometry of Ocean Climate

Dear Mr. Spikes,

Testing and documenting the global warming changes is a valuable cause and research in this area is important. The information gained by successful testing the ocean climate using acoustic thermometry would certainly assist government funding and public attention to the serious issues at hand with global warming. Discoveries founded using acoustic thermometry of the ocean climate can benefit whales and assist in resolution of radiation and assessment of solar impact to species that are the whales food source.

Sending sound across the Pacific Ocean to determine the ocean temperature can be harmful to whales, dolphins, seals, sea turtles and other marine species. a Has an analysis been completed for the impact to marine life? Is there an analysis for the effects to marine life for the sound emissions predicted for this testing? b Are studies available regarding the impact to the migratory behavior of the marine life during acoustic thermometry? c What stress levels will this type testing cause to marine life? d In the scientific arena who are the specialists involved with facts surrounding any habitat studies related to this proposal?

a 1 I-6k
b 2 I-10c
c 3 I-11b
d 4 Sec 7 App. C, E

I am aware of the Public Hearing being held Friday, January 6, 1995, at the Santa Cruz Civic Auditorium, 307 Church Street, Santa Cruz, California. Please forward a copy of the meeting minutes published for this meeting.

I am very concerned with the severity of global warming. I am equally concerned for the ocean marine life in the Monterey Bay Marine Sanctuary. Please forward any information of analysis or studies completed to support this proposal. As new information and discoveries are formulated on this issue, please keep me informed. I appreciate your assistance with this topic. Thank you very much for your time.

Sincerely,

Pamela Spehar

C-21 THE COMMITTEE FOR UNIVERSAL SECURITY
ZERO TOLERANCE TOXIC CAMPAIGN

Advanced Research Projects Agency
c/o Clayton H. Spiked
Marine Acoustic, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

RECEIVED 1-18-95

1/11/95

Greetings and Blessings

We are writing to oppose the California Acoustic Thermometry of Ocean Climate (ATOC) proposal.

We oppose the ATOC Project because it is an unnecessary economic experience.
1 We are in agreement with the idea of Congress who directed the department Of Defense to expend a portion of its budget on environmentally-related issues. We do not think that the ATOC Project is the best way to expend the funds and resources. I-1

We would rather see the monies used on Ecosystem restoration. or
Military toxic elimination and clean up. or
Urban Communities environment developmental enhancement projects,which would be designed by and for youth employment. or
Clean up and restoration of ocean environments, coast line, beaches,habitat water inlet systems.or
Provide homes for the homeless and other programs supporting universal security. To name a few.

Upon reviewing the ATOC draft statement, we have concluded that this proposal is just another testing devise;(in dispite of its noble intentions to serve the environment). the truth is we do not need another test in regard to the environment. We need proactive
2 task forces to stop the degradation and destruction of it. There are a number of"FIX" the environment plans already on the table, to many to site here however to name a few I-32 there is the Greenpeace Recommendations The union of concern science recommendations, The International Joint Commission Recommendations And The Committee For universal Security Recommendations.

C-21 1

We are concern about the cry from industrial "polluters" for more test as a way of curtailing actions against them for their negative impacts on the environment and the health and wellbeing of the human community.
Testing, More Research, assessments, reassessments,and evaluations has been used as an effective ploy in the opposition to real changes for a safe and clean environment. it is time to defeat the ploys and deception campaigns of industry and environmentally destructive enterprises.

In closing we urge you to Deny the permit (No Action)

We wish you well

For biological integrity
Benet Luchion
Rev. Dr. Benet Luchion D.D.
1095-A Smith Grade Road
Santa Cruz, Ca 95060
408 429-9623

C-22

RECEIVED 1-19-95

JANUARY 12, 1995

CLAYTON SPIKES,
ADVANCED RESEARCH PROJECTS AGENCY,

1 STOP THE MILITARY FUNDED ATOC EXPERIMENT TO BROADCAST LOUD UNDERWATER SOUNDS IN MONTEREY BAY FOR 10 YEARS TO STUDY GLOBAL WARMING. I-1

2 THE MARINE SANCTUARY SHOULD REMAIN A SANCTUARY FOR THE MARINE MAMMALS AND ALL LIFE IN THE MONTEREY BAY OCEAN ENVIRONMENT. I-4a

3 AS A WOMAN, I IMPLORE YOU TO STOP SPENDING MILLIONS OF DOLLARS THAT THREATEN OUR SANCTUARY WITH ATOC. I WANT FUTURE GENERATIONS TO BE ABLE TO SHARE OUR SANCTUARY WITH SPERM WHALES, ELEPHANT SEALS, LEATHER BACK TURTLES, ORCAS, GREY WHALES, BLUE WHALES, HUMPBACK WHALES, AND PLANKTON. MANY OF THESE SPECIES DIVE DEEPLY ENOUGH TO BE SIGNIFICANTLY ADVERSLY EFFECTED BY UNDERWATER SONAR EMITTERS FROM OUR BEAUTIFUL MONTEREY BAY SANCTUARY TO KAUAI. IT IS UNACCEPTABLE FOR ATOC TO CAUSE EVEN THE SLIGHTEST IMPACT ON OUR MARINE SANCTUARY. I-4a

Melissa Gibson
181 Hubbard Gulch Rd
Ben Lomond, CA 95005

C-23

RECEIVED 1-19-95

JANUARY 12, 1995

CLAYTON SPIKES,
ADVANCED RESEARCH PROJECTS AGENCY,

1 STOP THE MILITARY FUNDED ATOC EXPERIMENT TO BROADCAST LOUD UNDERWATER SOUNDS IN MONTEREY BAY FOR 10 YEARS TO STUDY GLOBAL WARMING. I-1

2 THE MARINE SANCTUARY SHOULD REMAIN A SANCTUARY FOR THE MARINE MAMMALS AND ALL LIFE IN THE MONTEREY BAY OCEAN ENVIRONMENT. I-4a

3 SPERM WHALES, ELEPHANT SEALS, LEATHER BACK TURTLES, ORCAS, GREY WHALES, BLUE WHALES, HUMPBACK WHALES, AND PLANKTON. MANY OF THESE SPECIES DIVE DEEPLY ENOUGH TO BE SIGNIFICANTLY ADVERSLY EFFECTED BY UNDERWATER SONAR EMITTERS FROM OUR BEAUTIFUL MONTEREY BAY SANCTUARY TO KAUAI. IT IS UNACCEPTABLE FOR ATOC TO CAUSE EVEN THE SLIGHTEST IMPACT ON OUR MARINE SANCTUARY. I-4a

James Jay Gibson
181 Hubbard Gulch Rd
Ben Lomond, CA 95005

C-24

ENVIRONMENTAL DEFENSE FUND

RECEIVED 1-18-95

California Office
Rockridge Market Hall
5655 College Ave.
Oakland, CA 94618
(510) 658-8008
Fax: 510-658-0630

January 12, 1995

Advanced Research Projects Agency
c/o: Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

To Whom it May Concern:

The Environmental Defense Fund is pleased to submit the enclosed written comments on the draft Environmental Impact Statement/Environmental Impact Report for the California Acoustic Thermometry of Ocean Climate (ATOC) Project and its associated Marine Mammal Research Program, prepared by the Advanced Research Projects Agency, the National Marine Fisheries Service, and the University of California at San Diego.

We hope you will take our recommendations for a cautious, prudent approach to the ATOC project to heart. The fact that there exists virtually no evidence bearing on the question of how marine organisms might respond to the ATOC sound source should be squarely acknowledged, and addressed with a credible pilot research program, conducted with a low-power mobile source. We ask that you consider our proposal to site the ATOC sound source outside the boundaries of any marine sanctuary, in a place that would minimize exposure of marine mammals to the source, even if the pilot research program indicates that adverse impacts are expected to be minimal. We contend that the long term and subtle, but nevertheless potentially serious, impacts can never be fully known, especially within the short time frame contemplated for the pilot research program. Finally, we hold that better defined, objective thresholds for adverse impacts that would result in termination of ATOC signals must be in place, and that environmentalists and citizens-at-large must play an important role in defining and implementing those thresholds, before ATOC is allowed to proceed further.

a 1 I-42, b
b 2 I-122
c 3 I-69

Sincerely,

Rodney M. Fujita, Ph.D
Senior Scientist
National Headquarters

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C-24

ENVIRONMENTAL DEFENSE FUND

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COMMENTS OF THE ENVIRONMENTAL DEFENSE FUND CONCERNING THE ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT

January 6, 1995

Rodney M. Fujita, Ph.D
Senior Scientist

The Environmental Defense Fund is a leading national nonprofit environmental group with over 250,000 members. EDF scientist Dr. Rodney M. Fujita holds a doctorate in marine ecology. In addition to expertise in marine ecology, Fujita bring years of experience in policy analysis and advocacy relating to climate change to the issue we are here to discuss, the ATOC project. He participated in the Intergovernmental Panel on Climate Change, the scientific body that developed the consensus on climate change that in turn spurred the negotiation of an international climate change treaty. Fujita also helped alert policymakers to the mass coral bleaching events of the 1980's, which were linked to elevated sea surface temperatures.

EDF strongly supports the development of new scientific information that will reduce uncertainty about the existence and potential impacts of global climate change. However, none of us should be overly optimistic that data generated by ATOC, no matter how accurate or precise, will result in a dramatic improvement in climate change policies. ATOC could reduce key uncertainties about ocean heat uptake, perhaps the most important factor in projecting short term climatic responses to the buildup of greenhouse gases in the atmosphere. While a reduction in this uncertainty, better climate models, and a more definitive indication that global warming is occurring -- all potential benefits of ATOC -- would definitely be helpful, they are probably not the most important factors limiting progress toward taking action to prevent global climate change. Vast economic and political interests continue to resist significant changes in the current patterns of fossil fuel use and deforestation that are driving climate change, and they are not expected to disappear in the foreseeable future. For example, it seems inevitable that China will accelerate its use of coal to generate electricity in order to fuel economic growth.

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Before putting too much faith in the ability of improved climate models to shape global warming policy, we should remember that models of complex systems have a rather poor track record. Fishery models have been used to support unsustainable harvest rates, and risk assessment models have been used to buttress arguments that various kinds of pollution sources pose a negligible threat to human health, to cite just two of many examples. On the other hand, models validated with observations played an enormously important role in the speedy consummation of a treaty to phase out CFCs. However, economic and political inertia associated with phasing out a single class of chemicals, CFCs, was much, much less than the inertia associated with reducing fossil fuel use and deforestation.

Furthermore, the potential for using ATOC data to provide a reliable measure of a global climate trend seems uncertain. Even if ATOC succeeds in detecting a temperature trend over 10 years that might take many decades to detect in more variable data sets, what if the climate system happens to be in a temporary stable or even cooling phase? Any data set, no matter how precise, that spans less than 30 years or so is more likely to give rise to a false negative than is a longer data set. For example, if one considered only atmospheric and sea surface temperature data from the 1990's, one would falsely conclude that there was no global warming trend, because the explosion of Mount Pinatubo resulted in a temporary decline in global average air temperatures. In fact, a global warming trend has been documented over the last century or so. In addition, one would expect deep ocean temperatures to lag behind atmospheric temperatures in responding to increased forcing from greenhouse gases, limiting the potential effectiveness of the ATOC data as an early warning system.

While the benefits of ATOC with respect to improving global warming policy are uncertain, I do think that ATOC would be worth pursuing IF risks to marine organisms and ecosystems can be shown to be acceptable. If successful, ATOC could generate data that could greatly improve understanding of ocean and climate dynamics. The key to good policy making on this issue is to freely acknowledge the great uncertainties surrounding the potential impacts of ATOC and work to reduce them, rather than attempting to paint a rosy picture that shows that the impacts are likely to be insignificant. Unfortunately, the draft EIS appears to do just that.

The National Research Council, the nation's most important bastion of conventional scientific wisdom, concluded that "Although we do have some knowledge about the behavior and reactions of certain marine mammals in response to sound, as well as about the hearing capabilities of a few species, the data are extremely limited and cannot constitute the basis for
4 informed prediction or evaluation of the effects of intense low frequency sounds on any marine species". I concur with this assessment. The EIS consistently makes the error of concluding that if no evidence for a significant impact exists, the impact must be nonexistent. The EIS also errs in many cases by overextending assumptions and inferences drawn from data on other species to conclude that impacts on marine mammals are likely to be less than significant. In many cases, evidence for significant impacts does not exist because no research has been conducted. I-6K

In addition, the assumptions supporting many of the conclusions that a specific impact would not exist or would be less than significant are debatable.

Because very little is known about the effects of low frequency sounds on marine organisms, a well designed research program aimed at reducing this uncertainty will be essential. Such a research program would need to be sited in an area rich in marine mammals. However, this does not mean that the ATOC climate protocol should be carried out in the same area. It would
5 be desirable to site the ATOC source in an area with relatively few marine mammals, in order to minimize risks. I-42,b

During both the pilot research program and the ATOC program, a protocol for shutting down the ATOC source in the event that adverse impacts are observed or expected will be absolutely essential. Criteria that clearly define the kinds and levels of adverse impacts that would result
6 in a cessation of ATOC signals are critical. In addition, the criteria should be flexible enough to allow for appropriate action should unexpected impacts be observed. As described in the EIS, these criteria are ill-defined and thus subject to interpretation. I-69

In conclusion, I urge the National Marine Fisheries Service, the Monterey Bay National Marine Sanctuary, the California Coastal Commission, and any other agency with jurisdiction over some aspect of the ATOC project to do three things. First, they should recognize that while ATOC may provide valuable scientific insights, the potential for sweeping changes in global warming policies resulting from ATOC data is low. This should be taken into account when weighing the risks and benefits of ATOC. Second, they should acknowledge the dearth of scientific understanding of the potential impacts of ATOC on marine organisms and ecosystems. And finally, they should come to grips with the limitations of science -- they should recognize that
7 uncertainty about the impacts of ATOC will always remain, because the habits of marine mammals, the complexity of the marine environment, and the difficulty of doing controlled experiments that isolate cause and effect relationships in the ocean will often prevent the drawing of strong inferences. Above all, we humans need to avoid hubris, and adopt a more humble attitude based on a respect for the complexity and mystery of the ocean and its inhabitants. I-12a

I believe that the ATOC project should be conducted ONLY if the following three conditions are met: (1) outside experts and community representatives must conclude that the pilot study shows that potential impacts of ATOC will be acceptable; (2) criteria for terminating ATOC transmissions must be defined more clearly, yet remain flexible enough to allow for appropriate
8 action in light of unexpected impacts; and (3) citizens at large and environmentalists must play a significant role in determining what the termination criteria should be and when they have been met. In addition, EDF would favor the use of sites that would minimize exposure of marine mammals to the ATOC sound source, well away from marine protected areas such as the Monterey Bay National Marine Sanctuary, should the ATOC program move forward. I-69

C-25

RECEIVED 1-18-95

JANUARY 12, 1995

CLAYTON SPIKES,
ADVANCED RESEARCH PROJECTS AGENCY,

STOP THE MILITARY FUNDED ATOC EXPERIMENT TO BROADCAST LOUD
1 UNDERWATER SOUNDS IN MONTEREY BAY FOR 10 YEARS TO STUDY GLOBAL WARMING. I-1

THE MARINE SANCTUARY SHOULD REMAIN A SANCTUARY FOR THE
2 MARINE MAMMALS AND ALL LIFE IN THE MONTEREY BAY OCEAN ENVIRONMENT. I-42

AS A WOMAN, I IMPLORE YOU TO STOP SPENDING MILLIONS OF DOLLARS THAT THREATEN OUR SANCTUARY WITH ATOC. I WANT FUTURE GENERATIONS TO BE ABLE TO SHARE OUR SANCTUARY WITH SPERM
3 WHALES, ELEPHANT SEALS, LEATHER BACK TURTLES, ORCAS, GREY WHALES, BLUE WHALES, HUMPBACK WHALES, AND PLANKTON. MANY OF THESE SPECIES DIVE DEEPLY ENOUGH TO BE SIGNIFICANTLY ADVERSLY EFFECTED BY UNDERWATER SONAR EMITTERS FROM OUR BEAUTIFUL MONTEREY BAY SANCTUARY TO KAUAI. IT IS UNACCEPTABLE FOR ATOC TO CAUSE EVEN THE SLIGHTEST IMPACT ON OUR MARINE SANCTUARY. I-43

BARBARA GIBSON
181 HUBBARD GULCH RD
BEN LOMOND, CA 95005

C-26

Laurel Robertson
P.O. Box 108
Tomales, California
94971

RECEIVED 1-18-95

Jan 14, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Research people,

I have looked with interest at your EIR statement-report draft. All I can say is that I think you have let your brains go to your head. Please try using a higher faculty, your imagination. This
1 world of the sea, it is a world where sound is so important, much as sight is for you and me. If you continue with this project you stand to do so much harm, and you really have no idea what it will be! Please, stop out of compassion, before it is too late, and be proud of your restraint. All that money can be spent on something that will make the word better whether the temperature is rising or not. I-64

Sincerely,
Laurel Robertson

C-27

COMMENTS ON:

DRAFT Environmental Impact Statement/Environmental Impact Report
for the
California Acoustic Thermometry of Ocean Climate Project
and its associated
Marine Mammal Research Program
by

Linda S. Weilgart, PhD

DATE: 5 January 1995

I am a Research Associate at the Dept. of Biology, Dalhousie University. My graduate degrees are in the areas of whale bioacoustics and behavior, and my present research is on sperm whale acoustic communication.

My general impression of the DEIS is that it is unconscionably dismissive of likely adverse impacts on marine life. Moreover, it is sloppy, internally inconsistent, and shockingly inaccurate in places. Conclusions of "minimal impact" are repeatedly made, even when these conclusions are based on completely unsubstantiated assumptions. There is certainly no attempt being made to err on the side of caution.

Behavioral disruptions and psychological stress are given very short shrift, if mentioned at all, even though this effect is likely to be dominant. Even low duty cycles and modest increases to ambient noise levels can cause a serious rise in stress levels, thus potentially placing populations in jeopardy.

The DEIS gives much greater emphasis to the impact of ATOC on the hearing capabilities of marine organisms. Yet here, the great gaps in knowledge often render the assumptions worthless. For instance, we are asked to assume marine mammals hear the same way humans hear, which is clearly not the case. We are asked to assume that the same relationship by which noise trauma to the human ear is estimated can also be applied to the marine mammal ear, even though recent research on pinnipeds seems to cast doubt on this assumption. And furthermore, we are asked to accept complete guesses at the auditory sensitivities (thresholds) of the vast majority of species in the study area, particularly the endangered large whales. Diving abilities of many species are also uncertain. If any of these "stabs in the dark" happen to be wrong, the radius within which animals could suffer potential hearing damage could increase from 178 m to 40 KILOMETERS or more. ATOC's own independent scientific advisory board states that "ATOC documents assume hearing damage...will not occur if received levels of ATOC sounds are below 150 dB. The Advisory Board notes that this assumption may or may not be true, but there are no supporting data from marine mammals." (MMRP-AB report, June 13, 1994).

Ambient noise levels appear to be exaggerated to downplay ATOC's relative contribution to underwater noise. Ambient noise levels are repeatedly listed as being around 90 dB in the DEIS, yet these numbers do not reflect noise levels in the sound channel, which is most affected by the ATOC source. P. ES-9 of the DEIS states "at deep sound channel depths the ocean is very quiet, with ambient noise levels considerably below those at the surface". Studies on fish and shrimp conclude

C-27

that sounds only 20-30 dB over ambient levels, or levels of only 100-130 dB, can significantly decrease growth and reproduction rates. If a level of 85-90 dB in the (quieter) sound channel is harmful to fish or invertebrate reproduction, populations could suffer over a radius of about 3,500 km at depth around the ATOC source, i.e. over about 1/4 of the entire Pacific Ocean, as calculated by Scripps. This is a potentially serious ecological effect, and yet the DEIS states that impacts on fish and invertebrates are expected to be minimal.

The DEIS repeatedly maintains that the ATOC source site inside the Monterey National Marine Sanctuary is not known to be a significant feeding area for marine mammals, yet this is ludicrous. Any area consistently used by high concentrations of marine mammals with some species resident year-round, and with upwellings and high productivity levels is highly likely to be a significant feeding area.

We are asked to believe that the original calculations for the ATOC source's sound fields are wrong, even though these were presented in the previous permit application (incidentally completed before there was any public outcry against the project). The re-calculations made for this DEIS conveniently reveal a smaller area of high sound intensity. Such mistakes do not inspire confidence.

In conclusion, this document consistently attempts to downplay the very real risks that this project presents, concluding minimal impact when effects are unknown or even with evidence to the contrary. All this for a project, which, as the DEIS concedes (p. ES-3) may or may not provide useful climatic information.

DETAILED COMMENTS ON THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE ATOC PROJECT
16 January 1995
by

Linda S. Weilgart, Ph.D., Research Associate
Dept. of Biology, Dalhousie University
Halifax, Nova Scotia B3H 4J1 Canada

Both my M.Sc. and Ph.D degrees were obtained in the area of whale bioacoustics. I have been doing research on free-ranging whales for 13 years. The following are my comments:

1) EIS Abstract, p. ES-1, ...Various places in the document refer to ATOC's purpose as "measuring] long-term ocean climate changes" (emphasis mine). p. 1-21 (under heading "Acoustic Thermometry Program Objectives") "Obtain early baseline data on transmission times in Pacific pathways to compare with data that may be obtained in a follow-on global program..." p. 1-22 - the EIS/EIR talks about a "...future ocean monitoring system."

1 I-3a

Yet Dr. Munk wrote me that ATOC would only be used to refine current climate models. He writes in a 19 Oct. '94 letter "With regard to climate, my views of what we should focus on have been modified over the last two years. A stand-alone detection and mapping of the greenhouse-induced changes over and above the ambient changes will take a long time, a few decades if Manabe's predictions are correct. I now think our emphasis should be to test, and help improve, current climate models."

ATOC should be pinned down as to which of these objectives is the truth--a long-term measuring program or simply to improve climate models. If it is the latter, there should be justification of the duty cycles, intensity levels, etc. being the minimum necessary for this goal. If it is the former, given the uncertainties regarding ATOC's effects on marine life, ATOC's operation over such huge scales of space and time should be viewed as highly risky and should not be allowed to proceed at all, even for just the two years.

2) p. ES-3. "...whether the ATOC technique will provide useful climatic information depends on..." (emphasis mine) and "Since it is not presently known what will be learned from the demonstration phase [of ATOC]..." p. 1-20 "ATOC...is subject to fundamental uncertainties about the extent to which acoustic means can detect ocean climate changes." A $35 + million project which puts the environment at risk should be required to provide a greater probability of success than that stated! Such uncertainty is not scientifically justifiable.

2 I-3f

3) p. ES-3. "...whether long-term underwater low frequency acoustic transmissions are safe for marine animals..." (emphasis mine). This is a completely impossible task for cetaceans. We can learn more about low frequency sound effects on cetaceans,

3 I-12a

but we can NEVER determine safety as we cannot get at the most important effects on populations (growth rates, fertility rates, mortality, etc.).

4) p. ES-3. "Climate-related transmissions will only begin if the system is determined safe for marine mammals and other sea life." See #3 above, but even if this were possible, the ATOC schedule has only allowed 1 MONTH to analyze the MMRP pilot study data! ATOC's own independent Scientific Advisory Board has stated that "...the Board considers it unrealistic to expect the MMRP to complete a substantive analysis of all types of behavioral reactions, and to prepare a comprehensive report suitable for external review, within 1 mo. after the end of data collection." (MMRP-AB report, 13 June '94). Table 1.1.2-1, p. 1-6, shows March '96 as the date at which the pilot study final report is due, yet 6 mos. of ATOC climate-related transmissions will have already been underway!

4 I-6c

5) p. ES-5. "...these estimates were high because NMFS recommended including estimates of populations for the entire eastern Pacific stocks of most species as a "worst case" or "upper bound" scenario." This is deliberately misleading--the reason that entire eastern Pacific stocks of SOME species needed to be included is that the whole of these populations could (were thought to) migrate within the area influenced by ATOC (Zone of Influence). Also, the estimates may very well NOT be high--may even be low, since multiple takes of the same individual are not considered in the estimates.

5 I-8b

6) p. ES-6. The document notes that many marine animals hear through different means than humans do, that sound behaves differently in water than in air, and that comparisons are risky between a marine animal's perception of the ATOC sound and a human equivalent--all of which are very true, and yet it goes on to present Table ES-1, p. E-7, which is completely worthless and without factual basis. The purpose of this table is clearly to make ATOC seem less loud to us, compared to familiar, in-air, sounds.

6 I-7d

Using a conversion of 61.5 dB (rather than 26 dB) between sound power levels in air and water is unjustified, because we do not know which acoustic stimuli (energy flux or sound pressure) is the important one for hearing loss in marine mammals. Section 1.1.4 (p. 1-11) talks about a 35.5 dB difference due to the differing impedance of air and water, yet there is no evidence whether this characteristic, rather than simply sound pressure, is damaging to the marine mammal ear. We need to know a lot more about factors such as sound pathways to the inner ear of marine mammals before we can come up with a realistic transformation between air and water. Therefore, while the physics is correct, the biology is not. The EIS/EIR (p. 1-11) goes on to state that the National Academy of Sciences' National Research Council, in its publication "Low Frequency Sound and Marine Mammals", calls for caution in comparing sound levels in air and water, but the EIS/EIR neglects to note that the NRC publication uses a conversion factor of only 26 dB, NOT 61.5 dB! Furthermore, the EIS/EIR itself uses only a 26 dB conversion factor on p. 4-117 (last sentence, 2nd para). The document notes that the conversion of sound pressure level from air to water is speculative in the case of birds (p. 4-107) and even humans (p.

4-116): "IF a realistic transformation between water and air could be determined..." (emphasis mine).

7) p. ES-6. To say 120 dB "has produced some minor detectable changes in the behaviors of certain marine mammals" is incorrect. The changes were subtle, but it is impossible to say if they are minor to the marine mammals. In fact, such subtle changes may have major consequences to the welfare of marine mammal populations. A study of the effects of low-level flying fighter jets on caribou also showed that the reaction of the caribou was subtle, yet resulted in significantly increased calf mortality. I-7b

8) p. ES-8. "The large whales...are relatively rare in the vicinity of the ATOC source." Large whales are rare, period. What does "relatively" mean? Relative to plankton? TC

9) p. ES-9. The EIS/EIR admits that ambient noise levels in the deep sound channel are considerably below those at the surface, yet comparisons throughout the document always refer to ambient noise levels at the surface, e.g. Table 1.1.3-1, p. 1-10. The ambient noise levels listed in the EIS/EIR are invariably inflated so that ATOC appears to account for only a small proportion of ambient noise. Instead of the figures of 90 dB (p.3-9) or 74-100 dB (p. 4-17), a more reasonable, average value for ambient noise is probably 60-70 dB, certainly in the sound channel, at least. The figure on p. 2-44 seems to show an average value of about 75 dB for SURFACE ambient noise at ATOC's center frequency. I-7c

10) p. ES-9. Why does commercial harvesting of fish legitimize harming them senselessly? TC

11) p. ES-11. It is well possible that ATOC could "substantially reduce the number or restrict the range of a rare, endangered or threatened plant or animal, cause a fish or wildlife population to drop below self-sustaining levels, or adversely affect significant wildlife habitats." I-12a

12) p. ES-12. Given the MMRP has a very low ability to detect any effects of ATOC on marine mammals, it is VASTLY more important to safeguard marine mammals than to locate the source in an area of high populations of marine animals! First, do no harm. I-4b

13) p. ES-16. "a goal of the MMRP will be to identify the...significance of any behavioral responses to ATOC...". For cetaceans, this is absolutely impossible to do with any validity, as even the initial ATOC permit application to NMFS conceded. I-6a

14) p. ES-17; p. 4-88 - "...potential for increased predation on fish"??? Is this supposed to imply that even if some fish will be harmed, they will serve as prey to other animals, thus there will be no net loss? Using this logic, almost any adverse effects on fish (explosives, etc.) can be excused! What about the research cited p. 4-33 where moderate increases in noise levels significantly reduced fish growth rates and egg viability? The MMRP should monitor fish stock assessments to assess I-8c, TC

whether ATOC is reducing fish stocks. Fisherfolk have cause for concern.

15) p. 1-5. "ATOC climate-related transmissions will begin only if the system is determined to be safe for marine animals..." This is an impossible task for cetaceans, at least. Also, why is only 1 month allotted for this most important of evaluations? ATOC's own Scientific Advisory Board has stated that this is an "unrealistic" timetable. I-6a, 6c, 6i

16) p. 1-6. The ATOC climate-related transmissions should not proceed until the completion of the MMRP pilot study final report, not 6 mos. before. I-6c

17) p. 1-13. ATOC is also very costly and also will not be enough to demonstrate definitively whether the oceans are warming or cooling, overall. How can it determine whether systematic ocean warming is due to anthropogenic or natural causes? p. 2-50 - "XBTs...cannot be used alone to resolve global climate questions." Neither can ATOC. ATOC is only one small (likely unimportant) part of current ocean climate-measuring techniques. I-5a

18) p. 2-3. The source operational protocol for the MMRP lists using levels of 185-195 dB and a 4 day on 7 day off pattern. No boat-based playbacks are proposed. Yet the Scientific Advisory Board in its Sept. report states "...boat-based playbacks...should be seriously considered for the Calif. area. ...source levels near 175 dB are suggested." The Advisory Board also asked for "additional rationale for selecting a 4-7 d duration for the test periods and a 7-10 d duration for control..." The Advisory Board's recommendations seem not to be heeded on these and other points. I-6e, 6i

There is no reason why the MMRP studies using the ATOC source need to be conducted in a sanctuary. Even if portable source playbacks are conducted there, there is even less reason to place the fixed ATOC source in a sanctuary.

19) p. 2-4. "Source levels would also be reduced to the minimum necessary..." Why not start out at low source levels and work up as needed, rather than the other way around? See 2.2.1.1

20) p. 2-16. Increasing the efficiency of the sound transmissions does not "reduce the exposure of marine animals to sound". It reduces the exposure of animals to more intense sound, but as the sound propagates further, a greater amount of ocean, and thus life, is affected. I-6d

21) p. 2-43. "...this operating band does not significantly overlap the frequencies of sounds known to be produced by whales..." It is unknown how SIGNIFICANT to the whales such overlap may be. The overlapped sounds may be the most essential ones. "...either a higher or lower frequency might be expected to result in increased impacts." A much lower frequency (< 5 Hz) is much more likely to impact whales less. TC

22) p. 2-47. The EIS/EIR states that alternatives to ATOC such as satellites are I-5a

inaccurate because they "use simplifications of the ocean...". So does ATOC. p. 2-51 - "Correlation between ice noise and air temperature...would be extremely difficult to calibrate or quantify...over a reasonable time period." ATOC also requires decades (perhaps 100 years) to arrive at meaningful results, if it works at all.

23) p. 2-52. It looks like the 120 dB levels come pretty close to shore from Fig. 2.2.1.2-1, p. 2-8. I wouldn't be so sure gray whales won't be affected. p. 3-23 - "94% of all migrating gray whales pass within 1.6 km of the... coast". What about the remaining 6% = 1,252 animals? Aren't they important? TC

24) p. 2-53. Why are XBT data integrated with ATOC measurements if they're as inaccurate as stated on p. 2-50? TC

25) p. 4-2 - 4-6. Table 4.1-1. This table is riddled with problems, and seems to ignore or downplay cited, relevant research. Also, increased stress, etc. from lower sound levels than would cause hearing loss is ignored. The results from Bowles et al. (1994) I-8c, seem to be ignored when arriving at the less than significant impact for some marine TC mammals. Also, to state that minimal impacts are expected just because a species' distribution is patchy (p. 4-5), is flawed. The reasons species have patchy distributions is often because there are preferred areas of high productivity--the proposed site is one such area! To say minimal impacts are expected on fish and invertebrates, in light of the Banner and Hyatt (1973) and Lagardere (1982) studies, is astounding. What we know about the effects of noise on these groups is cause for concern. What if a large mass of eggs is ensonified? This may affect a whole population. Also, see p. 4-96 - "...although the number of fish affected at any one time may be small, over a long period of time, the proportion of fish in a population exposed to the source could be relatively large."

When little or nothing is known of an organism's reaction to noise, the general approach of the EIS/EIR is to conclude that impacts will be minimal. This is very disturbing approach to take.

26) p. 4-12. "Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time." Exactly. What about the cumulative impacts of ATOC? I-12c

27) p. 4-13. "Sounds can result in behavioral changes...that can only be detected through sophisticated statistical analysis...". Or not at all! "Behavioral changes generally are detected at sound intensities higher than the levels at which the sounds would be barely detectable." We do not know what levels are barely detectable to whale species, nor are we likely to detect anything but the most gross behavioral changes. I-10d TC

28) p. 4-13. Animals may become less sensitive over time to noise through habituation, but they also may be becoming hearing impaired. It is impossible to determine which is happening. I-11a

C-27

29) p. 4-14. Natural and human-made levels of noise should NOT be equated. Marine animals have, over evolutionary time, most certainly become adapted to filtering out natural noise. The same can not be said for the recent addition of human-made noise. I-9c

30) p.4-14. We need to have a "better understanding of the functional importance to mammals of faint sound signals from the same species, predators, prey..."? I think we are not making too outrageous an assumption that the ability to detect faint sounds from predators, prey, mates is VITAL. TC

31) p. 4-15. 150 dB is assumed to produce at most a temporary threshold shift. ATOC's Scientific Advisory Board (AB) states "ATOC documents assume hearing damage...will not occur if received levels of ATOC sounds are below 150 dB. The AB notes that this assumption may or may not be true, but there are no supporting data from marine mammals." (MMRP-AB report, June 13, '94). Why have an AB if the advice is not taken? TC

32) p. 4-15 "A larger number of animals...could respond...with minor behavioral changes." Subtle is not the same as minor to the animals involved. TC

33) p. 4-16. "...many animals are small...and include invertebrates and other animals that provide no measurable indication of...acoustic impacts." What about measuring reproductive output--the most essential impact to a population's well-being? In fact, this has been done (p. 4-102) and the results raise serious concerns. I-6h

34) p. 4-20,21. This section uses a number of unsubstantiated assumptions which do not err on the side of caution. 1) Land mammals and terrestrial mammals are compared, ignoring the differences in specialized ear structures for their respective medium and the different sound pathways to the ear; 2) Ketten estimates that a sound must be 80 dB over the hearing threshold of the animal, at a given frequency, to produce a temporary threshold shift (TTS). There is no data on marine mammals to substantiate this. In fact, p. C-30 seems to contradict the 80 dB figure, stating "we have some evidence [in pinnipeds] that broadband noise at levels approximating 25-40 dB above threshold are sufficient to induce a TTS in air." 3) That a sound must be louder than 150 dB to cause a TTS assumes a hearing threshold of (150-80 =) 70 dB. This figure is a complete guess as well. We only have audiograms for a few marine mammal species and several odontocetes have thresholds down to 30-40 dB (p. 4-49) at their peak sensitivity. Thresholds of 40-50 dB are probably average for most species, so why pick 70 dB? I-9a

If some species have thresholds at ATOC's frequency down to 40 dB, and assuming the 80 dB figure is correct to calculate levels for TTS, TTS could be occurring at only (40 + 80 =) 120 dB!! If the 80 dB figure is too high (more like 25-40 dB), TTS or hearing damage could even occur at levels less than 120 dB. Thus, the calculation for the high intensity zone in which animals could suffer hearing loss could be seriously underestimated. Instead of a radius of 178 m around the source, animals as far away as 40 km or more could suffer hearing damage. This could completely change the EIS/EIR's conclusions of "minimal impact", as these conclusions are based

on the relatively small area of the high intensity sound field. It is simply impossible to say, given all the assumptions upon assumptions. Also, see #31 above.

35) p. 4-27. "If [marine mammals]...are subject to ongoing stress while in [a noisy] area, then there could be long-term effects on the individuals and the population." Absolutely. Why are effects such as psychological/physiological stress given such short shrift in this EIS/EIR, and not factored in when conclusions of "minimal impact" are made? I-12b

p. 4-30 also cites research which shows that "...physiological reactions, such as elevated heart rate, can occur even in the absence of overt behavioral responses."

36) p. 4-29. "Any...adverse effect from habituation to the ATOC source...is rated for the purposes of this EIS/EIR to be non-existent." This paragraph does not address the danger of habituating to noise which could cause hearing loss. The report "Low Frequency Sound and Marine Mammals" by the National Research Council, p. 66-67, states "Hearing loss induced by exposure to intense sound is painless, so the creation of an exposure-induced loss does not produce a concomitant motivation to avoid that high-level sound in the future in the exposed animal. Thus, were there behavioral habituation to intense sounds, animals might, to their detriment, re-enter regions having dangerously high sound levels, thereby risking additional hearing loss." I-11a TC

37) p. 4-31 and other places. That the proposed site is not believed to be a sensitive habitat (i.e. significant feeding area, etc.) is ludicrous. Any area consistently used by high concentrations of marine mammals with some species present year-round, and with upwellings and high productivity levels is highly likely to be a significant feeding area. Also, p. C-26 states that Monterey Bay may provide a valuable foraging area for leatherbacks. I-4b TC

38) p. 4-32. "...there is no evidence that whales respond to one another over ranges greater than about 20-25 km." Such evidence would be difficult to obtain, but I believe SOSUS data (from Chris Clark) have shown that blue whales change course to avoid Bermuda at much greater ranges, which may mean they are listening to far away acoustic cues. I-8a

39) p. 4-33. "Thus, intense sounds (i.e., 165 dB), potentially could affect the availability of organisms in the food chain...." In fact, the two studies cited found detrimental effects at noise levels of only 105-120 dB (Banner and Hyatt 1973) and 100-130 dB (Lagardere 1982). TC

40) p. 4-35. Fig. 4.3.1.1.2-1. This seems to be a ridiculous comparison between a moving and stationary source. I-7c

41) p. 4-36. The possibility that whales could become habituated to ATOC is raised in the EIS/EIR, but that the opposite could occur i.e. that whales could also be sensitized, is only briefly noted in the 2nd para, but not seriously addressed. App C

C-27

42) p. 4-40. "...the project's incremental contribution to any cumulative impacts from other [noises]...are speculative." I think it safest and not unreasonable to assume the impact of fewer available "windows" of silence for broadcasting or listening animals, for use in communication, orientation, prey or predator detection, is negative. ATOC's contribution to human-made noise in the deep sound channel must be quite substantial. I-7e

43) p. 4-51. First para. I've checked the Tyack et al. 1993 reference, and the stated information is not present in this manuscript! Also, I believe there is a possibility that these animals might have suffered hearing impairment. Data Check

44) p. 4-52. The Bowles et al. (1994) study of the HIFT shows quite a strong effect on at least sperm and pilot whales. If these whales stopped vocalizing for more than a few hours, this is highly unusual, and in all likelihood, shows a detrimental effect, as vocalizations are required for food finding, etc. More schools of hourglass dolphins could have been sighted, not because they were attracted to the sound, but because they surfaced (thus making them more visible) to avoid higher sound levels at depth. Sea turtles have been shown to do the same (p. 4-74). TC

45) p. 4-58. "...alternatives, which would both use sources buoyed up from the seafloor, could possibly result in more close encounters by sperm whales...". No, this is utterly false. Placing the source in deeper areas far offshore is likely to be less harmful to marine life. I-5d TC

46) p. 4-63. See #6 above. In the Schusterman study, a TTS was observed in air at 100 Hz from a noise of average source level of 85-90 dB (air standard). If the air/water sound level conversion factor (26 dB) of the National Research Council's Low Frequency Sound and Marine Mammals (p. 82) is used, 85-90 dB in air converts to only 111-116 dB in water! This is much lower than the 150 dB figure repeatedly used in the EIS/EIR below which supposedly TTS can not occur. Again, such air/water comparisons are risky. I-7d

47) p. 4-74. Just because deep dives are rare for leatherbacks, doesn't mean they're not important or even essential. TC

48) p. 4-76. I would think that masking the acoustic signature of a turtle's natal beach, to which it returns for nesting, could be very serious indeed! I-13a

49) p. 4-77. "The proposed project will have no impact on coastal algae and seagrasses..." Is there any evidence for this? Random noise has been demonstrated to have a negative effect on plant growth (Woodlief, C.B., L.H. Royster, and G.K. Huang. 1969. Effect of random noise on plant growth. J. Acoust. Soc. Amer. 46(2): 481-482.). TC

50) p. 4-81. "Many species of fish are important prey for odontocetes and pinnipeds...". What about mysticetes???? TC

51) p. 4-86. The data on fish seem to be a real cause for concern. Just because a few of the most acoustically sensitive species that are known do not occur in the study area, does not mean there aren't species in the study area that are similarly sensitive--only audiograms from a few species have been done. I-9a, 10a,d, 11a, 12a,b,c

52) p. 4-89. "...no adverse effects (from shipping traffic) have been documented." This isn't saying much! Such effects would be very difficult to detect, but see p. 4-91. TC

53) p. 4-89. Contrary to that stated in the EIS/EIR, the Banner and Hyatt study DOES, in fact, document ambient noise levels, and the levels to which the fish eggs and larvae were exposed were only 105-120 dB!!! I-5e, TC

54) p. 4-89. Does Hasting's safe zone apply to fish fry and eggs as well? TC

55) p. 4-102. Why use an UPPER estimate for ambient noise? If average noise levels at ATOC's center frequency are 75 dB (p. 2-44; and p. 4-17 lists 74 dB as a lower limit), adding 30 dB produces a level of, not 120 dB, but only 105 dB, which could affect shrimp production! This makes a huge difference in the amount of area potentially harmfully exposed to ATOC. The levels of noise in the Lagardere experiment are actually presented in the paper as being between 100 and 130 dB, though, strangely, this isn't mentioned in the EIS/EIR. TC

56) p. 4-103. The planned ramp-up period isn't really all that helpful to invertebrates, I don't think! Many can't move so quickly nor may they know where to go to avoid the sound. TC

57) p. 4-104. "There is no clear evidence that many invertebrates are capable of hearing or intentionally producing sounds." Really? There are certainly some, like the cricket! TC

58) p. 4-114. "MMRP and ATOC source transmission protocols would result in the termination of source transmissions before...impacts were realized." No, adverse impacts on population growth rates for many of the large whales would show up much too late to reverse. Their rates of increase are too slow. I-12a

59) p. 4-122. Why is just ATOC's center frequency noted in the table? ATOC still has considerable energy at the critical frequencies of 100 Hz (172 dB according to Fig. 1.1.3-2, p.1-9), 40 Hz (158 dB), and 50 Hz (172 dB). TC

60) p. 4-123. I would be surprised if 108 dB did not reach within 2 km of the shore, as it doesn't look that way from the FEPE, Fig. 2.2.1.2-1, p. 2-9. I would be more than a little concerned if I were diving in the area. TC

61) p. 4-130. "At (3700 km), the ATOC sound levels will be well below ambient background noise...". I believe ATOC sound levels will be 85.5 dB at 3500 km in the sound channel. If ambient noise in the sound channel is around 70 dB (see #9 above), then I would think ATOC would be above this level at 3700 km. Again, ATOC is exaggerating ambient noise levels in the sound channel. TC I-7e

C-27

62) p. 5-6. I believe there is a good chance that ATOC could adversely affect marine biodiversity, and thus is in conflict with the Coastal Act. It is unlikely that the MMRP will provide important information about marine mammals that could not be obtained without the addition of a new source of noise. ATOC's success is also far from certain (see #2 above), and existing, less environmentally risky techniques for studying global warming are probably adequate. TC

63) p. 5-11. It is perverse to argue that a new source of noise is required to study marine mammal's response to low frequency sound. We have plenty of already-existing sources of noise, or a portable source could be used for a much more rigorous study than ATOC proposes. I-6e, 6f

64) p. 5-12. "A priority goal for the Sanctuary is the protection of marine resources." Yes, and this should take precedence over scientific research where the two might be in conflict. I-4a, 4b

65) p. 5-15. ATOC is "...enhancing the habitats of humpback whales"? and "...reducing...disturbance to the whales caused by humans"??? By adding a new source of noise, ATOC is reducing noise disturbance to humpbacks? The MMRP is not a well-controlled study, and cannot discover the most important impacts to the health of cetacean populations. I-6a,k

66) p. 5-16. "ATOC would provide a model of international cooperation on global ocean issues...". A bit of a stretch. ATOC would introduce a new source of noise pollution into international waters without the consent of all countries potentially affected. Is this allowed under the Law of the Sea? TC

67) p. 6-1. It is quite likely that ATOC could result in major adverse environmental effects, both short-term and long-term. I-6a,k 12a

68) p. 6-2. The project could well result in "significant irreversible changes to the marine environment". See #58 above. I-12a

69) p. C-10, etc. The null hypotheses should be stated to assume there IS an adverse effect, and then the research should be required to disprove this, rather than the other way around. This is the conservative approach, if one is concerned about safeguarding the environment. I-16b

Comments on:
DRAFT Environmental Impact Statement/Environmental Impact Report
for the
California Acoustic Thermometry of Ocean Climate Project
and its associated
Marine Mammal Research Program

by

Hal Whitehead, PhD

DATE: 16 January 1995

These are the comments of Hal Whitehead on the Draft EIS/EIR for the California ATOC project. I am an Associate Professor of Biology at Dalhousie University and a University Research Fellow of the Natural Sciences and Engineering Research Council of Canada. My graduate degrees are in mathematical statistics and zoology, and my research is principally on the population biology, social organization and ecology of the deep water whales (sperm and beaked whales). I have a number of detailed questions and comments on the document (which are attached), but this is a summary of my major impressions.

The document was clearly put together with extreme haste. One of the results of this is shoddy presentation. For instance:

- many of the cited references are not listed (e.g. on pp 2-51, 4-91, 4-55);
- inappropriate sources (such as the ATOC Scientific Research Permit Application) are cited for biological information;
- some parts are incomprehensible and/or irrelevant (e.g. Fig. 3.2.4.3-3);
- the document suddenly lapses into describing the effects on the Hawaiian rather than Californian environment (4-56).

In the areas where I have most expertise, the document is often seriously wrong, invariably in the direction of minimizing the potential effects of the ATOC source on the marine environment. For instance, on page 4/50, there is a calculation of the number of sperm whales likely to come within the 150dB contour. When calculations are carried out correctly (including the whales missed when diving, the proportion of time at depth, the tidal sampling and the mean speed of movement of whales) the number of sperm whales affected is increased by more than a factor of 100.

70 I-8b

Other examples of misleading statements are:

Page 2-17. A seamount would not have a 360° view, so it is ruled out, but neither of the two proposed sources have more than a 180° view!

Pages 4-17, 4-43. Individual residence times in an area cannot be estimated from densities. The statements that the "maximum residence within the general area...is estimated to be <2½hrs" are completely false. Individual sperm whales, fin whales, blue whales and beaked whales are known to spend periods of weeks

or more in small ocean areas.

Page D-3. It states that at a meeting on 7/19/94 "...further refinements to the project protocols are discussed and agreed to." I was at this meeting. There was no agreement whatsoever about refinements to the project protocols. In fact the whole project, from its overall goals and structure, to the details of the research program, was severely criticized by non-ATOC participants.

Given these serious deficiencies in the areas where I know something, it is hard to take the other parts on faith.

The major structural problem with the document is that it refuses to consider the most sensible and environmentally acceptable alternatives as legitimate, especially:

The No Action Alternative.

Benefits (compared with ATOC):

1. No financial costs.
2. No short or long-term effects on the environment.

Possible costs (compared with ATOC):

1. Lack of knowledge gained about global ocean climate. As the acoustic method is only one (and a rather dubious one) of several methods of looking at ocean temperature changes, the loss of ATOC's potential results are of very little consequence.
2. Lack of knowledge gained on the effects of low frequency sound on marine mammals. As the portion of the MMRP dependent on the ATOC source has very poor statistical power, its results will largely be inconsequential. Moreover, The ATOC sources are not necessary to study the problem of low frequency noise in the ocean. There are other anthropogenic sources, or (for experimental work) special mobile, low-powered sources could be used.

116 I-5a

Autonomous source for ATOC and low-power mobile source for MMRP

This alternative has been suggested several times by critics of ATOC, and (at least the second part) recommended by members of the ATOC MMRP Scientific Advisory Board.

Benefits (compared with current proposal):

1. Possible lower cost (2-42).
2. Much higher statistical power, and greater temporal and spatial flexibility, for MMRP.
3. Minimal effect on environment if source is placed in an area of low productivity. The suggested increased exposure of sperm whales and myctophids (Table 4.1-1, 4-58, 4-96) by using the autonomous source is complete rubbish if the source is placed in an unproductive area--another example of the misleading nature of the document.
4. Shorter paths and lack of bottom effects would mean either lower source levels or higher received levels or both.

Costs (compared with current proposal):
1. Some additional engineering work (2-42).

The MMRP may produce some interesting information but, as it stands, it has no hope of examining the effects of the ATOC source on cetaceans. The experimental protocol can only detect a small range of potential effects because it is spatially fixed and tied to a particular, and biologically arbitrary, temporal scale. The chances of detecting any of the four "unacceptable effects" listed on page C-7 are virtually zero:

1. "avoidance or abandonment of previous high-use areas." According to section 3. there are no high-use areas near the source site. I would disagree with the assumption that the Monterey Bay Sanctuary is not a high use area, but if it is assumed that it is not, then no avoidance or abandonment can be observed.

2. "increase in at-sea observations of dead animals or strandings..." Dead animals are rarely observed at sea, and strandings are rare events, so that even if there were sightings of dead animals at sea or strandings, it would be impossible (in the research period proposed) to show a statistically significant change in these rates. Important changes in population parameters can easily occur without any detectable change in observations of dead animals or strandings.

113 3. "increased incidence of emaciated animals and stress, and associated disease." There are no plans for cetaceans to collect measures of emaciation, stress or disease. I-6a

4. "decrease in calving/pupping rates and/or total population size." Except for gray whales, there are no estimates of calving rates, and population estimates have coefficients of variation of around 0.5 (Table 3.3.1-1), so that there is no possibility of detecting even an almost complete and sudden extinction of a population.

Thus, for cetaceans, the MMRP is almost completely useless as a means of detecting the effects of the ATOC source.

Another major deficiency in the document is that there must be some discussibn of potential extensions of the ATOC program. If the minimum extension feasible for useful work on global climate is ecologically unacceptable, the project should be stopped now. There are potential extensions out there in the oceanographic literature. If there are no problems with stability, internal waves, acoustic propagation limits, or ocean boundary scattering, how would the project ideally (in the oceanographic sense) proceed? According to the ATOC technical proposal (p 65) a high-powered team at Scripps and MIT have been working on global extensions to ATOC for some time. What are the results? We should be given a reasonable preview of future potential plans.

For these and the other reasons (given in my list of detailed comments) I view the document as an incomplete and misleading representation of the environmental effects of the proposed project.

SOME DETAILED COMMENTS ON ATOC-CA DRAFT DEIS
By Hal Whitehead

1-1 ATOC is not "scientific research on marine mammals...", as indicated, for instance, by the statement on page 1-3 "..the 71 global climate question that ATOC seeks to address." Thus, under the MMPA, it should be considered as an incidental take not marine mammal research. Sec. 1

1-4 Time scales: ATOC will not obtain any data on temporal variation in "large scale observations of ocean temperatures" I-3d useful for "comparing with and verifying the predictions of 72 existing climate models" for a decade or more, and then the information will be principally about the deep sound channel axis where there is a several year delay in responding to changes in surface temperature.

1-4 ATOC is not a response to the need for data to test against 73 global climate models. The basic program was suggested before I-3d there were useful climate models.

1-5 The transmission schedule is NOT "necessary to continue to 74 study the potential effects on marine mammals..." Other I-6e experimental designs, especially with a movable source, would be much more efficient and less potentially damaging to the environment.

1-10 Table 1.1.1.3-1. This table integrates from 20-1000Hz, about 6 octaves, and so, for the man-made and non-biological sources, is 75 totally incomparable to ATOC (about half an octave). For TC biological sources, the frequencies are different. This table is a blatant attempt to mislead the reader into thinking the ATOC source is not powerful.

1-11 "These sections take many weeks to complete and are rarely 76 repeated." Using XBT's from ships of opportunity, sections could I-5a be sampled quickly, frequently and cheaply.

1-17 Frankel's work does not show "reliable acoustic location 77 coverage for vocalizing whales out to approximately 40km from the TC array." I have reviewed his work. I think the range is about 15km.

78 1-17 What are the frequency sensitivities of the arrays? TC

1-20 There must be some discussion of extensions. If the minimum extension feasible for useful work on global climate is ecologically unacceptable, the project should be stopped now. 79 I-3d There are potential extensions out there in the oceanographic literature. If there are no problems with stability, internal waves, acoustic propagation limits, or ocean boundary scattering, what would you do? We need to know.

80 2-4 The ATOC transmissions start before the pilot study report? I-6c

81 2-5 Sperm whales who might be most affected are not an indicator species? I-6l

82 2-7 Figs 2.2.1.2-5 and 2.2.1.2-6 cannot be compared. They are in different units. TC

83 2-14 (top) But "taking no action" would safeguard the marine environment, so it should be reasonably considered. I-5a TC

84 2-14 (bottom) "at least two source locations were necessary to provide a greater number of acoustic pathways..." Greater than what? With one source? There is no logic here. This should read "The ATOC people want two sources, so we have two sources!" TC

85 2-15 They chose the sites for places with lots of marine mammals to get statistical power!!!! OUTRAGEOUS! Use a low-power mobile source if you want statistical power. Then stick your main source away from the marine mammals. As outlined in Appendix C-6, there will not be enough statistical power anyway to detect anything but the most blatant effects over a certain small range of time scales. You want statistical power, and then you also say you want a site with additional noise sources--these will heavily reduce your statistical power. This section is GARBAGE to a statistician who knows anything about marine mammals--it is a post hoc justification of the previously chosen site. I-4b

86 2-17 A seamount would not have a 360° view, so it is ruled out, but neither of your two sources have more than a 180° view! TC

Table 2.2.3.3.1 Absolutely no mention of environmental consequences!

It's weird how all the alternative sites are offshore from naval or air force facilities, or are defence establishments continuous the whole way along the west coast of the U.S.?

87 2-41 Why not turn it off when grey whales are migrating, blue whales are nearby, or whatever? This subsection makes no analysis of the feasibility and desirability of this alternative. I-5c

88 2-42 A basic decision as to whether it is desirable to put the source in a biologically rich area (so you can study its effects) or a biologically poor area (so it harms as little as possible) must be made. You cannot argue things both ways. As we know so little, and in the immediate future will continue to know so little, the second option is preferable. Studies can be made in richer areas with low-level portable sources. I-4b

89 2-47 Apparently El Niño type events can now be predicted in the Indian Ocean. TC

90 2-47 At what depths is ATOC measuring temperature? I-3c

Sections 2.2.7-2.2.11. So we have the models, and we have these methods of gaining data which can be used to validate them (SST measurements, sea level measurements, etc) none of which is perfect, so we want to add another (also imperfect, but potentially environmentally dangerous) technique, ATOC. Is this right? Stating this does not justify ATOC. I-3d

91 2-50 The addition of copper, etc. to the ocean by XBTs. How does this relate to what is there anyway, or comes in through natural sources? You cannot dismiss XBT's without evaluating this. I-5b

92 2-52 Why not just turn the source off when animals are nearby? I-5c

93 3.3.1 This section is sloppy. There are good primary references to many of the points made. Instead, secondary, tertiary (e.g. Clark 1993) or personal communications are cited. I-8a

94 3-17 Are population estimates corrected for diving animals being missed on surveys? They were not in earlier presentations of these data. If not, numbers of sperm and beaked whales will have been serious underestimates. I-8b

95 3-18 Where are Notes 10-12? TC

96 3-20 Most evidence is now suggesting that sperm whales do not make much in the way of seasonal migrations. If they are in an area they are probably using it for feeding. TC

97 3-27, 3-57 But in some areas (e.g. off Nova Scotia) sperm whales are found in shallow waters. Off California 32% were found in less than 1,700m. I-9c,

Table 4.1-1:

Presuming LSM for odontocetes, mysticetes, sea turtles and fish is unfounded. I-8c

That autonomous mooring will increase the risk to sperm and beaked whales is extraordinary--look at Townsend's charts. I-5d

98 4-11 "Leq calculations indicate that less than significant increases in average ambient noise levels will occur..." You have not defined what significant means so this is meaningless. I-6k

99 4-17 Individual mysticetes will often spend periods of weeks or more in a small area if there is food there (examples include Mingan Islands, Stellwagen Bank, San Juan Islands, Brier Island). Therefore the statement "the maximum residence time within the general area of the proposed action alternative for any individual mysticete is estimated to be <24 hrs" is totally wrong. You cannot TC

estimate residence times from densities. Similarly for time in 120dB sound field.

4-17 You cite a study of bowhead whales (Ljungblad et al. 1980) for the principal energy of all baleen whales in the 50-300Hz band- -for blues and fins, most energy is below this. 100 TC

4-17 Fin and blue whales are frequently coastal species. Right now there are fin whales a few km from my house within 2km of shore. Blue whales are consistently sighted close to shore off Trincomalee, Sri Lanka, and Mingan Islands, Quebec. I have seen blue whales within a few km of shore near Pt Sur. 101 TC

4-22 Animals may have the capacity to leave the area during the ramp-up time, but will they, if their food is there (see Brodie 1981)? 102 I-11a

4-31,4-32 This section seems to say "We know nothing about masking. It could be important, or not. Let's assume it isn't and presume the effects are not significant." For instance, if Payne and Webb are even partially right then masking effects could be severe. 103 I-13b

104 4-41 No mention of behavioral responses or masking. TC

4-43 Individual odontocetes will often spend periods of weeks or more in a small area if there is food there (examples include Kaikoura for sperm whales, the Gully for beaked whales, etc.). Therefore the statement "the maximum residence time within the general area of the proposed action alternative for any individual mysticete is estimated to be <24 hrs" is totally wrong. You cannot estimate residence times from densities. Similarly for time in 120dB sound field. 105 TC

4-50 The statement that sperm whales make deeper dives in deeper waters and therefore would not reach the ATOC source (referenced to Rice's general review) is wrong. Sperm whales cannot dive below the ocean floor, but in shallower waters (e.g. ca 850m), they will often dive to it. The statement in the document is contradicted by the next sentence--Watkins' work showing sperm whales diving to the bottom. The calculations on the risk to sperm whales are very wrong: 106 I-9c TC

Correcting for dives during surveys the density is about 4/1000km²;

Sperm whales spend about 50% of their time at depth (e.g. Whitehead and Weilgart 1990; Papastavrou et al. 1989), although, depending on the area, they may not dive below 650m. We do not know dive depths off California. Assume they do (this is supposed to be a worse case scenario).

Sperm whales travel about 4km/hr while at depth. Therefore animals in an approximate horizontal area of 178mx2x4km/hrx20/60hr=.47km² would pass through or over the 150dB

area in any transmission.

The number of transmissions is 1100, plus the tidal sampling (45 extra days at 6 per day)=270.

Thus an estimate of the mean number of sperm whales going within the area during broadcast during the project would be .004x.5x.47x1370=1.3 (not less than 0.01 as stated in the DEIS). Of course it could be much greater if sperm whales repeatedly feed in the area (something they can do).

4-52 Having just stated that sperm whale vocalizations changed totally in response to the HIFT, it seems totally unwarranted to then say (3 paras later) "the impact is expected to be minimal." 107 TC

4-54 Just because you can reasonably assume that masking effects are negligible on most odontocete species does not mean that they are for all--you mention the important exceptions of the sperm and beaked whales. 108 TC

109 4-56 Suddenly we are talking about Kauai and Hawaii! TC

4-58 (also Table 4.1-1) The moored autonomous source alternative would have more close encounters with sperm whales! The autonomous source could be placed in an area where sperm and beaked whales are almost absent. This is misleading. 110 TC

111 4-96 Similarly, the autonomous source could be moored in an area of few myctophids. TC

C-6 This experimental protocol can only detect a small range of potential effects because it is fixed in space and tied to a particular, and biologically arbitrary, temporal scale (4 days on, 7 days off). This study will only be able to detect major changes in distribution over a small range of spatial and temporal scales. It seems to be designed to fit the needs of the physical oceanographers. A more appropriate design would be to use a lower level movable source. This would greatly increase the power of the research, as well as the range of scales that could be examined. 112 I-6c

C-7 For the cetaceans, the chances of detecting any of the unacceptable effects listed are virtually zero: 113

1. According to section 3, there are no high-use areas near the source site. I-6a, 12b

2. Dead animals are rarely observed at sea, and strandings are rare events, so that even if there were sightings of dead animals at sea or strandings, it would be impossible (in the research period proposed) to show a statistically significant change in these rates. Important changes in population parameters can easily occur without any detectable change in observations of dead animals or strandings.

3. There will be no measures, for cetaceans, of emaciation, stress or disease.

4. There are no estimates of calving rates, and population

6

estimates have c.v.'s of around 0.5 (Table 3.3.1-1), so that there is no possibility of detecting even an almost complete and sudden extinction of a species.

114 Many cited references (e.g. Lewis 1994 on 2-51; Myrberg et al. 1978 on 4-91; Whitehead et al. 1990 on 4-55) are not in reference list. TC

D-3 7/19/94. At this meeting, which I attended, there was no agreement whatsoever about refinements to the project protocols. TC
115 In fact the whole project, from its overall goals and structure to the details of the research program, were severely criticized by non-ATOC participants.

Jeanwo
BoulderCrea
950

Dear Mr. Spikes, RECEIVED 1-23-95

1 Hi my name is I-1
Jeri and I'm 10 years old.
And I dont want you to
put sound waves in the
ocan because it harts al
the animals in the ocans
ears and if you do this
then it will be interfering
with their regular life and
it might coss them to die
because these sound waves
scare the other animals so
all the animals won't be
adle to eat and they
will die. Please don't put
sound waves in the
ocean.

Love,
Jeri Spehar

C-29

RECEIVED 1-23-95

115 Majors St.
Santa Cruz, Ca. 95060

RECEIVED
JAN 13 1995
CAMPUS PLANNING

January 8, 1994

Advanced Research Projects Agency
3701 North Fairfax Drive
Arlington, Va. 22203-1714

Re: California Acoustic Thermometry of Ocean Climate Project

I attended the public hearing in Santa Cruz, Ca. on January 6. The testimony was overwhelmingly against the project.

I, too, am against the project for the following reasons:

1. Philosophically I disagree with the scientific idea of controlling at will nature to the "benefit" of human beings. I believe it is time we stopped trying to control the natural world—the habitats, the lives of other creatures, the destruction of land, forests, and waterways. Such activities will ultimately kill us and the earth. I believe that we should live with and preserve the natural world.

2. I very strongly feel that anything funded by the Defense Department has to be for a military advantage. I belong to Women's International League for Peace and Freedom and believe in their principles of world disarmament to include the Comprehensive Nuclear Test Ban.

1 I-1

3. We know many causes of global warming. Strong political leadership is needed as well as education of the public both in schools and in the media and millions of our dollars need to be put into the production of fossil-free energy, solar and wind power and mass transportation--not into thousands of fossil-fueled cars and larger and more freeways.

2 I-3R

As was testified a number of times at the hearing, more studies are NOT the answer to global warming, ACTION on available knowledge is.

Sincerely,

Jane Podesta

Jane Podesta

cc: National Oceanic & Atmospheric Adm., National Marine Fisheries Service
University of California, San Diego, Campus Planning Office
Save Our Shores, Santa Cruz, Ca.
Hon. Sam Farr

C-30

RECEIVED 1-23-95

January 19, 1995

Steven K. Webster, Ph.D.
210 Asilomar Avenue
Pacific Grove, CA 93950

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Re: Draft EIS/EIR for the California ATOC project

I am writing in full support of the ATOC project as described in the Draft EIS/EIR, including the Marine Mammal Research Project (MMRP). I speak as an at-large member of the Advisory Council for the Monterey Bay National Marine Sanctuary, as a board member of the Monterey Bay Chapter of the American Cetacean Society, as a member of the Review Panel (the "Potter Commission") for the National Marine Sanctuary Program in 1990, and as a marine biologist and environmental educator with over thirty years ' experience. As I was the moderator for the May and January ATOC hearings in Santa Cruz, I was unable to speak (I regret) to the issues at those times. I appreciate the opportunity to do so in writing.

I firmly believe that ATOC never deserved the play it received in the public press and resulting debate. The available data from the outset provided little cause for concern regarding the likely impacts of this research, and I have become aware of nothing in the intervening months that would suggest I change that assessment. The combination of irresponsible "tabloid" journalism, misinformed self-proclaimed "experts" and issue-hungry, fundraising fringe environmentalists has elevated this issue to a level of controversy it never deserved, and still doesn't.

I fully support the conclusions of the Research Activity Panel of the sanctuary Advisory Council, and will (tomorrow) strongly support the acceptance of their report by the council. I agree with their report that this research (both on ocean climate and the marine mammal study) is of high priority, that the Sur Ridge site is appropriate from a variety of aspects, and that the project is entirely consistent with the MBNMS Management Plan, and with the research objectives of the National Marine Sanctuary Program and the MBNMS, specifically. Indeed, I believe it is the business of the sanctuary program to encourage, coordinate and even facilitate research within its boundaries, not obstruct it.

I look forward to working through the sanctuary Advisory Council and its Education Advisory Panel, and my place of employment (the Monterey Bay Aquarium, where I am Education Director) to interpret the ongoing findings and conclusions of the ATOC and MMRP projects, and in providing accurate, objective and scientifically supportable conclusions resulting from this research, to the public. The balance between "heat" and "light" in the public discussion to date has been strongly skewed in the direction of heat. It is time the balance shifted to the right - that is, in the direction of "light."

Thank you for the opportunity to contribute to the discussion.

Very sincerely yours,

Steven K. Webster, Ph.D.
Director of Education
Monterey Bay Aquarium

Member At-Large
Advisory Council
Monterey Bay National Marine Sanctuary

January 21, '95

Nancy Boyd
3620 Faberge Way
Sacramento, Ca. 95826

RECEIVED
1-24-95

Dear Committee,

I am writing today to express my concern over the upcoming ETOC Project Proposal.

First off, I am not convinced that enough thought and consideration has gone into the potentially harmful affects this type of experimenting will do not only to our precious marine environment, but to us, the human race as well.

Finally, I would hope your true intentions for what you plan to do with this data, is not ill-advised. Please stop and think.

Thankyou, Nancy Boyd

1 I-15

C-32 RECEIVED 1-24-95

Advanced Research Projects Agency
c/o Clayton Spikes
Marine Acoustics INC.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Va. 22202

Dear Sir,

I'm writing to express my opposition to the ATOC project. The draft environmental impact statement (DEIS) is inadequate to allow this project to proceed. The DEIS
1 failed to incorporate the concerns of hundreds of individuals who attended the 3 scoping hearings last year. Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS as uncertain. It is impossible to estimate the irreversible effects of high decibel low frequency sounds on marine mammals such as gradual deafness and damage to their reproductive and immune systems.

I-12b, 14b, 15

The $35 million which Scripps Institute received from the Department of Defense to "research global warming" is in fact going to the navy to improve submarine detection, making use of the
2 old SOSUS listening arrays which would otherwise be shut down. There is also a section of the ATOC proposal which is classified, suggesting an undisclosed purpose and unknown impacts. Considering the expenditures of XXX dollars and the risks involved, the money for Atoc would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global climate.

I-1

Sincerely,

John Delta

C-33 RECEIVED 1-24-95

01-19-95

BLAKE T. LECOUNT
10341 WESTACRES DR
CUPERTINO, CA 95014

ADVANCED RESEARCH
PROJECTS AGENCY,

RE: CATOC & MMRP EIS/EIR

I AM A COLLEGE STUDENT AT DE ANZA IN CUPERTINO (SILICON VALLEY). I STUDY SCIENCE. I UNDERSTAND THAT SCIENTIFIC EXPERIMENTS OFTEN REQUIRE A SMALL SACRIFICE TO achieve RESULTS. THE
1 SACRIFICE SHOULD ALWAYS BE SOME FRACTION OF THE RESULTS. I DON'T BELIEVE THE *ATOC TESTING CONFORMS TO THIS RULE. I BELIEVE THE RAMIFICATIONS OF ATOC ARE FAR TOO WORSE THAN THE "GOOD" OF ITS BENEFITS.

I-3d

AT THE 3RD PUBLIC HEARING FOR ATOC, DR.
2 MUNK STATED THAT ATOC WOULD NOT EVEN DETERMINE GLOBAL WARMING. IT WOULD MERELY BE A BASIS TO PROVE AND PROVIDE MODELS. NOW, SINCE THERE EXIST ALTERNATIVE TECHNOLOGY, SUCH AS SURFACE+ABYSSAL THERMISTERS THAT WOULD NOT HAVE THE RAMIFICATIONS OF ATOC, I VOTE THAT ATOC NOT BE USED. IF NECESSARY, AT LEAST DELAY ATOC AND ITS PUBLIC HEARINGS, AND ALLOW GREAT MODIFICATION OF THERMOMETRY METHODS.

I-3c

IN CLOSE, I WOULD BE THE FIRST TO SUPPORT
3 SCIENCE, ESPECIALLY FOR ENVIRONMENTAL PURPOSES. BUT, I DON'T LIKE ATOC. I THINK IT WILL HARM CETACEANS, ALL KINDS OF SEA LIFE, AND THEIR HABITATS. I DON'T THINK ATOC'S *MMRP WILL HELP MARINE MAMMALS. I DON'T THINK HAWAII OR MONTEREY SANCTUARY IS A GOOD PLACE FOR ATOC.

I-5a

XC-ACOUSTIC THERMOMETRY OF OCEAN CLIMATE
RP-MARINE MAMMAL RESEARCH PROGRAM

Blake T. LeCount
1-19-95

C-34

RECEIVED 1-24-95

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

Mr. Clayton H. Spikes:

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement is inadequate to allow the ATOC project to proceed. That statement did not include the concerns of hundreds of people who attended the three hearings last year.

The DEIS calls both the adverse impacts to marine life and the "research benefits" of the project uncertain. It is impossible to determine the possible
1 effects of these high decibel, low frequency sound tests on the marine mammals I-12b
which could include damage to their reproductive and immune systems. It is also very questionable, in my opinion, whether this project is actually about
2 global warming. It seems much more likely to me that it is military in nature. I-1
This is supported by the "classified" nature of a section of the ATOC proposal.

I am adamantly opposed to such experimentation taking place within
3 marine sanctuaries; the title "sanctuary" will be meaningless if experiments such I-4a
as these are allowed within them.

Let's spend the ATOC money for known benefits to the environment such as clean energy, efficient use of energy and other such responsible efforts to reduce the degradation of our global climate.

Sincerely,

Dawn S. Sare

Dawn S. Sare

C-35

RECEIVED 1-24-95

January 20, 1995

Elaine Sohier
P.O. Box 2972
Grass Valley, Ca. 95945

Advanced Research Projects Agency
c/o Clayton Spikes
Marine Acoustics Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Va. 22202

Dear Sir,

I'm writing to express my opposition to the Atoc project. This letter is commenting on the DEIS and on the project!

There is a substantial lack of scientific evidence on the impacts of low frequency sound and its combined effect with other already existing sounds on marine mammals. Whales are critically dependent on sound for social communication and for food finding. It is impossible to estimate the irreversible effects of high decibel low frequency sounds on marine mammals such as gradual deafness and damage to their reproductive and immune systems. These adverse impacts may be difficult to detect.

The DEIS is inadequate to allow this project to proceed! The DEIS failed to incorporate the concerns of hundreds of individuals who attended the 3 scoping hearings last year. Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS as uncertain.

If we allow Atoc and its associated Marine Mammal research project, we threaten the very species our laws are supposed to protect. These laws are the Marine Mammal Protection Act and the Endangered Species Act.

According to the DEIS: "The Marine Mammal research project has been created to obtain much information." Is this how we go about protecting our endangered species and marine mammals, by turning them into experimental guinea pigs, potentially stressed and disrupted, violated in their own habitat?! While more research and a better understanding of marine
1 mammals and ocean eco-systems may be of some value, and of this I have yet to be convinced, I-15
the process so far has taught me that the institutions, scientists, organizations and agencies that support Atoc have not shown that they necessarily have the best interests of marine mammals in mind at all. We all know that the marine mammal component of this project only came about because of public concern and outcry. If this knowledge about marine mammals is so critical,
2 then cancel Atoc and initiate the marine mammal research free from the pressure to pour more I-1
money into the military.

The fact that the Atoc sounds will be generated from within 2 national marine sanctuaries;
3 Point Sur (part of Monterey Bay Marine Sanctuary) and Kaihu Point (in Hawaii) both of which I-4a
are rich in marine mammals is in my opinion, both alarming and appalling. Doing this is inconsistent with the goal of minimizing impacts. The name sanctuary should speak for itself.

The stated purpose of Atoc is to test for evidence of global warming by measuring differences in deep ocean temperatures. The initial experiment is for 2 years and then if successful Atoc
4 would be established as a worldwide network in operation for 10 years. In other words, through I-3b
Atoc it would take 10 years to gather sufficient data on global warming. Many of the world's most renowned climate scientists now agree that we can't afford to wait to take action against global warming.

Intense floods, like the ones we just experienced, storms of the century, increasing hurricanes, and intense droughts are all signs amongst large growing bodies of evidence that climate change is occurring. The impacts of this climate change and global warming have already begun.

Clean energy technologies are already available to begin the transition away from dependence on fossil fuels which cause global warming.

I greatly distrust the proponents of Atoc, due to the vagaries, generalities, contradictions, half-truths and patronizing tone of the DEIS.

The 35 million dollars which Scripps Institute received from the Department of Defense to "research global warming" appears to be going to the Navy to improve submarine detection, making use of the old SOSUS listening arrays which would otherwise be shut down. So Atoc is a military experiment designed by the military for the military and not for an environmental purpose at all. Atoc is just an excuse for millions of dollars to go to the Navy. Yet the public isn't informed about this. There is also a section of the Atoc proposal which is classified, suggesting an undisclosed purpose and unknown impacts. 5 I-1

As a member of the tax paying public I am furious that this exorbitant amount of money which could be spent on clean energy and used to prevent global warming is instead going to the military in the guise of a test on "global warming."

As a member of the public and as someone who is in contact with many people, I and many of us feel that the proponents of Atoc have purposely set it up to make it very difficult for public input in order to steam roll the project through. This is easy to see, given that the public is only supposed to comment on the DEIS, a document which is difficult to obtain and difficult to read and understand for your average person. It is also easy to tell this, given that the public hearing was planned just after the holidays, only a month after the release of the DEIS on December 2nd, and given that the final EIS is planned to be released at the end of February, only 30 days after the close of the public comment period. If the agencies involved in Atoc really wanted the public's participation, then the public hearing would have been scheduled at a much later date, and more effort would have been made to educate the public and invite their attendance.

I'm asking for an extension to the public comment period and for an additional public hearing so that the public really has the chance to be heard. 6 I-14a

Sincerely,

Elaine Sohier

Elaine Sohier

January 15, 1995

Advanced Research Projects Agency
c/o Clayton N. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

RECEIVED 1-24-95

Dear Mr. Spikes,

I am writing to express my opposition to the Acoustic Thermometry of Ocean Climates projects and to the sloppy DEIS/EIR which was prepared to justify the project. The public comment period since the DEIS was released is much too short for a document and project of this complexity. Clearly the aim is to have as little public input as possible. As a taxpayer whose money will help fund ATOC should it be approved, I demand that the public comment period be extended until March 2.

Humans have been making war on the animal nations for thousands of years and ATOC is one more attack of the anti-Earth mindset on the natural world. At this point in time species like blue and humpback whales are so depleted that reputable cetacean biologists such as Roger Payne and Victor Shiffer have serious doubts that these species will survive unless habitat-destruction of all kinds is

stopped. After the beating the whale nations have taken from humans it is unconscionable for us to do anything that would harm them, particularly since both ATOC sites are in biologically rich waters.

1 The entire DEIS, including the discussion of the MMRP, is appallingly flippant in its dismissal of the probable harmful effects of ATOC on marine life. I-62

2 There is no talk in the DEIS of cumulative impact of the ATOC project as a whole (Kauai, California and New Zealand). Legally, for a project of this scope cumulative impact for all sites needs to be addressed. I-12c

ATOC sound level at 20M below surface is compared to freeway noise at a distance of 30m away, or a garbage disposal running, yet even my jaded human ears would be stressed by having a garbage disposal going off

3 in my home for 20 minutes every 4 hours. Cetaceans have exquisitely sensitive hearing capabilities, much more so than industrial age humans. At the May 16 scoping hearing many people raised concerns about disruption of whales' echolocation by ATOC, which could then cause difficulty in finding food sources or other whales to mate with. Given that humpback whales use vocal- I-5c

4 izations to communicate with eachother across entire oceans it seems like that their lives will be negatively impacted by ATOC. It is the height of human arrogance for ATOC scientists to suggest otherwise. The DEIS ignores this whole issue as well as blatantly disregarding any potential I-10b, c, d, 13-b

C-36

5 impacts on leatherback, green, olive ridley and other species of sea turtles living around the ATOC sites. Sec 4.3.2.1

Finally, it's amazing to me that the public is viewed as being so stupid that we would

6 believe that the Navy is suddenly concerned about global warming. I would be surprised if there weren't military applications attached to ATOC, and I demand to be made aware of any that are. The whole way this project has been approached smacks of arrogance on the part of Scripps, UC Santa Cruz and the Navy. I'm all for intelligent Marine research that doesn't harm the ecology of the ocean. The DEIS/EIR has not convinced me that ATOC is benign. As a taxpayer and concerned citizen, I demand that the permits for ATOC be denied. I-1

Sincerely,
Michelle Waters

Bob DeBolt
127 Mason St.
Santa Cruz, CA 95060

C-37

RECEIVED 1-25-95

January 11, 1995

Dear Mr. Spikes;

I am writing in regards to the Acoustic Thermometry of Ocean Climate (ATOC) project. I question the need for such a project as there are other studies which already establish that global warming is occuring. The important issue is to reduce the causes of global warming which includes combustion of fossil fuels and deforestation. The emphasis should be on preventing the causes global warming. I also question the source of funding for the project from the DOD which could be intended for military purposes.

1 I-3a

2 I-1

A National Academy of Sciences report concluded that it is virtually impossible to predict the effects of loud noises on marine mammals. Whales and other marine mammals depend on their acoustic ability to survive and sounds generated over ATOC's large scales of space and time could potentially jeopardize the health of marine mammal populations. The effects could range from deafening, through hearing loss, to disturbances in feeding or socializing, to long-term psychological effects. Because of the importance of hearing to whales, a deaf whale is a dead whale. According to oceanographer Sylvia Earle the high level of noise is bound to have a hard, sweeping impact on life in the sea. In 1991 scientists conducted a pilot test off Heard Island in the Southern Indian Ocean and there were reports of sperm whales that stopped clicking, or vocalizing, within a forty to forty five mile radius of the Heard Island transmissions and did not resume for days.

3 I-15

There is an immediate need for noise reductions to make the oceans quieter. To establish and enforce maximum noise standards for boats, ships, underwater industrial noise, and the noise of seismic, military and scientific exploration. I urge you to reject the ATOC project and protect the ocean environment for all marine life.

Sincerely,

Bob DeBolt

C-38

RECEIVED 1-27-95

MOSS LANDING MARINE LABORATORIES
CALIFORNIA STATE UNIVERSITY FRESNO, HAYWARD, SACRAMENTO, SAN FRANCISCO, SAN JOSE, STANISLAUS
P.O. BOX 450
MOSS LANDING, CA USA
95039-0450
(408) 633-3304

24 January, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive, Arlington, Virginia 22202

Dear Mr. Spikes:

This letter comprises my comments on the November 1994 Draft Environmental Impact Statement (DEIS) and Environmental Impact Report (DEIR) for the proposed Acoustic Thermometry of Ocean Climate (ATOC) research project to be located off Point Sur, within the Monterey Bay National Marine Sanctuary (MBNMS). I have read this DEIS/DEIR and have carefully considered the consequences of the research contained within it.

Having been a Professor (Ichthyology, Marine Ecology) in the Monterey Bay area for over 20 years, I feel I have the experience and knowledge to comment on this document. In addition, as Chair of the MBNMS Research Activity Panel (RAP) and member of the Sanctuary Advisory Council (SAC), I have been exposed to many facets of the proposed research, ranging from the acoustic thermometry through the Marine Mammal Research Program (MMRP). Recently, Dr. Dan Costa (UCSC), who has been integrally involved with very recent marine mammal surveys and tracking studies in the vicinity of the proposed ATOC study site for the past several months, presented a brief review of the results of the studies as they pertain to the methodology proposed in the DEIS/DEIR.

I am concerned about the potential effects of both natural, long-term, global temperature changes as well as those which may have been caused anthropogenically, through global warming. Many perceive man-induced global warming as one of the greatest environmental threats facing our planet. As part of the whole story, we need to be able to measure ocean temperatures and improve our ability to predict its rate of warming, as well as what might be causing these changes.

The ATOC/MMRP project will allow scientists to evaluate synoptic techniques involving sound transmission over a large area of the Pacific Ocean to measure ocean temperatures. In my opinion, the DEIS/DEIR provides clear and adequate details of this research project and its implications. Therefore, I support the ATOC/MMRP research on the Point Sur Ridge, the preferred sound source location.

The project's MMRP to monitor potential effects on targeted mammal and reptile species is soundly designed and appears to have a good chance of succeeding. It also includes a mechanism to take immediate action to terminate the sound transmission if and when significant effects are detected. The MMRP also proposes to measure ambient sound levels in the area, which will provide good background information, as well as verify the physical models upon which ATOC is based. It is my opinion that the effects of the acoustic signals used in the ATOC experiment will have less than significant effects on marine mammals and other marine life (including fishes, the subjects of my studies). In addition, this project will provide much good, quantitative information on the distribution, abundance and behavior of many observable and tracked marine organisms, including mammals.

The preliminary survey data indicate that only a few marine mammal species with low frequency sensitivity utilize habitats in the proposed ATOC vicinity off Point Sur. These studies also establish procedures for the effective study of a select group from these species. They also indicate that several species can be successfully studied and that it is feasible to monitor the behavior of tagged animals that traverse the area. Thus, any ATOC source-induced changes in distribution and behavioral responses can be studied in detail during early, controlled sound transmissions.

I certainly feel it is appropriate to conduct the ATOC/MMRP studies within the MBNMS, because this Marine Sanctuary, as all others, was designated to promote research, education and conservation. The proposed ATOC/MMRP research is certainly relevant to the MBNMS to help predict the consequences for marine organisms if global warming is as serious as thought by many scientists. These consequences could include altered climates, collapse of food chains, failure of reproduction of many common organisms and the like.

For all of the above reasons, I feel the DEIS/DEIR adequately states the benefits and possible consequences of the proposed ATOC/MMRP studies. I strongly endorse the research involved and hope it can be accomplished in the MBNMS at the preferred and most appropriate site.

Sincerely yours,

Gregor M. Cailliet

Gregor M. Cailliet, Ph.D.
Professor

RECEIVED 1-27-95

January 21, 1995

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Dr.
Arlington, Va. 22202
ATTN: Clayton Spikes

RE: ATOC

Dear Mr. Spikes:

Today I learned of the proposed research project known as ATOC, or acoustic thermometry of ocean climate, while listening to a public radio station in Grass Valley, Ca. Of course they were urging their listening audience to write in opposition to this project because of the possible harm done to marine life, and because this project is most likely a military one because it is funded by the Pentagon.

However, I am not opposed to this research project, and I encourage you to press on with it. I believe in our military, and the importance of being defensively prepared.

I do not agree with the efforts of Greenpeace and others of the liberal Left to cripple our ability to defend our country. I am a conservative American, so if they are against your project, I am for it.

Sincerely,

Dave Clewett

Dave Clewett

C-40 RECEIVED 27-15

Derek and Margaret Cole
1555 Merrill Street #97
Santa Cruz, CA 95062

CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT

TO: ADVANCED RESEARCH PROJECTS AGENCY
c/o CLAYTON H. SPIKES, MARINE ACOUSTICS, INC., ARLINGTON, VIRGINIA.

Thank you for the privilege of sharing in commenting on this proposed project and for the opportunity to look over the very well produced and informative draft Environmental Impact Report.

My findings, concerns, and conclusions are listed below:

1. What a splendid heat sink the ocean provides, just what is needed to establish long-term heating or cooling effects, provided the mass as a whole is considered, which is not what this proposal proposes. I have a concern that the acoustic channels proposed are not sufficiently representative of the ocean at large, even over a decade, to provide acceptable evidence for global warming. It may well be
1 argued that the time changes expected are so small as to be lost in other time I-3d
influencing variations such as the combined effects of current flow, salinity and signal path dispersion within the acoustic paths. This could make the long-term information sufficiently unreliable that the transit time data would provide no proof, and the ten years time and money would have been better spent in reducing ozone depleting emissions.

2. It is of concern to me that the majority of the acoustic energy transmitted into the water will not travel in the desired direction. Why illuminate the whole marine sanctuary and cause undoubted distress, no matter what the sparse collected data indicates, unnecessarily? I have yet to encounter a scientist that can communicate with a whale, yet we purport to know what they hear and how they interpret it. Surely a
2 more efficient transmitting array can be developed if it is to be mounted in a sanctuary. I-6d
This would provide a better chance of an intelligible signal reaching its destination and may also enable a reduction in transmitted power. I can visualize that if the experiment is allowed to proceed as proposed, it will be discovered that the output power is too low for reliable reception, and the plea will go out that now we have gone so far and spent so much money, we must increase power by a moderate amount in order for the data to be gathered, or even worse, "lets tweak it up a little while no one is looking", the ends justify the means!

3. The whole premise of usable results relies upon a transmitter and receiver at a constant fixed distance apart. But what if the continental shelves upon which they are mounted are in motion. Over a decade does anyone know the relative motion between California and New Zealand? Are satellite measurements accurate to a yard over such great distances and time spans. If the answer is yes, then how has that been verified?

From my stated concerns I am forced to conclude that there are too many questionable factors, and any element of doubt must lead to at all costs protecting the marine sanctuary. Even if results are obtained supporting global warming I think they

will be too little and too late, all at the cost of broken marine behavior patterns, resulting in who knows what? In the name of scientific advancement we should not create a precedence that does not honor sanctuaries and seeks to prove theories at the expense of any part of this creation. Let us spend the time and money in funding and fighting the causes of ozone depletion, which as I understand is a proven and measured fact. Furthermore, the decade or more needed to collect data may be used as an excuse for not taking positive action in tracking and defeating the causes now.

Derek J. Cole - Retired Radar & Sonar Engineer
1/24/95

c.c Representative - Sam Farr

24 Jan 95

C-41

RECEIVED 1-27-95

To Clayton H. Spikes:

I Am Staunchly OPPOSED to the ATOC Project, as the Publicized Draft Environmental Impact Statement (DEIS) is unacceptable. ADVERSE EFFECTS ON MARINE LIFE & UNKNOWN "RESEARCH BENEFITS", AS DESCRIBED IN THE DEIS, MAKE THIS PROJECT UNWORTHY OF TAX DOLLARS. I AM NOT WILLING TO RISK THE HEALTH OF ANY MARINE LIFE DUE TO PROLONGED EXPOSURE TO HIGH DECIBEL LOW FREQUENCY SOUNDWAVES - DEAFNESS, REPRODUCTIVE + IMMUNE SYSTEM DAMAGE RESULTING. THE HEALTH OF OUR OCEANS IS WAY MORE IMPORTANT THAN THE IMPLICATION OF A MILITARY OPERATION INTENDED TO IMPROVE SUBMARINE DETECTION. I:1
(NO, I DON'T BUY YOUR "GLOBAL WARMING" GREENWASH — PLEASE STOP INSULTING THE INTELLIGENCE OF THE MEMBERS OF THE HUMAN RACE)
IT'S CLEAR THAT THE TRUE INTENTIONS + CONSEQUENCES OF ATOC HAVE NOT BEEN REVEALED TO THE PUBLIC, + I THEREFORE FEEL THIS PROJECT SHOULD BE ABANDONED FOR DEAD.

SINCERELY,
Natalie dePrisque
3127 N. WESTERN AVE
CHICAGO, IL 60618

C-42

RECEIVED 1-27-95

1/24/95

Dear Mr. Spikes,

I just learned about the ATOC project you hope to conduct. I am very alarmed that this is being rushed through without the public being informed. The first thing you should do is extend the public comment period. Then you should be honest with the American public about the true nature of these experiments. If the purpose is to learn more about Global Warming, why the classified designation. Please respond. I-14a

Thank you.

Bill Jackson, 2900 Breeze Terrace, Austin TX 78722

C-43

RECEIVED 1-27-95

Advanced Research Projecy Agency
Marine Acoustics Inc
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the project to proceed as planned.

First of all, the adverse effects on marine life, as well as the "research benefits", are described in the DEIS as being unknown. It is impossible to estimate the irreversible and long-term effects of high-decibel, low-frequency soundwaves on marine mammals, such as gradual deafness and damage to reproductive and immune systems. This project could therefore devastate the health of our oceans. 1 I-15

Furthermore, the Scripps Institute has received 35 million dollars from the DOD to "research global warming." However, if global warming was the true priority, then the use of tax dollars would be more wisely spent in the areas of clean energy and energy efficiency, as well as other responsible efforts to reduce our impact on the global climate. Also, the "classified" nature of the ATOC implies that this has nothing to do with global warming, rather it is a military operaton intended to improve submarine detection, which is a gross misuse of important tax dollars. 2 I-1

It is clear that the true intentions and consequences of ATOC have not been revealed to the public and I therefore request that this project be halted.

Sincerely,

Dan Overmyer

Dan Overmyer
37619 Summers
Livonia, MI 48154

1

Margaret Owings
Wild Bird
Grimes Point
Big Sur, CA 93920-9620

C-44

January 22,1995

RECEIVED 1-27-95

The Advanced Research Projects Agency,
c/o Clayton Spike
Marine Acousitic, Inc.
4 Crystal Park, Suite 901
2345 Crystal Drive,
Arlington, Va, 22202 Re: ATOC EIS/EIR

May I thank you for making an effort to carry out this EIS/EIRwhich the public requested. I am one of the concerned public - and have attended the meeting in Santa Cruz with uneasiness - and have purused this document with care.

I have lived directly on the coast, 10 miles south of Point Sur for 38 years - and since my home on the cliff is directly above a Sea lion and Elephant seal beach - I am constantly aware of their activities along with attacking Orcas and passing Dolphins - not to mention Sea otters rafting in the kelp beds. The migrating Gray whales come close enough to us to hear their breath while a continual passage of Humpback and Minke whales and an occasional Blue whale churn into our vision.

I awaited this EIS/EIR anxiously,to see how it would be handled and immediatly found it clearly biased. I wanted to find a more thorough explanation and description of the impact on whales from the ATOC source. Monitoring, I understand, is a planned program at present and animal behavior could be viewed and recorded - but this document has hardly touched on the long-term effect on whales. 1 I-12a

How can anyone know, as the years pass, how this will effect the fertility, the breeding, the migrations, the care of their young - when their whole lives are totally dependent upon accoustic communication ? 2 I-10c

To me, an EIS/EIR cannot possibly be put together when the data and facts into the future are unknown. As John Twiss responded to the request for a Permit to take or harass these marine mammals - "the effect on marine mammals will only be discovered after the fact and the damage could be irreversible".

Its as if this document, with all the labor put into it, was brushed over by Dr. Walter Munk's conclusion (which he has written and verbally stated many times):
"Its no risk to marine life."
I, for one believe that if ATOC is carried out in the far-reaching program for the planet - it will have a sweeping impact on life in the waters of the world.

Margaret Owings

C-45

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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INSTITUTE OF MARINE SCIENCES
EARTH AND MARINE SCIENCES BUILDING
TEL: (408) 459-4026
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SANTA CRUZ, CALIFORNIA 95064

email: pearse@biology.ucsc.edu

RECEIVED
1-27-95

23 January 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Colleagues:

I am a Professor Emeritus of Biology at the University of California, Santa Cruz. I taught and did research at UCSC in coastal marine biology, focusing on invertebrate reproduction and ecology, from 1971 to 1994 when I retired. I continue to do research at UCSC's Long Marine Laboratory as a Research Professor.

I was a member of the Committee on Low-Frequency Sound and Marine Mammals of the Ocean Studies Board, National Research Council, which produced the report "*Low-Frequency Sound and Marine Mammals, Current Knowledge and Research Needs*", David M. Green, *et al.*, 1994, National Academy Press. Our 8-member committee, with expertise in hearing, sound, oceanography, marine mammals, and marine ecology met over a period of two years, reviewed enormous quantities of information, and interviewed a wide range of experts before we wrote our report. Although we were not charged to specifically review the proposed ATOC project (indeed we were unaware of it at the beginning of our research), our findings have direct bearing on it and the associated Marine Mammal Research Program.

Perhaps the conclusion in our report that is most relevant to the proposed ATOC project is the first one, given on page 1 of the report:

> "Data on the effects of low-frequency sounds on marine mammals are scarce. Although we do have some knowledge about the behavior and reactions of certain marine mammals in response to sound, as well as about the hearing capabilities of a few species, the data are extremely limited and cannot constitute the basis for informed prediction or evaluation of the effects of intense low-frequency sounds on any marine species."

Our report went on to propose some changes in the current regulatory system to facilitate the acquisition of scientific knowledge that would benefit the conservation of marine mammals, and to suggest

C-45

several areas of research that are needed to more fully understand the effects of intense low-frequency sounds. It is my opinion that the proposed ATOC project in general, and the associated Marine Mammal Research Program in particular, represents a tremendous opportunity to obtain much of the information needed to better protect both marine mammals and their food sources.

Much of the information in the draft EIS/EIR for ATOC/MMRP is the same as we gathered and presented in our report. Particularly germane is Figure 1 (p. 11) in our report and Figure 2.2.6.1.1-1 (p. 2-44) of the draft EIS/EIR showing ambient noise spectra. That figure, which is more than 30 years old, shows that the levels of low-frequency sounds in the ocean can be very high both from natural and anthropogenic sources. Particularly disturbing is the sound generated by shipping, especially supertankers, which are equal to or equivalent to those to be produced by the proposed ATOC project. These are produced in coastal waters continually, including right through the Monterey Bay National Sanctuary as shown in the draft EIS/EIR Figure 4.3.1.1.2-1 (p. 4-35), yet their effects on marine mammals and other forms of sea life are unknown. In addition to providing critical data for evaluating global warming, the proposed ATOC project and MMRP would provide an opportunity to access the possible hazards of low-frequency sounds to marine life in the Sanctuary. Without such information, we have no basis for protecting marine mammals, and other forms of marine life, from anthropogenic intense sounds.

I was pleased to see in the draft EIS/EIR a recognition that there is a need to determine how fish and squid are impacted by low-frequency sounds (p. ES-9, 4-94-95); these are closer to the center of the ocean food webs and provide the main food for many marine mammals. Myctophid fish, in particular, may be important in the food chain (p. 4-94), and could be severely impacted by tanker noise, especially at night when they approach the surface. However, I did not find any place in the draft EIS/EIR about how such potential effects on marine mammal prey would be determined. That lack should be addressed

As a person deeply concerned about the continued health of marine life in the Monterey Bay National Marine Sanctuary, and how anthropogenic disturbances such as intense low-frequency sounds might effect this life, I endorse the proposed ATOC project and MMRP. Although we can do little about global warming if it is occurring, we can at least understand biotic changes that could be caused by it, if we know that it is occurring. More importantly, this project can help determine whether noise from sources such as shipping are detrimental to marine life. If that is the case, steps can be made to control those sources. Without that information, no action can or will be taken until adverse effects are all to obvious. The proposed ATOC project and MMRP provide an extraordinary opportunity to determine in a rigorous and sound manner whether and how low-frequency sounds effect the ecology of the Sanctuary. That opportunity should not be lost as a result of uninformed protests from head-in-the-sand opponents.

Respectively,

John Pearse

Nicole Roskos
913 Post Oak St.
Austin, Tx 78704

RECEIVED 1-22-96

Advanced Research Project Agency
Marine Acoustics, Inc
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes,

I am opposed to the ATOC project. I question whether this project has to do with global warming. Why aren't tax dollars spent actually to protect us from the effects of global warming, like on projects for clean energy and energy efficiency?

1 Why is this project "classified" + received military funding? This suggests that this project really is centered around military operations. I-1

I believe intelligent animals such as whales + dolphins deserve respect. ATOC will pollute the ocean with noise. How can we possibly know how it will disturb these animals homes?

What's the big rush with this project? We need more time, an extension of the public comment period. You are responsible for your actions.

Sincerely,
Nicole Roskos

Dana Schroeder
2605 OAK LAWN
Austin TX
78722

RECEIVED 1-22-96

The Acoustic Thermometry Ocean Climate (ATOC) project IS TO Be potentially disastrous to the lives of all the remaining life in the Seas. I Dont want tax dollars used For this and I dont want it to continue. 83% of the worlds schools of Fish have been killed off since 1950 using Sonar. Greed and ignorance seem to be hell-bent on turning our planet into a lifeless cinder block. I have a young son and want the remaining pelagic life-form left inviolate until they can recover. This will continue the O^2 production capacity. FISH = Plankton = 70% Poop = Blue algae = O^2 produced Thank

Not only are we rapidly loosing our Earths'protective OZONE-LAYER,but we
also,at the same time loosing the OXYGEN-CONTENT of our Atmosephere as well!
NASA's Total-ozone-mapping-spectrometer(TOMS)aboard the NIMBUS-7 satellite,
measured a 12% loss of Ozonosphere over Texas in 1993, and a 2% decrease the
year before. Consequently,1994 saw 15% more Solar-radiation on the ground; 1
more U.V.rays creating,thus,increasing ozone on the surface here around us,wh
it is apoison. Ozone-alerts became,common this year,and will become more so
the Ozone-Layer dissolves.

In October,'94 British scientists based in Antartica measured a record 70%depl
and predicted,at this rate,the Ozonosphere over Antartica would be 100% dissc
by the year 2005.Will we be forced to go nocturnal by then?

The Ozone-Layer is being dissolved primarily by 3 things: the annual produc
of 40million tons of chlorine, the 60million tons of(rotting) plastics made
annually, and the burning of 225billion gallons of war-juice annually by the 4
million cars running around on our Planet. Much of the chlorine produced goes
into the making of (rotting) plastics. Too much more of it is used to BLEACH
THINGS WHITE(paper, rice,sugar,flour,etc.) Pesticides, herbicides,fungicides,
HCFCs are also among the dangerous chlorine-derivatives.

Ozone is a pale-blue gas,toxic to all plant and animal life.Breathed,it ca
head-ache, fatigue,burning in lungs and brochia, inflamation of eyes and sinu
Our eyes,of course. are also being burned by the increasing,harmful U.V.s now
in-coming.

Compouding the problem of decreasing Ozonosphere/increasig U.V.radiation i
the needless burning up of our Atmosphere's Oxygen content.and it's not being
replaced by natural processes.

70% of the Oxygen we breath comes from the top 3 feet of the Oceans'warmer
and currents(33% by PLANKTON,22%by BLUE-ALGAE,and 15% by other unicellular,ma
plants),20% of the total Oxygen derives from RAIN-FORESTS,and 10% by Temporate
forests.The RAIN Forests,Congo,Indonesia (1000's of islands),and the Amazon, hav
been 65% removed since the turn of the century. The 70% of our Oxygen that co
from OUR OCEANS ,depends on fish poopin' daily (600million years of fish swar
trapped in the top 1mile layer of OUR OCEANS, and subject all to sonar and r
since 1950. 83% OF ALL THE WORLDS SCHOOLS OF FISH HAVE BEEN KILLED SINCE 1950

Thus, Massive- Plankton-Dieoff across thousands of square miles began in 1
along with another unheard of phenominon WORLD-DROUGHT. It takes an Oxygen-ri
atmosephere to support upper-level weather-patterns. In the last dozen years,
frequency of huracans' has fallen by 90%; the catches of the Worlds' poor fis
cultures has fallen by 90%. NO MORE SCHOOLS OF FISH = NO FISH POOP = MASSIVE
PLANKTON-DIE OFF = NO MORE OXYGEN PRODUCTION. So, we're BUSY,BUSY BURNING UP
LEFT, with a variety of infernal and external combustion.

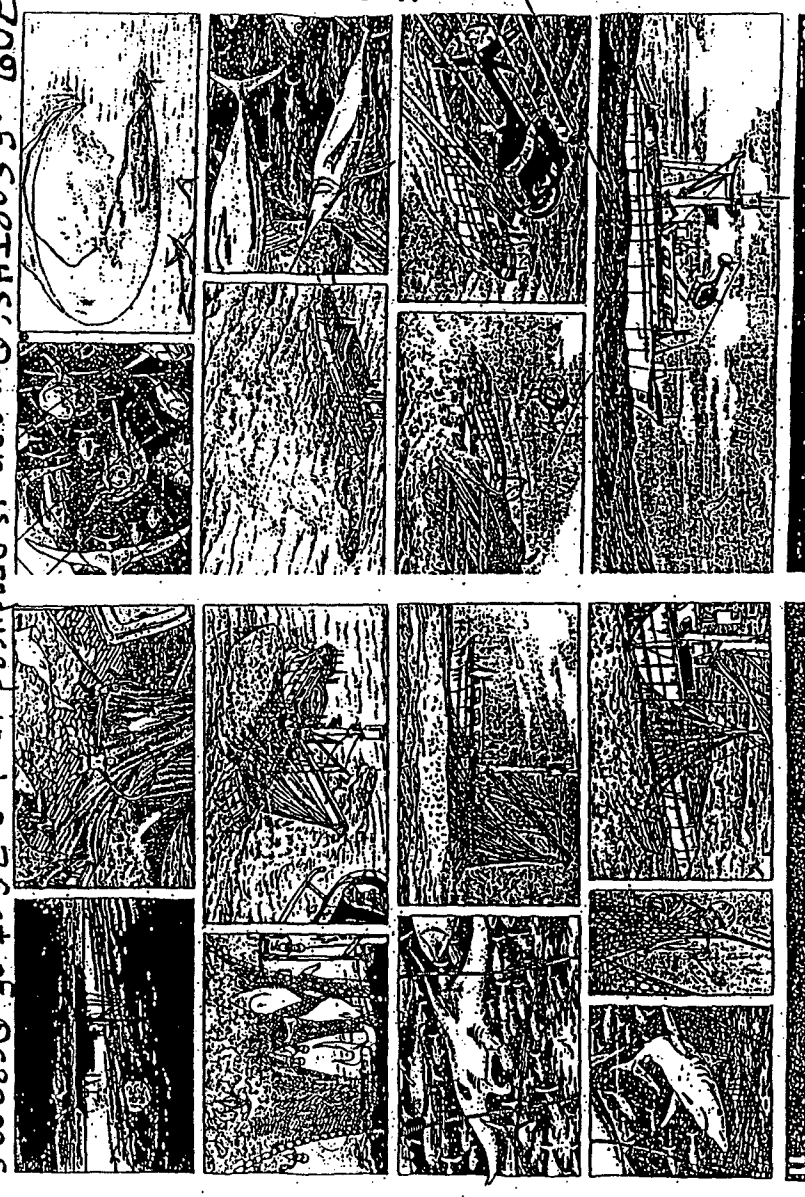
The solutions are generally simple: Use navies to clear the high-seas of al
fishing-fleet/factories, to allow the remaining 17% of fish to recover.(50 ye
east.)As it is, ever more boats are going out after ever less fish using ever
sophisticated equiptment. The armies can begin a massive tree-planting. The A
bases to be tree-nursuries.Three billion tree- planters can replant trillions o
shade, food and oxygen producing trees w/variety of endemic species. Paint yo
roof white to save $$, enrgy,.And stay cool as we stay indoors more in daytim
least our governments can do for us is U.V,-shades, a wide- brim hat-- white
top,black under brim), start savin'up an emergency-food supply, and start a m
tree- planting program. SHUT ALL ATOMIC POWER DOWN,COLD! IT'S TOO LEAKY, SHOD
AND DANGEROUS. Garbage-Incineration, oil and gas field- flaring, wars and oth
major oxygen-burns need to cease. Oxygen- starvation, going blind, ozone-pois
ehcatera!s no fun prospect,

The compounded-daily problem is called ECO-HOLOCAUST, the pr
MARSIFICATION of Earth. Increasing temperature-and-wind-variations, increasin
penetration, decreasing oxygen and moisture-content, decreasing Ice-caps,and
decimation of plant and animal species.City-gardens, decriminalizing natures
gift to humanity- HEMP (#1 for recycable paper, cloth, particle-board,etc.)

Plant trees in big wells, mandate xeriscape and recyclig. Cottonwoods, elm
nd chikapin oakes, walnuts, sycamores, hackberry, native plum and persimmon fo
Texas. Compassion, VEGANism, $upport EARTH-FIRST!, SEA-SHEPARD, PETA, FARM,AL
GREENPEACE ... LIKE NEVER BEFORE! COPY THIS (SAVES) 1lb bags beans,rice oatmeal

BAN JET FLIGHTS, spaceshots, SST's, they tear up OZONOSPH
wear shades and hats, Y'all always - No more roads extensions
N.B. do. No more

C-47



C-48

RECEIVED

P.O. Box 852
Capitola CA 95010
January 23, 1995

Advanced Research Projects
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901, 2345 Crystal Drive
Arlington VA 22202

Dear Advanced Research Projects people:

I am writing to express once again my strong objection to the ATOC project.

At the January 6, 1995 hearing held in Santa Cruz, commercial fishermen and a PADI dive instructor (among others) provided relevant information about likely effects of such an experiment on marine life. The dive instructor reported that the vibrations coming from a loud noise which has been heard off Monterey since August 1994 (which apparently cannot be identified or explained by anyone thus far) affect the absorption rate of gases in divers' lungs. It seems most likely that there would be similar effects on marine mammals.

We already know that there is global warming caused by man's activities in the modern industrial age. Rather than using our finite
1 resources to further measure this warming, we must focus on develop- I-3d
ing and changing our technologies in order to cease our damaging practices.

This seems to be yet another case of mankind's arrogance in thinking we have the right to seize, tag, and test other animals, and to manipulate their environments, rather than living within the fabric of life on earth without destruction and/or manipulation; and another case of scientists undertaking a project the true results of which will not be truly known until decades after it is begun -- when we may learn, as in the past, that we have caused irreparable damage to our earth and its creatures.

I was outraged to learn that preliminary testing began off Baja California when it had been prohibited off our shores. So typical -- we send our unsavory activities to other shores when we are unable to have our way at home.

I have wondered if the obnoxious loud sounds reverberating in the waters off Monterey these past months are some form of this experiment which was simply bulldozed through without notice or approval. This din was recorded by the PADI dive instructor, and played at intermission at the ATOC hearing on January 6. The recording was very unpleasant and made conversation difficult; there was universal relief among those present when it stopped!

Sincerely,

Freda Sprietsma

Freda Sprietsma

C-49

RECEIVED 1-27-95

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

January 23, 1995

1000 Oak St. #1
San Francisco, CA 94117

To Clayton H. Spikes:

I am writing to express my opposition to the ATOC project. The DEIS is inadequate to allow this project to proceed because the true intentions of the ATOC experiment have not been made clear to the public.

The "classified" nature of the ATOC project reveals that ATOC has nothing to do with the stated purpose--global warming and marine
1 mammal research. I do not believe that the DEIS sufficiently I-1
justifies the need for the ATOC project, nor is the need for this particular type of Marine Mammal Research Project (MMRP) justified.

The adverse impacts to marine life have not been satisfactorily determined and the DEIS refers to impacts as uncertain. It is I-12b,
2 impossible to gage the irreversible effects of high decibel, low 15
frequency sound on marine mammals, such as damage to reproductive and immune systems.

I urge you to extend the public comment period and allow the
3 final EIS to fully discuss the rationale and justification for I-14a
the ATOC project.

Sincerely,

Karen Susag

Karen Susag

* PLEASE RESPOND !!

1/24/95

C-50

RECEIVED 1-27-95

I am writing to express my opposition to the ATOC project.

The Draft Environmental Impact Statement (DEIS) is inadequate to allow the project to proceed.

Both the adverse impacts to marine life and the "resaerch benefits" are stated in the DEIS as "uncertain". it is impossible
1 to simply estimate the irreversible long term effects of high decible, low frequency sounds on marine biospheres. Among the effects upon mammals are gradual deafness, reproductive and immune system damage. I-15

Scripps institute has recieved 35 million from the Department of Defence to research global warming. If global warming were the true priority, then the expenditure of tax dollars would be far better spent on responsible, clean, energy efficient
2 efforts to reduce and reverse our impact on the global climate. I-1
However, the classified nature of the ATOC project indicates that it has nothing to do with global warming and suggests that it is a military operation designed to improve submarine detection and to make use of the SOSUS listening arrays which would otherwise be dismantled.

It is clear that the true intentions of ATOC have not been revealed to the public and further analasis must occur before the project is allowed to proceed.

Signed,

Vivian Traugot

VivianTraugot

C-51

RECEIVED 1-27-95

Dear Mr. Spikes,

I am writing to express my opposition to the A.T.O.C. project. The draft environmental impact statement (D.E.I.S.) is inadequate to allow the project to proceede. Both the adverse impact to marine life and the "research benefits" are stated in the DEIS. as uncertain. It is impossible to estimate the irreversable effects of high decibel, low frequency sounds on marine mammals such as gradual deafness
1 damage to reproductive and immune systems. I-12b

Scripps Institute has received $ 35,000,000 from the Defense Department to research global warming however, if global warming was the true priority then the expenditure of tax dollars would be better spent on clean energy, energy efficiency and other responsible efforts to reduce our impact on the global climate. The classified nature of the A.T.O.C project indicates that A.T.O.C. has nothing to do with
2 global warming and suggests that A.T.O.C. is a I-1
military operation to improve submarine detection and make use of the sosus listening arrays which would otherwise be shut down.

It is clear that the true intentions of A.T.O.C. have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely, Stephanie Hardin
1-22-95

01-30-1995 02:43PM FROM D pt Fish TO 87834181842 P.01

C-52

To: Clayton Spikes

4610 Bain Ave.
Santa Cruz, CA 95062
January 27,1995

To whom it may concern:

I am strongly opposed to the proposed ATOC Project for the following reasons:
* We already have plenty of studies and data showing that there is global warming. That is a given. We do not need another experiment that proposes to tell us what we already know. What is needed is global action. I see this project as spending millions and millions of "peace dividend" dollars to re-invent the wheel. Investigate solutions and put them into practice, instead.
* The project itself has a poor experimental design with far too many variables to ever accurately give the type of information hoped for. Also, with climatic changes occurring over long stretches of time, a ten year study will not yield accurate nor reliable results.
* The proposed site of the sound source is within the Monterey Bay National Marine Sanctuary and the two alternate sites are adjacent to the Sanctuary. Under the laws governing the
1 sanctuary, it is illegal to harass and /or injure marine animals, which transmitting 195dB soundwaves would surely do. Previous studies of marine mammal response to human-made noise, which were shorter term, and quieter than the proposed 195db, have shown a 50% avoidance response and a detectable change in swim direction (page C-4). I-4a
* The present permit application to the Monterey Bay National Marine Sanctuary required that all installation activities be completed before July 1994. A new request to extend the installation permit should be denied due to the proposed activity harassing and harming animals in the area.
* As a teacher of deaf and hard of hearing students, I know the long term effects of exposure to very loud sounds. Becoming deafened in this way is a gradual process which would be difficult to impossible to ascertain in marine mammals until it is too late and they are permanently injured.
2 195 dB is extremely loud and would carry underwater in the ocean canyon for long distances. I-12a
Many marine mammals and fish use their acute acoustic abilities to migrate, locate food and hunt, communicate, and reproduce. Their behaviors would most definitely be altered and many would move or die as a result.
* There is sparse research regarding the effects of noise on marine mammals, but the research that the DEIS/DEIR does mention discusses the noise of super tankers. This research is not meaningful here because of the following reasons:

ATOC	Super Tanker
195 dB	120dB
Deep under water	Surface of the water
Stationary	Moving
On-going	Sporadic

Let's try to cut back on noise, not add to it!
* It appears that this study has hurriedly tried to lump studying the effects of noise on marine mammals into the study on global warming. Neither part seems well thought out.
* I attended the public hearing on January 6, 1995 in Santa Cruz. Sentiments were overwhelmingly against this study. Many articulate and knowledgeable people clearly opposed ATOC and made strong cases against it. I hope you will listen to them.
3 * I support Alternative #2 -NO ACTION. It does not make sense to me to damage one aspect of nature to try to determine if another has been damaged. I-5a

Debby Molina

Debby Molina

TOTAL P.01

01-30-1995 10:12PM FROM CMC408375 TO 17834181842 P.02

C-53

Center for Marine Conservation

January 31, 1995

Advanced Research Projects Agency
c/o Mr. Clayton Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes,

Enclosed are the comments of the Center for Marine Conservation on the draft EIS/EIR for the California Acoustic Thermometry of Ocean Climate Project (ATOC) and its associated Marine Mammal Research Program. You will receive a faxed copy on January 31, and a hard copy postmarked January 31.

Feel free to call me should you have any questions on the comments. Thank you for your careful review of these and other public comments on the ATOC project.

Sincerely,

Anna Weinstein
Habitat Protection Specialist

ific Regional Office: 580 Market Street, Suite 550 San Francisco, CA 94104 (415) 391-6304 Fax (415) 956-7441
ional Headquarters: 1725 DeSales Street, NW, Ste. 500 Washington, D.C. 20036 (202) 429-5609 Fax (202) 872-0619
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C-53

RECEIVED 2-10-95

Center for Marine Conservation

January 31, 1995

COMMENTS OF THE CENTER FOR MARINE CONSERVATION ON THE DRAFT EIS/EIR (DEIS) FOR THE CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT (ATOC) AND ITS ASSOCIATED MARINE MAMMAL RESEARCH PROGRAM

The following are the comments of the The Center for Marine Conservation (CMC), a national, nonprofit, science- based advocacy organization dedicated to protecting marine species and their habitats. Our local focus in the central coast region is on protection of the species and habitats of the Monterey Bay National Marine Sanctuary.

The Center concludes that the DEIS is an important step toward resolving the issues that the scientific community and the public have raised in regard to this project. However, there are a number of serious deficiencies in the document which have greatly contributed to the continued criticism of the project.

The purpose of an environmental impact statement (EIS) is to describe potential environmental impacts of a project and to assist decision makers in choosing a course of action that minimizes adverse impacts. NOAA's National Marine Sanctuary Program, the independent scientific community, and the general public were expecting a report that would realistically portray the uncertainties related to the feasibility and safety of the project, that would describe a range of alternatives, and present a preferred alternative that would pose *negligible* risks to the federally recognized ecological values of the Sanctuary.

Instead, the document's ambiguities, inaccuracies, and treatment of uncertainties has intensified rather than quelled concern over ATOC. Ironically, most of these critics support the overall goal of the ATOC project to improve our understanding of global climate change, and support scientific research within the Monterey Bay National Marine Sanctuary. But the inadequacies of the DEIS, combined with the recognized values of the Monterey Bay ecosystem, leaves the public with little choice but to demand greater clarification on many issues of concern.

Major areas of concern include the project's feasibility and overall value to climate change policy, its procedural and regulatory legality, and its potential effects on marine life. While CMC has reservations about the ability of the project to gather accurate and precise data that will provide a reliable measure of global climate trends, we agree that if ATOC is successful it could provide a valuable

1 I-3d

Pacific Regional Office: 580 Market Street, Suite 550 San Francisco, CA 94104 (415) 391-6204 Fax (415) 956-7441
National Headquarters: 1725 DeSales Street, NW, Ste. 500 Washington, D.C. 20036 (202) 429-5609 Fax (202) 872-0619

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contribution to our understanding of ocean and climate dynamics. We also appreciate the experimental difficulties posed by ATOC's large geographic scope and highly dynamic test environment.

Accordingly, the Center will not oppose the ATOC project *provided* risks to marine life are shown to be acceptable. Making risks acceptable may mean choosing a different fixed sound source location, using a mobile sound source, or scheduling sound transmissions when sensitive species are not within the zone of influence; it will definitely mean improving the Marine Mammal Research Program by better defining the criteria for "unacceptable" short- and long- term behavioral and physiological effects in marine life, improving the program's ability to detect effects, and clarifying decision- making points and authority related to project initiation and continuation.

CMC's specific comments are set forth below and focus on the following issues:

1) The portrayal and handling of uncertainties;

2) The criteria used to determine the choice of Sur Ridge as the preferred alternative; and

3) The Marine Mammal Research Program (MMRP)

1. Portrayal and handling of uncertainties

While the DEIS acknowledges that "available information on subsea noise and its biological impact ranges from incomplete to nonexistent," (pg. 4-15) in the absence of this information it repeatedly defaults to a conclusion of no expected significant impact. Virtually every assessment of the potential environmental consequences of the project, as outlined in section four, admits insufficient data yet concludes that *nonexistent* or negligible impacts are expected. This tendency to dismiss uncertainty exacerbates rather than alleviates questions regarding potential impacts. It is as if the burden of proof regarding impacts is on the ocean, rather than the researchers. Consider the following examples:

2 I-15

a) The document notes that elephant seals and leatherback sea turtles hear at low frequencies, dive deeply, and are present in the project area. Further, it notes that there is no information regarding long-term impacts to elephant seals or sea turtles from sounds comparable to the ATOC source. Yet it concludes that adverse behavioral impacts for these species are expected to be "minimal" and "less than significant," and will be mitigated by low numbers in the project area and by the Marine Mammal Research Program. While it may turn out that impacts will be minimal or insignificant, there is no adequate scientific basis set forth in the DEIS for these conclusions.

b) The DEIS contends that "no information exists on noise impacts to salmon," but "due to their temporary occurrence in the study area, no adverse impacts are expected."(pg. 4-7) There is in fact abundant evidence that salmonids hear and behaviorally respond to low-frequency sounds. In fact, acoustic barriers comprised of repetitive low-frequency sounds are now being used to deflect juvenile salmonids from sloughs leading to water export pumps in the Sacramento-San-Joaquin Delta (C. Hansen, personal communication). Of course, results cannot be directly applied to an ocean setting, as the topography of a river channel is dramatically different from that of the deep sound channel and migrant fish are concentrated in the vicinity of the sound source in the river channel. However, this information means that the potential for impacts on salmonids cannot be readily dismissed, as in the DEIS.

The ATOC research group should heed the advice of The National Research Council, which recently concluded that "although we do have some knowledge about the behavior and reactions of certain marine mammals in response to sound, as well as about the hearing capabilities of a few species, the data are extremely limited and cannot constitute the basis for informed prediction or evaluation of the effects of intense low frequency sounds on any marine species." (National Research Council 1994) Rather than responding cautiously to this uncertainty, the DEIS draws conclusions in the absence of data, makes inferences and assumptions based upon data on species other than marine mammals and sea turtles, and proposes a pilot study and monitoring program that may not detect potential impacts. It fails to acknowledge that many aspects of the ATOC sound source differ from those of ships and other common ambient noise, and relies heavily upon unsubstantiated assumptions such as the assumption that a five-minute ramp-up period at the initiation of the sound source will allow sufficient time for animals negatively affected by the sound time to leave the area. What if a species is feeding or resting in the area, is disoriented by the sound, or cannot leave the area within five minutes? How will the sound source affect populations of sessile, highly localized, and/or planktonic invertebrates that cannot leave the area?

Testing, rather than speculation, is the way to determine whether the ATOC sound source is adversely impacting marine life. Therefore, CMC urges the project group to revise the DEIS to realistically portray uncertainties, and to address them through a scientifically robust pilot study and monitoring program that will both define significant impacts and detect any adverse impacts.

2. Choice of Sur Ridge as the preferred alternative

3 Section 2 (Alternatives) describes the criteria by which Sur Ridge was chosen as the preferred alternative. Tables 2.2.3.2-1 and 2.2.3.3-1, illustrate the derivation of scores based on a number of criteria. The DEIS fails to explain the weighting factors assigned to each of these criteria; they appear to have been assigned arbitrarily. Most notably, "minimum cable run to shore" and "close logistical I-4a,b

support," both given "high" ratings at the Sur Ridge site, are each inexplicably assigned a weighting factor of five in the ATOC source site selection criteria table. "Close proximity to land" and "sufficient marine mammal populations" are each given weighting factors of four in the MMRP source site selection criteria table. Without any explanation of these weighting factors, the reader is inclined to suspect that they were assigned to support the choice of the Sur Ridge site as the preferred alternative.

Further, using sufficient marine mammal populations as a site selection criterion is unacceptable given that the sole objective of ATOC is to measure changes in the ocean's temperatures over time. The MMRP is a permit requirement, not a research objective, of this experiment. Research on the effects of low frequency sound on marine life is desperately needed, but is a separate question. Yet the DEIS elevates the MMRP *to* a purpose *of* rather than a requirement *for* ATOC's initiation. The MMRP must focus *exclusively* on investigating the effects of the ATOC sound source on marine life, and not be couched as a complementary goal of the project. Otherwise, the MMRP is being misused to help justify the preferred alternative. CMC urges the project team to site ATOC in an area with low numbers of marine mammals and leatherback sea turtles, preferably outside of Sanctuary boundaries.

Finally, the location of the preferred alternative in a National Marine Sanctuary requires consistency with the regulations designed to protect the recognized values of the Sanctuary. CMC urges the ATOC group to cooperate with NOAA's Sanctuaries and Reserves Division to this end, to ensure that the Monterey Bay National Marine Sanctuary is fully protected.

3. The Marine Mammal Research Program (MMRP)

We are not confident that the MMRP as presented in the DEIS can fulfill its stated objective to "assess potential effects of ATOC signals on the distribution, behavior, and ecology of marine animals" for the following reasons:

4 a) The time frame is too short, and sampling events too few, to obtain statistically viable data. I-6b

Eleven sampling events over six months may be insufficient to detect the potential occurence of long term "unacceptable" effects that would change project operations, as described on pg. C-7. The DEIS lacks validation that noise from observational vessels and planes will be controlled for in the course of behavioral observations. Finally, there are no protocol contingencies in the event that power analyses demonstrate that baseline data will not provide a statistically valid basis of comparison with pilot study data.

b) The experimental protocol fails to require inclusion of leatherback sea turtles.

Studies suggest that leatherbacks may spend more time at the surface in the presence of low- frequency sounds, which could interfere with their deep feeding dives for salps and other jellies. In contrast to the information presented in the DEIS the Monterey Bay area is in fact an important feeding ground for this species (A. Baldridge, personal communication). Incorporating the assessment of potential impacts of the sound source on leatherbacks "as practicable" is simply not good enough. Regarding sea turtle research, the research protocol reads "if this research is undertaken..."(pg. C-27), language which lends little confidence that potential effects on sea turtles will be properly measured during the pilot project or the monitoring program. A reliable means of determining changes in the diving patterns or other movements of leatherbacks should be incorporated. This is particularly important in light of the fact that leatherbacks travel slowly (.5 - .8 m/sec), according to information presented in the DEIS (pg. C-27), and thus may be unable to leave the area during the five-minute ramp up "getaway" period, even if they are able to orient away from the sound source.

5 TC

c) Effects criteria are incompatible with the length of the pilot study, and levels of significance undefined

Table C-1 enumerates the effects to be measured by the pilot study surveys, including short term behavioral and long term acute changes. However, the only effects considered "unacceptable" are long term effects including abandonment of high use areas, increases in sick and dead animals, and reproductive depression. Since there is no way to determine in the six-month pilot study whether these long term effects are taking place, there is a high probability of reaching an unsubstantiated conclusion of no significant impact.

6 I-62,b

d) Relationship of pilot project results to initiation of 2 year feasibility study

The DEIS includes the contingency that "climate-related transmissions will only begin if the system is determined to be safe for marine mammals and other sea life," and that "the protocols for suspending operations are described more fully in Appendix C." (pgs. ES-3, 2-3) However, the protocol in Appendix C fails to describe how a violation of safety thresholds would change project operations, or who has the authority to make these decisions. A "2-day workshop" and a legally informal "consultation with NMFS regarding the biological significance of observed responses" (pgs. C-6, C-7) does not constitute an adequate protocol for suspending operations. Considering how much seems to hinge on the data from the pilot project, the DEIS should specify that the criteria used to determine significant effects found in the pilot study phase must be approved by NOAA and must be linked to specific actions regarding further project operations. Finally, the DEIS should acknowledge that the pilot project lacks the capacity to resolve many significant effects, and provisions must be made to alter project operations based upon results from the long-term monitoring program.

7 TC I-6g

e) Authority over initiation of project operations

To ensure that decisions to proceed with the ATOC project are based on sound science, not vested interest in the project, review of pilot project and monitoring program data must be made by a technically qualified group *independent* of the project, and the independent group's findings *must* be released for public scrutiny. Continuation of the project must be contingent on the group's findings, and the group's findings must be endorsed by NOAA's Sanctuaries and Reserves Division.

8 TC I-6c

f) The long term monitoring program

The various shortfalls of the pilot study underscore the need for the monitoring program to serve as the primary means of detecting cumulative physiological, behavioral, and distributional effects. A well-designed monitoring program is an essential prerequisite to initiation of long-term operations. This monitoring program must provide a mechanism whereby unacceptable effects on biota detected in the monitoring program would result in changes in project operations.

9 I-12a

In conclusion, while CMC supports scientific research to improve understanding of global climate change, the DEIS for the ATOC project does not provide sufficient information to accurately evaluate the project's environmental impacts. CMC urges the Advanced Research Projects group, Scripps Institute of Oceanography, and the University of California, San Diego, to correct the deficiencies presented in these comments in order to fully comply with the requirements of the National Environmental Policy Act.

Sincerely,

Anna Weinstein
Habitat Protection Specialist
cc: interested parties

C-53

REFERENCES

Baldridge, Alan. Librarian Emeritus, Hopkins Marine Station of Stanford University, Pacific Grove, CA. Personal communication with Rachel Saunders, Habitat Conservation Director, Center for Marine Conservation. December 1994.

Hansen, Chuck. Director, Hansen Environmental, Walnut Creek, CA. Personal communication. December 1994.

National Research Council 1994. "Effects of low frequency sound on marine mammals: current knowledge, research needs." National Academy Press. April.

C-54

January 25, 1995

Re: ATOC Proposal

Hello:

People have learned that vested interests like tobacco companies can afford science that will present them with the very results they seek to find. Even if this contradicts other credible science. Oil companies can buy science for the purposes of obtaining drilling permits that tell us oil spills rarely happen and when they do, they really don't do much harm. They can tell us marine life actually like their offshore drilling platforms because it creates a microenvironment and a food chain.

Why is it the mission of the Department of Defense to fund studies on the environmental issue of global warming? Perhaps they could stretch citing National Security but why is this study not being done by an agency that studies broader environmental issues? Are other scientists in this and related fields compelled to support this proposal for political, economic and not scientific reasons?

1 Why would these people have already spent $25 million on equipment and software, the majority of a $35 million project, before knowing whether the proper permits could be obtained? Where is the logic or precedent for that matter, in constructing most of a mechanism you might not be allowed to use? Is it because having the leverage of money already spent as a force behind them will soften official judgement especially when it comes to superficial documentation or less than clear motives? I-1

Could it be that these scientists are just confused by the dollars envolved? Why we managed to get the money allocated for this project--we've got to spend it! People are tired of paying for bad science. Especially science that one way or another ends up being used against them. Without sounding further heretical, I can't but help think how short a time ago the vested interests believed the earth was the center of our solar system and to express otherwise was to risk harsh persecution.

What other projects have been funded by the Advanced Research Projects Agency? What is the expressed pupose of this agency? Do they have a track record in environmental science they would care to share with us? Who is Andrew Forbes and what other projects has he been associated with and in what capacity?

A lot of those concerned about ATOC undoubtedly know that whales communicated for thousands of miles before the advent of machine powered screws for ships. With more and more noise introduced into the ocean in recent history, one need only listen to the cacophony of traffic, urban environments or even citizens band radio to find out what overused channels of communication are like.

C-54

While it is suggested that the ATOC transmitter will only emit 260 watts of sound, about as much as a home stereo, this signal is intended to be effective for thousands of miles; this in itself a good indication of how pervasively sound travels thru water and therefore why great care should be taken not to further impact species that are affected by sound waves.

With this new effort, surely years of reference will need to be established to track changes in global warming. Why couldn't other means of thermometry be used? Why not measure temperature directly if that is the objective; why get exotic and risk these long distance sound tests.

2 Will harmonics, multipath, distortions and any other number of interferences render these tests less than effective? I-36

Why not use a number of strategically placed thermometers to send data by low ultra powered transmitters if the Navy has this sophisticated array of listening devices. If the intent is that the scattered receiving nodes of their array measures pitch variation from the primary frequency emitted at their two transmitters, what would prevent using temperature sensors located near the array nodes to begin with? They would know precisely where these thermometers where located and it would seem a more direct method of obtaining temperatures rather than having to perfect sonar thermometry and learn what its limitations or ill effects are.

The right arm shouldn't work independent of the left arm to reinvent the wheel. If the Navy really wants to help us protect the environment, fine; they won't mind accepting input from or diverting this research to, other agencies with more direct involvement and background in environmental study as a whole. On the other hand, if the Navy wants to sell us defense research cloaked as environmental concern, they should have gone to the CIA or NSA and kept their mouth shut.

Before permits are issued and indeed any more of our money is spent to do this project here or elsewhere, we have a right to know the answers to these and questions posed by others.

Sincerely

Matt Hellmann
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C-55

PACIFIC FISHERY MANAGEMENT COUNCIL
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CHAIRMAN
Frank R. Warrens

EXECUTIVE DIRECTOR
Lawrence D. Six

January 27, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

SUBJECT: Draft Environmental Impact Statement (DEIS) for the California Acoustic Thermometry Project

Dear Mr. Spikes:

The Pacific Fishery Management Council manages ocean fisheries in the 3 to 200 nautical mile exclusive economic zone off the coasts of Washington, Oregon and California. Because human impacts on the environment affect the abundance and behavior of fish, the Council actively reviews and comments on projects with potential adverse effects.

The Magnuson Fishery Conservation and Management Act (MFCMA) is the federal statute which authorizes our activities. The MFCMA requires federal agencies which sponsor projects affecting habitat to provide a detailed response to our concerns, in writing, within 45 days. Our comments on the proposed Acoustic Thermometry of Ocean Climate Project are limited to the effects on fish and fishing.

1 The DEIS correctly documents that there is a substantial demersal fish community at the proposed site approximately 21 nautical miles off Point Sur at a depth of 850 meters. Commercially important species include rockfish, sablefish, Dover sole and thornyheads. Bottom trawl and other fishing vessels are active in this area. I-5e

The document does not address the potential conflict between trawl gear and the facilities, including the sound source, monitor and cables. The DEIS states that the new cables will be laid "closely paralleling the existing Navy cable." This may or may not reduce the likelihood that bottom trawl gear will encounter the new cables. What is the historic frequency of conflict between trawl gear and the existing Navy cables? What is the distribution of fishing activities (especially trawl fishing) in the vicinity of the cables and other equipment? How much larger must the "trawl avoidance zone" be to ensure that conflicts do not increase? That is, how much additional fishing opportunity will be lost? This should be addressed in the discussion pertaining to the socioeconomic environment. The DEIS should address not just the loss of fish through direct mortality of the proposed study, but also the loss of access to those fish stocks from the physical presence of experimental equipment, potential loss of fishing gear that encounters that equipment, and the cost of repairs to that equipment and disruption of the experiment should an

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encounter take place. While not as directly affected as groundfish and the trawl fishery, salmon, their food sources and salmon fishing also occur in the impacted area and are of concern to the Council.

It is unfortunate that the fishing industry was not consulted in the developmental stages of this project. Potential conflicts might have been avoided or minimized. We recommend that the project be delayed until such time as the appropriate consultation is completed.

The document extensively reviews the literature on the effects of sound on various fish species, although there are few data on the fish that inhabit the study area. The study concludes that the project could impact fish behavior and increase vulnerability to predation, but assumes that the impact is less than significant given the minor proportion of any population that might be affected. As a mitigation measure, the marine mammal research program will monitor fish stock assessments to attempt to evaluate impacts. This measure likely will be ineffective in determining any change in the local groundfish populations or the larger (regional) populations. Groundfish stock assessments are done only every three years, at best, and only for major species. These assessments lack the precision to determine any but the most substantial changes in fish population size or structure. As an alternative, we suggest that the action agency monitor impacts on fish on a site-specific, species-specific and real-time basis. This effort could be concentrated during the early phases so that project adjustments could be made, if necessary.

Thank you for consideration of our comments. We look forward to your response.

Sincerely,

John Coon

for Lawrence D. Six
Executive Director

LDS:clw
c: Habitat Committee

C-56

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January 31, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
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Dear Sir:

The Kauai Friends of the Environment (KFOE) would like to take this opportunity to present our comments on the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the California Acoustic Thermometry of Ocean Climate Project (CATOC) and its associated Marine Mammal Research Project (MMRP). Since the so-called California ATOC is a part of the overall ATOC project which includes the Kauai project our comments apply equally to both aspects of the Project, notwithstanding the persistent efforts on the part of the Scripps Institution of Oceanography (SIO) to segment these parts for the purpose of the environmental process.

INTRODUCTION

KFOE believes, and will demonstrate, the DEIS fails fundamentally to address the issues of alternatives and potential impacts, as well as the requirements of the statutorilly mandated consultation and scoping process. The DEIS completely ignores the hundreds of comments offered by the public at the three hearings in Hawaii and California in April and May, 1994. The arguments put forth in those sections in the DEIS dealing with impacts are highly presumptive, often self-contradictory and, where scientific data are concerned, grievously incomplete. The DEIS fails to support any of its arguments against alternatives other than the proposed action with logically and scientifically sound discussion. We at KFOE conclude, on the basis of all the information presented, that, other than the repeated use of the phrase "presumed to be less than significant", SIO has failed to make a convincing case for the eventual finding of "no significant impact". On a more fundamental basis we believe the correct choice of alternatives should be one of "no action" instead of the proposed action, because SIO has failed to demonstrate, against a backdrop of scores of theoretical and experimental projects specifically addressing the issues of global warming, that the ATOC project can yield meaningful information on global climate change. This surmise is, interestingly enough, supported by the manner of the genesis of the

ATOC project and the words of its principal investigator.

1. FAILURE TO RESPOND TO PUBLIC COMMENTS

Three scoping hearings were conducted prior to the preparation of the DEIS - in Honolulu, Lihue (Kauai) and Santa Cruz. The comments presented by the hundreds of members of the public (of which SIO had complete records, since recording systems were present and manned at all three hearings) ranged from one-sentence proclamations of opposition to well-prepared expositions of viewpoints, perspectives and reasons for opposition; yet the DEIS completely ignores these inputs from the public, which not only exposes the essential hubris of the preparers of the DEIS but also puts to waste the enormous expenditure of resources, and the time and efforts of the hundreds of attendees at these three hearings. It can certainly not be for lack of time that these public comments were not addressed, since almost seven months passed between the last hearing and the issuance of the California DEIS. We strongly suggest that the
1 present DEIS be withdrawn and re-issued after SIO and its sponsors have adequately addressed I-14b
the public comments offered at the three scoping hearings.

In particular, we refer to the comments Raymond L. Chuan, representing KFOE, presented orally at the May 6 scoping hearing in Santa Cruz, California, and the written comments sent to Dr. Alewine and Dr. Fox on June 11, 1994, well ahead of the closing date for comments after the Santa Cruz hearing. These two documents we again submit here, since the issues therein have not been responded to in the Draft EIS for California. Furthermore, we take the present opportunity to elaborate on some of the issues.

2. FAILURE TO VALIDATE PRESUMPTIONS OF NO IMPACT ON MARINE LIFE

All the treatments of the potential impact of ATOC on marine life are based on self-contradictory assertions. Examples abound. A few of the more glaring examples are listed below.

In the opening discussion on Potential Effects on the Biological Environment (Section 4.3) there appears the statement "As stressed in the EIS/EIR, available information on subsea noise and its biological impact ranges from incomplete to nonexistent, depending on the species being considered." (p. 4-15) Yet in the very next paragraph there is this statement, "As set forth
2 below, the ATOC project and the MMRP are not anticipated, in most cases, to result in adverse TC
effects on biological resources." I-6k

The lack of information alluded to in the quotation above is further reinforced by the following, on p. 4-26, "In summary, variations in sensitivity to human-made noise between and within marine mammal species and lack of information about the consequences of short-term disruptions on marine mammals, make it difficult to define the criteria of ther responsiveness and to asses the consequences of the disruption in their natural activities." Yet the DEIS goes on to assert, in cases after case, repeatedly with the phrase, "....this potential impact is believed (or presumed) to be less than significant."

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In fact, the summary on the DEIS discussion of effects of ATOC on mysticetes, in Table 4.3.1.1.3-1, p. 4-41, is a study in self-contradiction. On every one of the seven mysticetes listed there appear, under the column marked "Potential Effects", the phrases: "Uncertain; however, no acute responses expected."

The routine of self-contradiction and multiple caveats continues with the treatment of effects on odontocetes, pinnipeds, fissipeds and sea turtles, beginning with the statement on p. 4-52, "As with mysticetes, variations in sensitivity to human-made noise between and within odontocete species and the lack of information about the consequences of short-term disruption on odontocetes make it very difficult to define criteria of responsiveness and to assess the consequences of a disruption in their normal activities.", and concluding with Table 4.3.2.1.3-1, p. 4-80, where assertions of "significant impacts unlikely" are not supported by scientific evidence.

Yet another tactic employed by SIO on the assessment of impact is the illogical equating of "low rate of occurence of a significant effect" with the conclusion of "less than significant impact". This has been applied to the assertion of less than significant impact on such species as sei whale and right whale (p. 4-41), odontocetes (Impact 6, p.4-50) and the seat turtle (Impact 8, p. 4-75).

3. FAILURE TO CONDUCT MEANINGFUL ANALYSIS OF ALTERNATIVES

The ATOC project has been advertised as a demonstration of the feasibility of using the measured ocean temperature averaged over thousands of kilometers to relate to, or predict, or monitor global warming. Yet nowhere in the original proposal submitted by SIO to ARPA in response to a supposed Broad Agency Announcement in 1992, or in any of the documents released by SIO since the beginning of the ATOC project, including the Draft EIS, is there any serious discussion of the relevance of ATOC to global climate change, other than sweeping statements ranging from perfunctory dismissal of the efficacy of established global climate
3 research efforts to self-contradiction and oxymoron. I-3c, d, e

The DEIS starts out, in the Executive Summary, with this astounding proclamation: "Generally speaking, all of the alternative scientific methods for addressing the global warming problem are either included in the project as proposed, or would not meet project objectives." (Page ES-12, Executive Summary) It boggles the mind to contemplate that for a mere $35 million (or $57 million, or $105 million, depending on whose authority is quoted) the Oceanography Division (not the Climate Research Division) of SIO would supplant the work of scores of established climate scientists supported by no less than eleven federal agencies with a total budget in the billions of dollars. Yet, in SIO's proposal to ARPA submitted in May, 1992, which presumably resulted in the award of the multi-million dollar contract to SIO to conduct the ATOC experiment, the following statements appear which would seem to contradict the confidence behind the statement in the Executive Summary of the DEIS:

"A new generation model is proposed .... because the known problems of the

models already in existence are so great...." P. 15 of Proposal.

"While paths could be resolved, there is uncertainty about their specific identification." P. 32 of Proposal.

"...these data will provide valuable insights into the temporal and spatial variability of the N. Pacific Gyre.." P. 33 of Proposal.

Leading these confusing and contradicting statements in the Proposal is the perplexing assessment of the ability of ATOC to relate averaged ocean temperature to global warming:

"This 'detection problem' is a non-trivial one, involving trend detection in the presence of red-noise proceses, and would eventually become a central issue.."

It would seem logical to consider this "central issue" of "detection" before the ATOC project ever starts, rather than allowing it to "eventually become a central issue". Unfortunately this has not been pursued by SIO in any but the most perfunctory manner, as exemplified by the following quotations from the DEIS:

(In discussing the relevance of Global Climate Models, Alternative 7)

"First, significant changes within the oceans occur on a much smaller or localized scale than changes in the atmosphere. While atmospheric weather fronts can span thousands of kilometers, significant features of the 'weather' in the ocean can be much smaller, on the order of 50-100 km, and are, therefore, more numerous. Thus, much higher spatial resolution is required of ocean models than of their atmospheric counterparts." P. 2-46, DEIS.

Yet, high spatial resolution is exactly what ATOC does not provide, since the temperature is averaged over basin scale distances, not 50-100 km! The self-contradiction inherent in the assertions on the scientific validity of ATOC in relation to global warming is further muddled by the oxymoron expressed on p. ES-1 of the DEIS "..The overall ATOC project is an international research effort to determine long-term ocean climate changes on global scales by using acoustic sound paths in the sea's deep 'sound channel' to precisely measure average ocean temperatures." (Emphasis ours)

In further reference to GCM's and Sea Surface Temperature (SST) ATOC claims to be able to enhance the capability of these by feeding ATOC data into GCM and SST, with such statements as:

"Ocean temperature data collected by ATOC operations in the Pacific will lead to assimilation of that data into Pacific GCMs. In addition, ATOC scientists would work on the interpretation of the best available climate models (Hamburg, Princeton, O'Brien/Hurlburt of Florida State University, Wunsch/Marshall of MIT)

under development, in terms of their acoustic signatures, to ascertain how well the GCMs describe the ocean acoustically." P. 2-47.

"Unfortunately, this wealth of SST information does not reflect thermal properties below the sea surface. Satellite measurements give surface boundary conditions, but due to the impenetrability of sea water to electromagnetic waves (microwaves, infrared), they do not measure temperatures at depth. As a result, there is also a need to monitor the ocean's interior by other means.
ATOC scientists would work closely with ongoing and future satellite data collection programs to couple the ability to measure temperature at the sea surface with measurement of the ocean's interior temperature, by acoustic thermometry. Therefore, this alternative (meaning SST) has been incorporated into the preferred alternative, and is not analyzed further as an independent alternative." P. 2-48.

without the least amount of discussion as to how the interior temperature of the ocean is to be related to surface temperature (which is going back to the original statement made in the ATOC proposal that this is not a trivial problem). Since GCMs use as boundary conditions the sea surface temperature and heat flux, there is no connection between GCM and ATOC until this "central problem" is delineated, which has not been touched upon at all. One also wonders why GCM modellers would want to describe the ocean acoustically in the first place, much less to want "to ascertain how well the GCMs describe the ocean acoustically".

The climax in the desultory treatment of GCM vis a vis ATOC comes on page 2-52, with the, by now familiar, sweeping statement

"Computer model results alone would be inconclusive because they are a simplification of the ocean with respect to physical processes and atmospheric forcing functions. ATOC temperature measurements would be incorporated into GCMs as benchmarks for verification and validation, with the goal to improve the model's reliability.",

the clear implication being that ATOC itself, by averaging temperature over thousands of kilometers, is not a simplification of the ocean with respect to physical processes.

In addressing the measurement of sea level heights as an alternative (Alternative 9 in the DEIS) another unsupported broadside is offered by ATOC:

"Precise measurements of sea level heights from satellite altimetry sensors would be appropriately incorporated into ATOC oceanographic and acoustic modeling efforts, that would feed into the global climate modle prediction efforts. Therefore, this alternative has been incorporated into the preferred alternative, and is not analyzed further as a separate alternative." P. 2-49.

again without offering even the slightest hint as to how sea level heights are related to the basin-

scale averaged deep ocean temperature.

The discussion over Alternative 10, Oceanopgraphic Point Sensors, is even more confused and carries self-contradiction to a new height.

> "The ATOC project would use expendable bathythermographs (XBTs) and conductivity-temperature-depth (CTD) profiling systems in order to validate its own temperature measurements; therefore, this alternative is an element of the ATOC project proposal. However, oceanographic point sensors are not a substitute for acoustic thermometry, due to the extremely large number of such sensors that would be required to provide a comparable level of data."

One must wonder how may point sensors are required to validate ATOC's acoustic thermometry measurements?

In concluding this section on the failure of ATOC to support its choice of the proposed action in favor of the cited alternatives, what emerges as the central defect of ATOC is its failure to show that the averaging of temperature over basin scale distances has any statistical meaning at all in the face of ATOC's own assertion that ocean properties on small spatial scales (of the order of 50-100 km) are of basic importance to the eventual understanding of global climate changes. There is also a complete absence of discussion of the temporal scales that are appropriate to the understanding of global climate phenomena. By comparison to these fundamental considerations the absence of any discussion of the relationship between deep sea temperature (averaged or not) and surface temperature and heat flux may seem insignificant. Regardless of the relative importance of the several categories of defects in the rationale of ATOC, it seem inescapable that the appropriate choice of alternatives should be Alternative 2 - the no action alternative.

4. THE GENESIS OF ATOC

In the overlooked (by the preparers of the DEIS) comments submitted by KFOE there is a lengthy discussion of the manner in which the ATOC project came into being. We wish to at least partially remedy the oversight by a summary here, along with some additional comments.

The ATOC proposal, which presumably arose out of an ARPA Broad Agency Announcement (DARPA 92-24), did not undergo an external peer review. The phrasing of the language in the BAA, the expediting of the proposal process (bypassing a Request for Proposal after the submission of the usual white paper) and the unusually short time for evaluation of both the technical and cost elements of the proposal all suggest this was a so-called "wired job", wherein the winner of the supposed competitive process (as explained to Representative Patsy Mink by ARPA director Gary L. Denman in his letter of may 20, 1994) was pre-selected.

In neither the Proposal nor the Draft EIS is there any reference to or citation of previous work in scientific publications by either the Principal Investigator (Dr. Munk) or his climate

modelling Co-PI's to support the scientific basis of ATOC; and neither the Proposal nor the DEIS makes any serious attempt at justifying the scientific rationale of relating basin-scale averaged deep ocean temperature to global warming. In fact, the definitive statement on this issue would appear to be contained in the lead article in the special issue of the Journal of the Acoustical Society of America on the Heard Island Experiment (Vol. 96, No. 4, October, 1994, pp 2330-2342) wherein the authors (Munk et al) state the following, "... Finally, it is important to emphasize that acoustic thermometry addresses the issue of measuring climatic change (ambient or otherwise) in the oceans; it does not tell us anything about the underlying causes and about the effects on the atmosphere." (Page 2331)

Since this JASA special issue is the principal exposition of the work leading to ATOC it is significant to note that the entire issue deals only with acoustic propagation in the ocean; there is no reference to global warming except the sentence quoted above.

5. THE MARINE MAMMAL RESEARCH PROGRAM

There has been much discussion within the marine biology community and between it and the environmental community that the Marine Mammal Research Program (MMRP) associated with ATOC has its own intrinsic value, and deserves support. We at KOFE agree that the near complete absence of data on the effects of anthropogenic sounds on marine life cries out for research. But we disagree vehemently that the MMRP associated with ATOC will satisfy this need, for, regardless of the protestations of the leaders among the marine mammal researchers associated with ATOC that the MMRP is an independent project, it is officially recognized as being associated with ATOC, is funded by ATOC, and its reason for being supported financially by ATOC is that the results of its research may bolster the argument that ATOC will not exert significant impact on marine mammals. One must admit candidly that without the need of ATOC for a clean bill of health there would be no MMRP. The marine biology community would be much better served to seek its own independent (truly independent) course of research than to be subsumed under a project which is essentially the extension of an interesting experiment on sound propagation in the ocean, an exercise of unsubstantiated scientific value other than perhaps the development of an underwater communication technique.

4 I-17

Both as environmentalists and as taxpayers we of the Kauai Friends of the Environment feel strongly that our national human and financial resources should not be wasted on such an ill-conceived project as ATOC. All the environmental processes that have been exercised in support of ATOC have essentially been a waste of time and money. The cost of the preparation of the Draft Environmental Impact Statement alone can probably support a significant portion of an independent MMRP.

Thank you for your attention. Mahalo and Aloha!

Sincerely yours,

Raymond L. Chuan

Raymond L. Chuan, PhD
Co-chair
Kauai Friends of the Environment

Attachments: KFOE comments delivered at scoping hearing of April 15, 1994.
KFOE written comments submitted to ARPA and NMFS.

cc: (without attachments)
SCLDF
Representative Patsy T. Mink
Scripps Institution of Oceanography
National Marine Fisheries Service

C-56

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May 16, 194

Testimony at the NMFS Hearing on ATOC at Santa Cruz

My name is Raymond Chuan from Hanalei, Kauai, Hawaii, the site of one of the ATOC sound sources. I am here representing Kauai Friends of the Environment and Hui Ho'omalu I Ka Aina, a native Hawaiian environmental coalition on Kauai. We wish to comment on the belated decision of the ATOC project, through ARPA and NMFS, to comply with provisions of the National Environmental Policy Act. While there are relevant statutes in the states of Hawaii and California which ATOC may not have complied with, our testimony at this moment is directed at the failure of the ATOC project to examine alternatives, in earnest, as required by the EIS process.

The ATOC planners have failed to address the issue of alternatives at two levels: one, the advertised goal of ATOC to monitor greenhouse warming; and two, the narrower goal of measuring basin scale ocean temperature. About the broad goal we quote from the "statement of work" of the Scripps Institution proposal, page 63, "It will be demonstrated within 30 months that an affordable international network can be constructed and operated that is capable of detecting and characterizing the actual greenhouse signal, thereby establishing the foundation for a long-term measurement system." This bold assertion is proclaimed in the absence of either physical evidence or mathematical modelling predictions that the greenhouse effect can be related to temperature in the deep ocean in any definitive manner. In the mean time, long term, multi-disciplinary, multi-nation projects have been in progress, such as the 10-year, 18-nation "Tropical Ocean and Global Atmosphere (TOGA)" project launched in 1985 and its proposed 15-year follow-on "Climate Variability (CLIVAR)" program; and the myriad modelling and measurement programs under the "U.S. Global Change Research Program" launched in 1989 and has a current budget of $1.5 billion. Within the impressive temporal, geographic and fiscal scales of these programs there are no doubt many other alternatives to ATOC as far as greenhouse warming is concerned.

Leaving out the issue of greenhouse warming, if all that ATOC can realistically be expected to accomplish is to measure basin scale ocean temperature, then there are alternatives that are less potentially damaging to the ocean environment. For example, sea surface temperature is being measured globally and continuously by a number of satellites. There is the "Global Acoustic Mapping of Ocean Temperatures (GAMOT)" project which calls for sound sources

moored at sea and drifting hydrophones for receiving the signals. There is also being considered a non-intrusive acoustic method using sources of opportunity that already exist.

The above are but a few examples of alternative ways to monitor greenhouse warming or to measure basin scale ocean temperature. The experts at Scripps must be aware of many more.

Furthermore, the ATOC program is supposedly competitively bid, with ARPA having solicited proposals. Thus it is reasonable to conclude that among the proposals submitted are likely to be alternatives that should be considered in the light of the current controversy regarding the environmental integrity of ATOC. Our organization has requested, under the Freedom of Information Act, information regarding the other proposals. Unfortunately, the Defense Department, which is the funding and monitoring agency, has failed to respond to date.

One reason for seeking alternatives to the intrusive ATOC approach that has not been adequately addressed is the issue of impact on the fishing grounds in Kauai waters on which Native Hawaiians depend for their livelihood. The Hui Ho'omalu I Ka Aina specifically requests that the rights of Native Hawaiians be addressed in the assessment of alternatives.

Thank you for your attention. Mahalo and aloha!

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June 11, 1994

Dr. Ralph W. Alewine, III
Director, Nuclear Monitoring Research Office
Advanced Research Projects Agency
3701 North Fairfax Drive
Arlington, VA 22203

Dr. William W. Fox, Jr.
Director, Office of Protected Resources
National Marine Fisheries Service
1335 East-West Highway, Room 13130
Silver Spring, MD 20910

Re: ATOC Project, Pt. Sur, California
Notice of intent to prepare an environmental impact statement and request for comment.

Dear Dr. Alewine and Dr. Fox:

The comments in this communication are offered on behalf of Kaua'i Friends of the Environment, Hanalei, Kaua'i, Hawai'i and Ho'omalu I Ka Aina, Haena, Kaua'i, Hawai'i and their over one thousand members. While these are environmental organizations of concerned citizens on the island of Kauai, we believe the environmental issues raised by the ATOC project are not site specific, such that those pertaining to Pt. Sur, California are the same and inseparable from those in Kauai, Hawai'i. In fact, the issues must ultimately be addressed in oceanic contexts, including sensitive marine resource areas outside U.S. waters, over which NEPA operates as long as federal funds are involved. (NEPA applicability outside the U.S. has, for example, been established in the case of the operation of the National Science Foundation in Antarctica.) Furthermore, there is extant a separate EIS Notice by ARPA and NMFS for ATOC operations in Kaua'i, even though it has not been made explicit by the agencies whether the Kaua'i EIS is being actively prepared, or is being combined into the Pt. Sur EIS.

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These comments are offered in addition to oral and written testimony submitted by members of Kaua'i Friends of the Environment and Ho'omalu I Ka Aina at public hearings at Lihue, Hawai'i on April 15, 1994, and at Santa Cruz, California on May 16, 1994.

INTRODUCTION

The genesis of the ATOC project is presumably in the Broad Agency Announcement

(BAA), DARPA 92-24, issued in January, 1992, by the Advanced Research Projects Agency. The procurement process for ATOC apparently was expedited by going directly from the BAA to the submittal of proposals, without the usual intermediate step of a Request for Proposal (RFP). This expeditious treatment was justified, according to a communication from Mr. Gary L. Denman, Director of ARPA to the Honorable Patsy T. Mink, U. S. House of Representatives on May 20, 1994, "... to afford the broadest possible response with conceptual and applied technology while retaining a highly competitive process." (emphasis ours).

The ARPA/NMFS EIS Notice (for Pt. Sur) list as significant issues, currently under consideration by ARPA and NMFS,

A. The potential effects of the proposed low frequency sound source on marine mammals, sea turtles and other marine resources.

B. Alternatives with respect to site selection.

C. Purpose of the ATOC program and evaluation thereof as compared to other possible alternatives for assessing global warming.

We intend to demonstrate, by commenting on the above, that the content of the BAA, along with the expedited procurement process, effectively precluded, a priori, any consideration of alternatives with respect to both research concept and implementation; thereby rendering A above inevitable, ignoring environmental implications of B, and causing C to be irrelevant.

IMPACT ON MARINE RESOURCES

The Scripps Institution of Oceanography (SIO) technical proposal lists as part of the ATOC program "Experimental Studies of Effects on Marine Mammals" (SIO Proposal pp 43-49). The logic used to support these "studies" are rather curious. Instead of designing a specific research program to study the effects of low-frequency high sound level on marine resources, the SIO proposal relegates the subject to an incidental and subsidiary adjunct to the ATOC project. "The ATOC program provides a unique opportunity to study the impact of low-frequency noise that is unrelated to other human disturbances on the most vulnerable species, baleen whales and deep-diving odontocetes." (SIO Proposal p 43.)

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The so-called ATOC Program Update of May 16, 1994, advanced by SIO just before the Santa Cruz hearing, does not fundamentally alter the incidental and subsidiary role of the "marine resources impact studies". The only substantive (the word is used here advisedly, for lack of anything truly substantive in the "Update") changes deal with yielding the "control of the source" to the biological element of the consortium, and changing the duty cycle of the source operation. In relation to the latter SIO claims in its "Update", "Environmental groups critical of the project objected, and requested a duty cycle that was 'graduated' and 'optimal' for marine mammal scientists to monitor the effects of the operation of this source on marine life." (SIO ATOC Program Update, May 16, 1994) This statement is patently a distortion of facts. While there might have been individual marine scientists suggesting such a particular (and very narrowly scoped) modification, it was certainly not true of the broad-based objections of the environmental

community as expressed in the three hearings in Maryland and Hawaii. To enhance the worth of a very modest change in the ATOC program by suggesting that it was in response to the concerns of the environmental community is, at least, dis-ingenuous. Besides, SIO in its original proposal already spoke of varying duty cycles from 2% to 30% (SIO Proposal p 46); and already during the Hawai'i hearings SIO representatives were talking about "ramping" the source level.

Unfortunately, what SIO defines as "ramping" in its program Update is, by definition, incorrect. "Ramping" means bringing the sound level gradually up, along some prescribed locus (curve) of "level" versus "time". It takes at least three points to define a curve. Yet SIO proposes: "Initial testing will be at a reduced power of less than 10 watts. If this level is found safe, a full power test will be performed using the same 'one week on, ten days off ' pattern for up to five repetitions." This is not a ramped function, but a step function, going from 10 watts in one step to full power (presumably 260 watts, the capacity of the source to be used).

There is a fundamental deficiency in all the SIO proposed protocols of assessing impact on marine resources. All the observations deal only with marine mammals on the surface or very shallow depth, where the sound level from the ATOC source is obviously significantly attenuated. No investigation has been proposed on the behavior of marine resources closer to the source. Finally, while the EIS Notice lists as significant issues "....the potential effects of the proposed low frequency sound source on marine mammals, sea turtles, and other marine resources, ..." SIO proposes only to study near surface marine mammals.

SITE SELECTION ALTERNATIVES

The SIO proposal alludes only perfunctorily to the issue of effects on marine resources in the source selection process. (SIO Proposal pp 41-43) While purporting to "refine the process of site selection sources supporting the demonstration program to further minimize upper ocean sound levels in the local areas of these sites." (p 41), the selection was in fact already made, on other than marine resource impact grounds. The Kaua'i site was clearly selected because of proximity to existing Navy power cables from the Pacific Missile Range Facility on the island. The facts that the waters surrounding Kaua'i are rich in marine resources, and have, because of their protected situation, supported the unusual appearance of the heretofore unseen endangered monk seal in recent years; that these waters are included in the proposed Humpback Whale Sanctuary; and that the Pt. Sur site is in an existing National Marine Sanctuary, are completely ignored in the source site selection. No alternative sites to Kaua'i and Pt. Sur are even suggested in the SIO proposal, either in its original form of May, 1992 or in its updated version of May, 1994.

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See 2.2.3

PURPOSE OF ATOC PROGRAM AND ALTERNATIVES FOR ASSESSING GLOBAL WARMING

According to ARPA, BAA 92-24 was designed to "afford the broadest possible response with conceptual and applied technology while retaining a highly competitive process." The title of the BAA appears to constrain the responses to: "Technologies for Acoustic Monitoring of Global Ocean Climate". Beyond the title the BAA becomes even more limiting in terms of technology, by describing, in effect, the methodology to be employed. Paragraph 3 in the preamble of the BAA states, for example, "The major issues involve source and receiver design,

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resolution of the multipath/modal structure of the arrivals, and an understanding and quantification of the effects of natural variability of ocean temperature." The results of such a narrowly delineated solicitation, notwithstanding its being called a broad agency announcement, are entirely predictable: There would not be "the broadest possible response with conceptual and applied technology", in the words of the director of ARPA; nor would "a highly competitive process" be retained. The actual results of the solicitation clearly demonstrate the inevitability of this prediction.

Of the nine proposals received by ARPA, two, involving insignificant portion of the eventual total cost of ATOC, dealt with the supplying of hardware for the sound source. Of the remaining seven, only one, from SIO, addressed all the specific task areas specified in BAA 92-24, or, in other words, the overall program; while the other six, conveniently, divided up the sub-tasks, with no overlap. Of the seven proposers (other than the two source hardware proposers), only one, Teledyne, which had proposed to develop the computerized visualization of the acoustic propagation paths, failed to win a contract. This task went to Florida State University (OSU), which did not propose, in response to the BAA, to undertake this task; but was, instead, a member of the Woods Hole Oceanographic Institution (WHOI) bidding team which proposed to use remote moored sound sources and drifting receivers. The WHOI proposal apparently became the "GAMOT" project, presumably a part of ATOC, constituting part of the ATOC budget, but for which no environmental assessment or environmental impact statement has been prepared, nor application made for a scientific research permit from NMFS.

With the specific language of BAA 92-24 and the apparent prior division of efforts among the seven major proposers, there clearly was no competition; as indeed there was no need for competition, since the outcome was pre-ordained. Under this unusual procurement scheme there would also be no room for any consideration of alternatives in terms of concept or technology.

The non-competitive, no-alternative procurement process apparently also contributed to the unusually expeditious evolvement of the proposals to contracts and the rapid expenditure of funds. The bid closing date of the BAA was June 1, 1992. The funding schedule published by ARPA for ATOC shows expenditure of Fiscal Year 1992 funds. As FY 92 would end on October 31, 1992 ARPA clearly anticipated early launch of the ATOC program soon after the bid closing date. In an October 14, 1992 memorandum from David Hyde, ATOC Project Director to Ralph Alewine, ATOC Executive Committee, SIO submitted a revised budget which Ralph Alewine, in the capacity of Director, Nuclear Monitoring Research Office, ARPA, approved in a memorandum to Hyde on October 22, 1992. Presumably ATOC had come into being as an ARPA approved program some time prior to October 14, 1992, and an ATOC Executive Committee had been formed, with the ARPA project monitor as a member, some time before that, and, further, there had been time for SIO to go through more than one budget revision.

All the evidence elucidated above strongly suggests that, contrary to the claim of the director of ARPA in his letter to Representative Patsy T. Mink on May 20, 1994, the procurement and selection process leading to the ATOC program was not designed to afford the broadest possible response while retaining a highly competitive process. It was, in effect, a directed sole source procurement in the guise of a broad agency announcement. The process,

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therefore, could not have allowed for consideration of alternatives on either scientific validity or environmental impact grounds.

CONCLUSION

We have demonstrated, using documents supplied by ARPA and other participants in the ATOC program, that ARPA cannot pass the first test of an environmental impact statement, namely, the assessment of alternatives, for the simple reason that the process by which the ATOC program has been created precluded any consideration of alternatives. While specific issues relating to such matters as the scientific validity of ATOC vis a vis global warming and the program's intrusive effects on the ocean environment have no doubt been adequately addressed by many experts, we believe the process of creating the ATOC program has been so grievously flawed that the entire program should be stopped until the fundamental questions of providing a level competitive ground for the development of a scientifically valid and environmentally relevant research program have been answered.

We hereby request that 10 copies of the Draft Environmental Statement be supplied to Kaua'i Friends of the Environment and Ho'omalu I Ka Aina immediately upon publication. Recognizing that it usually takes longer for mail to reach us than for those on the Mainland, it is essential to assure the timely arrival of the DEIS to allow our members ample time to prepare comments before the expiration of the 45-day comment period. We further request that public hearings be held at Santa Cruz, O'ahu and Kaua'i after the DEIS has issued.

Thank you for your attention to the concerns of the public and your cooperation in providing us with relevant materials for the generation of these comments to assist you in the preparation of the environmental impact statement on the ATOC program.

Mahalo and aloha!

Sincerely yours,

Raymond L. Chuan

Raymond L. Chuan, PhD
Co-chair, Kaua'i Friends of the Environment

cc: SCLDF
Hawai'i Congressional Delegation
Save Our Shores, Santa Cruz

C-57

Peter Molitor
840 Haverford Ave. #3
Pacific Palisades, CA 90272
(310) 459-1029

January 30, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes,

Attached, please find a copy of my comments regarding the California ATOC Draft EIS/EIR. I would like the issues raised therein to be addressed and/or included in the final EIS/EIR when you prepare it for submission. Thank you.

Sincerely,

Peter Molitor

C-57

WRITTEN COMMENTS
Regarding
The Acoustic Thermometry of Ocean Climate (ATOC) Project
By Peter Molitor
January 30, 1995

While yet another study on global warming is admirable, if not belated and redundant, ATOC is not that study. It is highly intrusive, expensive and of extremely dubious scientific usefulness. The Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) does nothing to provide a *raison d'être* for it's placement anywhere, let alone for it's placement in a marine sanctuary. The addition of the Marine Mammal Research Program (MMRP) does nothing to mitigate the intrinsic uselessness of ATOC, it only attempts to cover it's deficiencies by dangling a tiny carrot of much needed marine animal research (albeit only research into the damage that ATOC will itself cause) in the hopes that the nasty whale huggers will ignore the overall undesirability of ATOC just to get some research money.

As demonstrated below, the DEIS/EIR fails to demonstrate a need, purpose or rational objective for ATOC. It consistently and self-servingly underestimates it's impact on the environment, particularly marine life in the Monterey Bay National Marine Sanctuary (MBNMS) and what mitigation measures it does propose are totally inadequate should ATOC go forward, doing little or nothing to alleviate the project's harassing effects on endangered, threatened or protected species. It fails to adequately examine alternate sites and alternative study techniques, again dismissing them seemingly because they are not what the ATOC scientists want to do, not for legitimate reasons with corroborating data elaborated in the DEIS/EIR. In addition, it is equally lacking in data as to ATOC's potential for economic disruption to the region's fishing and tourism industries.

No Action Is the Best Action:

The DEIS/EIR fails to justify the need for the ATOC project at all. It goes on at length about how it will study deep ocean temperatures yet, as it plainly states "...the ATOC project is experimental and is subject to fundamental uncertainties about the extent to which acoustic means can detect ocean climate changes."[1] (Emphasis added). It further concedes that the ATOC technique will provide useful climatic information only if it can "surmount[] a number of technical and other potential barriers...Ocean movements from tides, currents, internal waves, eddies, and other oceanographic features also affect acoustic transmissions. While traveling long distances, sounds could be scattered, distorted or otherwise rendered unusable."[2] (Emphasis added).

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I-3d, 5a

What this means (and what the DEIS/EIR fails to clearly state) is that some other method will, by necessity, have to be put in place to check ATOC temperature conclusions. The DEIS/EIR blithely assumes that ATOC will instantly provide accurate and meaningful deep ocean temperature readings yet virtually nothing is mentioned on how these results will be checked or tested, in spite of the fact that the DEIS/EIR does grudgingly mention the extremely important caveats about it's reliability mentioned above. After all, tides, currents and eddies are basic components of ocean dynamics and are unlikely to cease just because we "need" to run ATOC.

Clearly some other technique is going to be required to double check ATOC's results. The logical choice (and an alternative proposed by witnesses at the public hearing in Santa Cruz) is the plain old, boring thermometer. While the DEIS/EIR does mention in Alternative 10 that it will use expendable bathythermographs (XBTs) and conductivity-temperature-depth (CTD) systems to "validate it's own temperature measurements"[3] it goes on in the next few paragraphs to dismiss their accuracy and appropriateness as an alternative to ATOC given the subtle temperature differences expected to be found. The DEIS/EIR provides no data on how they propose to resolve this paradox as it relates to ATOC data, causing this reader to question whether they are truly interested in the accurate study of deep oceanic temperatures at all.

The DEIS/EIR further dismisses the use of XBTs and CTDs because of various alleged inconveniences and purported cost problems due to the outlandish and scientifically suspect research techniques it proposes for their use. It doesn't mention just how many of these devices could be purchased or how accurate they could be made if we were to spend the millions of dollars about to be blown on ATOC to further develop these extremely non-intrusive instruments and then placing them throughout the oceans of the world at various depths and locations. We could gather far more data, at far more diverse levels of the ocean depths, at far lower cost than ATOC will ever provide.

Needless to say the cynic might suggest the DEIS/EIR fails to mention this because if we were to follow Alternative 10 we would negate the need for ATOC altogether. Yet, in spite of itself, the DEIS/EIR has demonstrated that ATOC is unnecessary for this very reason. It's data cannot be trusted on it's own, therefore it would be better to settle for the reliable and scientifically established data provided by these cheaper and less intrusive alternative methods which will have to be put in place to corroborate ATOC's questionable results anyway. The DEIS/EIR is totally defective due to it's lack of development of a rational discussion of Alternative 10 as required, once again conveniently choosing to dismiss it because Alternative 10 might actually reveal itself as a plausible and cost effective alternative to ATOC.

The DEIS/EIR also supports a "No Action" alternative when it's discussion of the effect of ATOC on animal species is taken in it's totality (something which the DEIS/EIR fails to do at any point). In spite of it's almost incantation-like insistence that most animals won't even be able to hear a bone throbbing 75 Hz, 195 dB sound source, provisions are made for those same creatures to have 5 minutes to get away from this thing they can't even hear. The DEIS/EIR is clear that blue whales, fin whales, sperm whales and leatherback sea turtles, endangered species all, will be potentially subjected to the full force of the ATOC sonic blast, forcing them to get away from the source point as fast as their flippers and fins will take them from it's crippling sound field.

By it's own admission, the DEIS/EIR states that the low end 120 dB sound field (as low as the DEIS/EIR seems to feel is potentially harmful or annoying) will extend from 7.4 to 15.5 miles around the source, potentially rendering hundreds of square miles of habitat unusable to these creatures.

To state simply what the DEIS/EIR incorrectly fails to, endangered species will be restricted from their natural range, will have their habitat diminished, will run the risk of injury (to their hearing) and will potentially be disrupted from their normal behavioral patterns including their migratory movements. Any one of these on it's own would lead to a conclusion that ATOC is bad science and not in compliance with our nation's laws regarding endangered species. However, the DEIS/EIR doesn't seem to mind a bit. It's trivial "mitigation" measures do nothing to overcome this lethal flaw. No matter how you look at it, ATOC removes large amounts of habitat from use by endangered species and must be denied on that ground alone. 2 I-42b, 6m, 12c

To make matters worse, the DEIS/EIR comes to the totally illogical conclusion that the only place that this habitat can be removed is from a National Marine Sanctuary! In fact, the DEIS/EIR dismisses the majority of the six alternate sites deemed worthy of study by the DEIS/EIR on the insane conclusion that the rejected sites would have inconvenient qualities for the MMRP, not because they are unsuitable for ATOC. If there ever was a case of the tail wagging the dog, this is it. The MMRP should not be the guiding factor of the DEIS/EIR, the MMRP is only a "mitigation" measure designed to lessen the impact of ATOC on endangered species and on coastal uses.

Using the premise that the DEIS/EIR takes, it would seem that the best ATOC site would be one which is known to have the most abundant wildlife that would potentially be devastated by ATOC. It's as if the scientists of the Manhattan Project would have wanted to drop an atomic bomb on New York or Los Angeles because that's the best place to study the effects of

radiation on people. Obviously that's preposterous. The DEIS/EIR is just as preposterous because it's totally negligent in it's examination of alternate sites. It must examine these sites based on their acceptability for ATOC use not on whether they are convenient for MMRP purposes. Based on this, the DEIS/EIR, as written, is defective and again supports the "No Action" conclusion.

It also seems that the authors of the DEIS/EIR might profit from a definition of "sanctuary," my trusty old dictionary calls it "...a reservation where animals or birds may not be hunted or molested..."[4] The DEIS/EIR is clear that endangered marine animals potentially will indeed be "molested" so it seems incomprehensible that siting ATOC in a sanctuary is appropriate. As witnesses at the public hearing emphasized again and again, a sanctuary is a sanctuary is a sanctuary!

The DEIS/EIR further claims that the MMRP is within the scope of research authorized in the MBNMS. It is not. The MMRP is designed to study the effects of ATOC on marine life, which means they will by necessity have to study animals in the MBNMS. It incorrectly asserts that this falls within the three categories of research goals for the MBNMS, which are baseline studies, monitoring and predictive studies. The only category it remotely falls into is baseline study. The only "monitoring" will be to see the results of ATOC harassment of animals in the sanctuary and it's "predictive" studies will be to "...analyz[e] the causes and consequences of ecosystem changes..."[5] changes caused by ATOC in the first place!

The DEIS/EIR seems to be a product of nineteenth century "science" where you had to kill and dissect an animal in order to study it. The DEIS/EIR takes this same attitude, implying that the best place to study harassment is in an area with the most potential harassees. Unfortunately, this mindset is not appropriate for the twentieth century. Due to the MMRP's and DEIS/EIR's deficiency in this area we can only conclude once again that the DEIS/EIR supports a "No Action" alternative since it is clearly not within the research guidelines set for the MBNMS.

The DEIS/EIR is also defective because it fails to consider the impact of all ATOC sources. The Point Sur sound source will not be the only one blasting 75 Hz noise into the sound channel, there is also a source off the coast of Hawaii which it chooses to ignore. The DEIS/EIR is clear on the point (it is in fact the entire point) that an ATOC sound source is capable of sending a signal across thousands of miles of ocean, yet it fails to address the combined impact of these two sources on animals in the MBNMS, instead presuming that the Point Sur source will be acting in a void.

No attempt is made to convey any information on the consequences of these two sources acting in conjunction. No mention is made regarding whether these two sources will be operating simultaneously, on an alternating basis or totally independent of each other. There is no discussion of potential masking caused by the two sources acting together, in short, the DEIS/EIR makes no effort to link these two sources at all. This failure to discuss all aspects of ATOC makes the DEIS/EIR totally deficient, no reasonable person could rely on the data contained therein due to the omissions of data present. Once more this forces a conclusion to be drawn that "No Action" is the only course to follow at this time.

Faulty or Suspect DEIS/EIR Data:

The DEIS/EIR is also problematic because it appears to play fast and loose with some of the "facts" it uses to jump to it's conclusions. One of the most pernicious is the way it grossly overstates ambient noise levels, consistently stating that it is often as high as 100 dB. To be fair it does mention (once) that this high end is what would be caused by a sea state 3-5, however it fails to mention just how often the ocean is at this high sea state, which is infrequent to say the least, or how deep a noise from a sea state 3-5 would actually penetrate. 3 TC I-8b

It's own chart (Figure 3.2.4.3-3) seems to indicate that a more realistic ambient level at a depth 1/5th as deep as the ATOC source will be closer to 80 dB or one hundred times quieter

than the DEIS/EIR recites. This overstatement of ambient sound tends to lessen the impact of ATOC and is highly misleading to the average reader, particularly when you consider that the 120 dB level the DEIS/EIR considers as potentially harassing is fully 10,000 times louder than true ambient levels at higher depths and this same 120 dB harassing level is what will basically blanket the southern portion of the MBNMS.

The DEIS/EIR does state that at the deep sound channel depths (800-1000 meters) ATOC will actually be operating at "...the ocean is very quiet, with ambient noise levels considerably below those at the surface. When animals capable of detecting low frequency sound are at these depths...it could be audible at a considerable distance."[6] (Emphasis added). The DEIS/EIR fails to mention just how "considerable" all this could be, an unforgivable omission. How can a reasonable person decide just how loud ATOC actually is or how far it will be heard when the DEIS/EIR never gives a straight answer or consistently mixes ambient sound levels from surface or near surface levels with what will actually be present in the much quieter deep sound channel? This must be explained and corrected if the DEIS/EIR is to be of any use whatsoever.

Cause for concern over the accuracy of additional DEIS/EIR data was also given at the public hearing in Santa Cruz with regards to the DEIS/EIR's analysis of sperm whale density around the ATOC sound source. Testimony suggesting much higher density levels was given which raised serious doubts about the conclusions in the DEIS/EIR that sperm whale density would be so slight so as to not merit mitigation. The final EIS/EIR needs to resolve this conflict since sperm whales would be one of the species most likely to be affected by ATOC, yet no mitigation measures are currently directed at it because of these questionable density conclusions.

Just as it often creates it's own "facts," the DEIS/EIR also seems to create it's own system of logic. All too often the DEIS/EIR dutifully presents various possibilities regarding potential impacts to endangered species of all types but then goes on to inexplicably conclude that ATOC will present no impact to these very same endangered species with no elaboration whatsoever of the data which caused it to jump to this conclusion. The DEIS/EIR seems to feel that just because they wish it, it must be so. This is incorrect. The DEIS/EIR must come to it's conclusions based on the evidence contained therein, this one fails to do so on numerous occasions.

Alternatives Not Adequately Addressed:

4 The DEIS/EIR is woefully deficient in it's discussion of alternatives to ATOC. It is supposed to include all meaningful information so that the reader would be able to reach his or her own conclusion (presumably the same as the authors of the EIS/EIR) as to the appropriateness of the proposed project and to it's lack of any better alternatives. This one doesn't even come close. It's lack of detail raises more questions than it answers, more concerns arise after reading it than were ever conceived of before this "detailed" document attempted to clear things up.

TC Sec 2.3

The first alternative that fails to receive meaningful discussion is Alternative 3, alternate project sites. The DEIS/EIR chooses six sites deemed worthy of detailed consideration yet virtually no discussion as to how over 1000 miles of coastline were eliminated in the process, only it's rote recitation that they didn't meet the criteria. How didn't they meet the criteria? How is it that the only sites available in California have to be in central California knowing that virtually all of central California is protected in one form or another? How can there be only one site in all of Oregon (with a virtually continuous north-south coastline) where ATOC could be situated? Much more discussion and analysis of how sites were selected needs to be present in the DEIS/EIR before meaningful conclusions may be drawn regarding the appropriateness of site selections for ATOC.

Also (as noted above), the DEIS/EIR incorrectly applies MMRP criteria to ATOC site selection, indeed, it places these criteria before the ATOC feasibility criteria itself.[7] The MMRP

is not the project that is at issue here, ATOC is. Site selection should not be based on the needs of a mitigation measure, it should be based solely on the needs of the project proposed. This correction needs to be made throughout the DEIS/EIR but it is in it's discussion of Alternative 3 that it absolutely must be applied.

Another alternative that is prematurely dismissed is Alternative 4, moored autonomous sources. The principal complaint here is that there doesn't seem to be an existing source that operates at the right frequency. This is ludicrous. It's not surprising that you can't get an ATOC compatible source "off the shelf" but it defies common sense that with the amount of money we're about to spend on ATOC that we couldn't figure out a way to hook one up. Similarly, it's half-hearted attempts to imply that we wouldn't be able to figure out the drift on a source flies in the face of what is known to this layperson about global positioning technology. It would seem that if you could precisely track a moving elephant seal across the ocean, tracking a relatively stationary sound source would not be that difficult.

Indeed two advantages the DEIS/EIR does let slip about Alternative 4 jump out quite prominently and that is "...cost savings over cabled bottom sources could be realized..." and "Could potentially be placed in areas of low marine animal activity."[8] (Emphasis added). Both of these appear to make Alternative 4 an ideal alternative to ATOC! It even rates quite highly in Table 2.4-1 if you eliminate the unnecessary link to the MMRP. It defies logic (again) to dismiss Alternative 4 so quickly. Just because it's not ATOC doesn't mean that it's not a viable alternative.

The DEIS/EIR must include a much more thorough discussion of Alternative 3, Alternative 4 and Alternative 10 before it can be considered anywhere near complete as to it's discussion of project alternatives.

More Mitigation Measures Required:

In the unfortunate event that ATOC does go forward, far more mitigation measures must be put into place and consequently must be discussed in the DEIS/EIR than are presently proposed. The majority of these measures must be applied to the MMRP.

5 Perhaps the single most important problem the DEIS/EIR fails to address is the fact that inadequate baseline studies are available for the proposed study area. Time after time the DEIS/EIR repeats a phrase to the effect that information is "sparse" regarding how ATOC will affect endangered species. The MMRP purports to fill in these gaps yet it only allots about 6 months in which to gather these "baseline" measurements and then 6 more months for a Pilot Study. This is clearly not enough. The DEIS/EIR does point out that the majority (if not all) of the mammals it feels will be impacted are migratory yet it does not explain how these "baseline" studies will be conducted when the animal is not even in the vicinity of ATOC!

I-6b

For any meaningful conclusions to be drawn scientists must have a clear picture of what the impacted endangered species are doing at any point in the year, not just in one 6 month period. ATOC wishes to operate throughout the year, therefore it requires animal data that is not dependent on the season. Further, one could hardly call even one year of analysis a "baseline." Too many variables are happening for one year long sample to be relevant, particularly in an "El Niño" year. For any data to be considered "baseline," ongoing study must prove that the accumulated data is consistent from year to year and not just a one time occurrence. The DEIS/EIR and the MMRP fail to acknowledge this and must be considered deficient because of it.

As witnesses at the public hearing in Santa Cruz correctly pointed out, the current time frame proposed for the MMRP does not allow for studying any problems ATOC may cause on the extended reproductive cycle of endangered whales. No provision is made to monitor if ATOC interferes with this cycle, it merely assumes that it won't. To make the MMRP "baseline" studies meaningful, it must precede ATOC startup by at least one full year. ATOC should not begin

operation until after one full year of baseline studies and should only then begin operation as a Pilot Study under the guidance of MMRP scientists for one full year after that. If no impacts are noted after the one year Pilot Study then ATOC should be allowed to go forward. The DEIS/EIR is totally defective until it includes realistic and rational periods of baseline study for the MMRP.

Another egregious "oversight" made by the DEIS/EIR and the MMRP is it's complete lack of consideration for sperm whales. Throughout the DEIS/EIR it consistently makes clear that sperm whales are one of the likeliest, if not the likeliest species to encounter the full effects of ATOC at depth. They are deep divers who prefer the 1000 meter contour proposed for use by ATOC and can likely hear ATOC frequencies. The DEIS/EIR incorrectly concludes that because of their density they are not worthy of discussion or for mitigation measures. As we've seen (above), that conclusion is extremely dubious and misses the point besides. These whales are rare, that's why they're considered endangered, that's why they're hard to find, that's why they must be protected even more vigorously than their more common cousins! 6 TC I-13c

The DEIS/EIR does state that "[t]here is no evidence of any masking to odontocetes (with the possible exception of sperm and beaked whales)..."[9] (Emphasis added). It then goes right by this as if it hadn't mentioned this grim potential. Studies must be undertaken to determine if masking will impact sperm whale behavior and communication before ATOC can be given a clean bill of health. Despite it's difficulty, sperm whales must be included in the MMRP as an indicator species. Currently no provision in the DEIS/EIR or the MMRP is made for the study of ATOC on odontocetes, the species most likely to be impacted by it's blaring noise.

The DEIS/EIR makes another glaring omission when it comes to ATOC's impact on fish in the proposed area. It acknowledges that "...fish comprise the greatest numbers of marine animals that could possibly be affected by the sound transmissions"[10] yet they are covered the least in the DEIS/EIR and the MMRP. As the California Coastal Act also makes clear: "The economic, commercial, and recreational importance of fishing shall be recognized and protected."[11] Evidently recognized by everyone but the DEIS/EIR.

Witnesses at the public hearing attested to the fact that they regularly fish the waters around the ATOC sound source yet the DEIS/EIR essentially dismisses without facts any impact on these fisheries. The DEIS/EIR plainly states that fish have been observed to move away from a boat that is generating low frequency noise, however, it then goes on to inexplicably presume that they will somehow habituate to ATOC. How? The DEIS/EIR does not elaborate as it must. 7 I-5c

ATOC's potential for impacting local fisheries is totally glossed over particularly when it comes to endangered winter-run chinook salmon populations. It states that "[o]cean dwelling juveniles occur primarily over continental shelf waters..."[12] precisely where the ATOC sound source is supposed to go. If the salmon don't "habituate" and ATOC removes any more habitat from that needed by our struggling salmon populations it would be a catastrophe on a catastrophe and must not be allowed to proceed. The DEIS/EIR must make a contingency to study the possibility of fish habitat disruption by ATOC.

The DEIS/EIR also admits that sharks use low frequency sound to detect prey yet it fails to give serious attention to potential masking caused by ATOC in this regard. As currently written, the MMRP does little to advance even baseline studies on the effect of low frequency sound on fish, it must be modified to include more study than simply monitoring fish stocks, in particular it must examine the potential effects of ATOC masking of low frequency sounds on salmon and sharks. 8 I-13d

Another mitigation measure that must be implemented is a longer ramp up time. The DEIS/EIR currently proposes five minutes. This is laughable. As was pointed out by witnesses and by a rather graphic demonstration of low frequency sound at the public hearing in Santa Cruz, it is extremely difficult to pinpoint the location of a low frequency sound source. It seems to come from all over and I can only presume that this phenomena would be even more 9 I-6m

pronounced underwater. To expect that an animal like a sea turtle could swim away, let alone identify the source in five minutes is preposterous. These animals must be given at least a fighting chance to escape. The ramp up time must be extended and the DEIS/EIR must include a realistic account of just how far each endangered species would be able to move from the source in a five minute period if we are to determine just how much this mitigates ATOC's effects.

The DEIS/EIR also fails to articulate a reason as to why ATOC needs to be run so many times per day.

If it's function is to accurately measure global warming (as stated) then this reader does not understand why measurements can't be taken once per day or even once per week? Since we are talking about modeling changes over the course of years in increments of thousandths of degrees of Celsius it defies logic (here we go again) to suggest that temperature fluctuations within the space of hours could possibly be relevant. The DEIS/EIR must make clear just how these repeated measurements are necessary for ATOC's usefulness. If it does not then one can only conclude that mitigation (i.e., fewer cycles per day) would be not only in order but would provide useful cost benefits to us taxpayers. Reducing the frequency of ATOC transmissions would reduce the need for monitoring animals and would lend credence to the DEIS/EIR's oft stated premise that animals might just get used to these 195 dB sound blasts. 10 I-5c

Clearer Definitions On How The Program Can Be Terminated:

The DEIS/EIR is absolutely negligent when it comes to discussing just how one would go about turning ATOC off should it begin to affect endangered species. Throughout the document it promises that ATOC will only continue if it's determined to be "safe for marine animals."[13] Yet it's not until one examines the MMRP criteria for suspending ATOC (buried deep in Appendix C) that this criteria suddenly changes from being "safe" to causing "Acute Responses" which include dead or disabled animals on the beach to permanent displacement from the source area. There is an extremely large area in-between that must be discussed and examined by the DEIS/EIR with specific criteria articulated that would need to be met in order to shut the project down. The DEIS/EIR and MMRP, as currently written, would potentially allow ATOC activities which I'm not convinced our environmental laws would. 11 I-6g

Clearly we do not want to wait for dead whales to come washing ashore before we can shut ATOC down. We cannot run the risk of hundreds of square miles of ocean becoming barren until we have enough "evidence" to show that ATOC is damaging our fisheries and our coastal environment. The potential impacts are far too grave to wait until such extreme measures appear. Therefore, a more accurate and less extreme set of criteria must be identified as potential "Acute Responses" for ATOC suspension.

More importantly, a reliable independent oversight committee must be formed to supervise ATOC's performance. This is in no way to suggest that there would be any deception with regards to ATOC by the project scientists, it would simply guarantee the public and the taxpayers that our dollars are being spent wisely and that marine animals are not being unduly harassed by ATOC. This is particularly important when you realize the leeway that the scientists running the program have when it comes to shutting the project down. By the time "acute responses" start becoming evident to the general public it could very well be too late. Regular reports to an impartial committee would go a long way to alleviating public concerns, my own included. 12 TC App.C

Given some of the self-serving "facts" that are contained in the DEIS/EIR, it's not impossible to believe that some facts might not be revealed to the public if ATOC were to remain wholly insulated in itself. Projects that are based on truth and real need should never be afraid of a little light being shown on themselves, it's only when they shroud themselves in secrecy and darkness that suspicions are raised. If ATOC is really going to study the problem of global

warming without impacting endangered species then it is to be encouraged, *if it is not then it* must be shut down.

Conclusion:

The DEIS/EIR, as *written, is severely flawed.* It must be enhanced to include real data, not under-documented conclusions regarding ATOC's influence on marine life. It's assumption that a 195 dB sonic blast in a pristine sound channel would not impact marine life is patently absurd. One could only wish that the scientists who "wrote" this work would have to spend the next year listening to their neighbor's daughter playing a single 75 Hz cello note for 20 minutes, every 4 hours, every day. I think then they might appreciate what they are proposing.

As written, the DEIS/EIR does nothing to articulate a need for ATOC, it greatly underestimates it's impact on marine life and it fails to justify it's siting in a Marine Sanctuary. Unless it is modified extensively, this DEIS/EIR can *only lead to a conclusion* that "no action" is better than ATOC.

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[1] DEIS/EIR, 1-20.
[2] DEIS/EIR, ES-3.
[3] *DEIS/EIR*, 2-49.
[4] Webster's New World Dictionary of the American Language, 1960.
[5] DEIS/EIR, 5-12.
[6] *DEIS/EIR*, ES-9.
[7] DEIS/EIR, 2-15.
[8] DEIS/EIR, Table 2.2.4-1, 2-42.
[9] *DEIS/EIR*, 4-54.
[10] DEIS/EIR, ES-9.
[11] PRC Section 30234.5.
[12] DEIS/EIR, 3-59.
[13] DEIS/EIR, 1-5.

AMERICAN CETACEAN SOCIETY
MONTEREY BAY CHAPTER
P.O. BOX HE
PACIFIC GROVE, CA 93950

30 Jan 95

Clayton H. Spikes
Advanced Research Projects Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes,

The following comments on the Draft Environmental Impact Statement (Draft EIS) of the California ATOC Project and Marine Mammal Research Program (MMRP) represent those of the Monterey Bay Chapter Board of the American Cetacean Society. Page numbers noted refer to pages of the Draft EIS.

We appreciate the opportunity to review the large volume of information supplied in the Draft EIS about the ATOC Project and the MMRP. Our collective view of the ATOC project is not unanimous: the uncertainty of successfully measuring global warming by this method coupled with the possible risks to marine animals will continue to arouse thought-provoking, polarized and inconclusive discussions. However, in general our board has agreed that this DEIS review process will be best served if we limit our comments to our area of greatest expertise, the MMRP. If the MMRP is modified to accommodate the concerns addressed here and by other respected organizations such as the Center for Marine Conservation, *and* the results of the MMRP Pilot Study indicate no significant adverse impacts to marine life, we are more likely to concur that the ATOC feasibility operations – accompanied by its own set of checks and balances throughout the operations period – are of sufficient potential benefit to warrant use of the sound source at the Point Sur site for detection of changes in ocean temperature.

Our greatest concern about the MMRP is regarding the process of timely information exchange and consequent decision-making which will govern the use of the sound source. Appendix C does not adequately describe this process. Therefore, we request that a clear, detailed flow chart be included in the final EIS which contains the following information:

1 1) How and according to what timeline* observations and results of data analyses will be transferred to the individual/team in charge of making decisions about the termination and modification of sound use; TC
* please define the minimally acceptable length of time for transferring this information, and justify in terms of enabling decision-makers to immediately respond to field observations;

2) Which individual or individuals will be in charge of making decisions about the termination and modification of ATOC sound use – please include names and affiliations. Since the ATOC sounds, if approved, are slated for use in the near future and the pilot MMRP is of short duration, we believe it is reasonable that individuals are identified and expected to stay with the pilot project through its duration; 2 TC

3) How and according to what timeline observations, results of data analyses and decisions will be transferred to the Sanctuary Advisory Committee, MMRP Advisory Board**, Marine Mammal Commission and National Marine Fisheries Service *during* the pilot study. We believe that all these entities must be kept informed and involved in the decision-making process throughout the pilot study and *not* just following completion of the pilot study (p. 2-3); 3 TC
** please list the members of the "independent panel of scientists, marine biologists, and marine mammal specialists assembled to provide advice and guidance to the MMRP", p.2-3

Also in regard to the information transfer and decision-making process, please respond to the following suggestions in the Final EIS:

1) Please clarify the type and timeline of data analyses which will occur during the MMRP Pilot Study. We are particularly concerned that data obtained from all methods (boat, plane, acoustic arrays, tags) be analyzed early enough in the pilot study that modifications to the sound usage based on initial duty cycles can be implemented and tested during the pilot study. (Note that we list several relevant suggestions in the study design section which follows); 4 TC

2) Please clarify conditions under which sound production will be terminated temporarily vs. completely vs. continued with modification. The research protocol repeatedly states that if the null hypotheses are rejected, follow-up analyses will be conducted to determine ranges/volumes at which response is not observed. Will sound use be halted until such analyses are completed? Also, since the document indicates that behavioral/physiological changes are not automatically grounds for sound termination, please clarify what level of change in individuals/groups/geographic area *will* be grounds for termination. 5 TC Table C1

Regarding the study design for the MMRP, please respond to the following requests in the final EIS:

1) Please prioritize all field efforts to encourage first and foremost the opportunistic study of animals most likely to be disturbed by the ATOC sound. Thus, if sperm, blue, humpback and fin whales, elephant seals and leatherback turtles are identified within the zone of influence, study of these species should be clearly stated as taking priority over other concurrent studies. For example, we would hope that opportunistic study of sperm whales in the region would take priority over the study of California Sea Lions -- which in contrast to sperm whales 6 TC

are unlikely to be sensitive to the ATOC sound (p. 4-67) and in general are not considered species of concern.

2) Please describe much more fully the acoustic portion of MMRP. Though ATOC is a sound-driven study, and many of the species to be studied have been identified as such due to their potential use of low-frequency sound, this part of the MMRP has not been afforded nearly as much effort as other aspects of the MMRP. For example, please clarify the use of the SOSUS array(s?) and other instrumentation in obtaining meaningful data on marine mammal vocalizations. Who will be in charge of supervising data collection, then analyzing in a timely manner the large quantity of data which will likely be generated, so that this important information can be used to modify experimental procedures *during* the pilot study? 7 TC
In particular, please describe how effort will be focused on study of the vocalizations of deep-diving cetaceans, which may be most likely to use the SOFAR channel for communication. Please address the potential masking of sound which may occur during ATOC sound production, including masking within the SOFAR channel. As this channel may be relatively quiet compared to the water column at other depths, ATOC sound production in this region may have a disproportionately large masking effect on sounds important to the livelihood of deep-diving cetaceans. We strongly encourage the MMRP to devote significant effort to the study of deep-diving cetacean vocalizations in relation to use of the SOFAR channel and ATOC sound production. I-13b

3) Regarding the aerial surveys, please justify the MMRP proposal to fly in the low range of 230-270 m. This is substantially lower than the federal guideline of minimum 1000' altitude to be flown over protected marine mammals. Though we recognize that animals in different behavioral states and life stages may react differently to any given altitude, within a given behavioral mode it is reasonable to expect that they would react more strongly to a lower flight. We believe that altitude should be made standard, not a range, in order to decrease the number of variables which must be considered in data analyses. We also believe that altitude should be increased substantially to approximately 400 m, since this will minimize disturbance and still allow identification of the large species most likely to be affected by the sound source (and who are not being studied by other more intensive methods) i.e. sperm, humpback and fin whales. We note that "mysticetes are more likely to be affected by ATOC transmissions . . . (than) odontocetes" (C-18). We believe identification of these large species, in addition to large odontocetes such as sperm and beaked whales, should be possible from 400 m. Increased altitude also increases viewing range, which will further enhance the data-gathering ability of this 'big picture' study method. 8 TC

4) Since the primary goal of the pilot study is to determine how the ATOC sounds affect marine animals, we strongly encourage use of the sound source only during periods when meaningful and comparable MMRP pilot data will be acquired, i.e. during daylight hours and also during periods (which may occasionally include night) in which tagged elephant seals, large whales or leatherback turtles occur in 9 TC I-5c

the study areas. (Note that we do *not* consider tagged CA sea lions -- a low priority species -- in the area to be sufficient reason to allow sound production to occur; see 1 above) This will not restrict boat observations, aerial surveys or tagging studies. If and only if acoustic arrays do become available and fully operational would we support occasional ATOC sound production at night in the absence of tagged animals.

10 5) Please consider the costs and benefits of increasing the ramp-up time for sound production to 10 minutes, with a corresponding total increase in duty cycle to 25 minutes. We are concerned that relatively slow-moving animals, e.g. leatherback turtles, may not be able to move out of the ensonified area fast enough to avoid the impact of the full decibel-level sound. I-6m

11 6) Please clarify how prey data will be analyzed and incorporated into other MMRP field work in a timely manner so that meaningful correlations can be drawn between marine mammal abundance and behavior and prey abundance and distribution. TC

12 7) Please make sure that the fall season is included in the Pilot Study field season, as this is typically the best time for field work and also coincides with relatively high numbers of cetaceans along the central California coast. TC

As our comments here and in our previous statement (during the May 1994 scoping hearing) indicate, we are very concerned about the potential direct and indirect impacts of low-frequency artificial sound sources on marine mammals. We are hopeful that our comments will help focus the Marine Mammal Research Program so that it can meaningfully address our current lack of knowledge regarding these impacts. Most importantly, we hope the results of the MMRP work will ensure that ATOC sounds– as well as other human-generated sound sources in our world ocean – will be allowed to occur only when we have the information to realistically determine that the benefits to our precious marine resources far outweigh the costs.

Sincerely,

Jo Guerrero

Jo Guerrero
President
Monterey Bay Chapter

Representing the Monterey Bay Chapter Board of the American Cetacean Society
E. Albright, A. Baldridge, D. Glim, J. Guerrero, T. Kieckhefer, S. MacDonald, D. Oglesby, D. Ternullo, R. Ternullo, J. Vandevere, K. Whittaker

Ms. Bobbi Marchand
26386 Carmel Rancho Lane #201
Carmel, California 93923

January 30, 1995

Advanced Research Projects Agency
C/O Clayton H. Spikes
Marine Acoustics Avenue
4 Crystal Park Street #901
2345 Crystal Drive
Arlington, Va 22202

Dear Mr. Spikes:

This is in reference to the Ocean Climate Project. I would like you to address the following concerns:

1 1) Recently, a naturalist explained to me that whales protect themselves and their young by listening for their predators. How are our migrating whales and their young ones going to protect themselves if their only defense is masked by the noise from this project? I-13b

2) 195 decibels is louder than a foghorn and travels farther (i.e. Hawaii) under water.

3) This is in a National Sanctuary.

4) My background is in mapping and imaging. And I am aware that a lot of thermal mapping of the ocean has already been done.

Sincerely,

Bobbi Marchand

30 January 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics Inc
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

SUBJECT: ATOC CALIFORNIA SITE DRAFT EIS/EIR COMMENTS

GENERAL COMMENTS

As stated on p ES-1, ARPA and UCSD "must ensure that the potential environmental impacts of the proposed project have been adequately addressed and analyzed". The DEIS/EIR for the California ATOC proposed project has failed to do that.

There was not sufficient time to adequately review all the complex issues addressed in the DEIS/EIR for the California ATOC proposed project. However, it became readily apparent that the document contains misleading, inaccurate, and internally inconsistent information; and makes assumptions, draws unsubstantiated conclusions, and omits data to minimize or dismiss negative, or potentially negative, aspects of the ATOC project.

TECHNICAL FEASIBILITY AND RELEVANCE TO CLIMATE

Although the misrepresentation of the ATOC technical feasibility and its relevance to climatic research has been expressed at prior hearings and in prior correspondence, the DEIS/EIR continues to perpetuate them. For example:

1 o It is the velocity of sound that is measured, not the average ocean temperatures (p ES-1). TC

o On p ES-3, it is admitted that the sound transmissions can be modified and/or rendered unusable by parameters other than temperature, thus there is no one-to-one correlation between sound velocity and temperature. I-3d

o Omitted from discussions of the SOFAR channel is that its waters vary in age as a function of water depth and latitude/longitude that can range up to 10-20

years, and that its depth and thickness fluctuate with time. Consequently, even if one could derive a temperature component from the measured average sound velocity, it would not be meaningful for climatic trend analysis.

o The SOFAR channel represents a special temperature-related feature within the ocean, and thus is a biased sample. And it is a small sample of the volume of water in all the oceans of the planet, which compounds the bias of the sample. I-3g

MARINE MAMMAL RESEARCH PROGRAM (MMRP)

The DEIS/EIR states on p ES-3 that the MMRP objective is "to address the question of whether long-term underwater low frequency acoustic transmissions are safe for marine animals (particularly marine mammals and sea turtles)". The MMRP can not achieve its objective.

2 The short time period allotted to the MMRP is insufficient to establish the needed base line data of species population size and distribution, habitat use, and acoustic sensitivities/dependence. The types of observations and investigations being done may provide some indicators of direct, short-term physical responses to human-generated sounds, but they can not provide answers to the long-term impacts and indirect effects that could physically damage the hearing of the acoustic-depend marine mammals and cause psychoigical damage that could suppress their immune systems, disrupt their social structure (communications, mating, birthing, etc.), and adversely affect their feeding. I-6b, 12a b, 10b

The sperm whale, which is the deepest diver (>2000 m) and perhaps the most sensitive to low frequency sounds of the great whales, was excluded as part of the few marine mammals selected for special investigations in the MMRP. And the DEIS/EIR consistently makes assumptions that this endangered species is not a concern. This is just one example of where the potential effects of the sound source on the marine life is minimized. TC

PROPOSED TRANSMISSION SITES

3 The National Marine Sanctuaries Act (NMSA) prohibits activities that would "destroy, cause loss of, or injure any sanctuary resources". As discussed in the MMRP section above, there are too many uncertainties, lack of data, unresolvable acoustic-caused damage, and insufficient time allotted to the MMRP to determine that ATOC sound transmission from within the Monterey Bay National Marine Sanctuary (MBNMS) will not injure any marine life. Thus, the proposed transmission site at Point Sur, or any alternate site within or in close proximity to the MBNMS should be rejected (Sur Slope and Pioneer Seamount). I-4a

The other alternate sites presented in the DEIS/EIR appear to have been selected to rate poorly on the important criteria of acoustic shadow (Figures 2.2.3.3-1, 2.2.3.3-2, and 2.2.3.3-6) namely, Pacific Beach, WA; Coos Bay, OR; and San Nicolas, CA. They occur on concave portions of the continental slope, which is the most restrictive bathymetric configuration (Figures 2.2.3.1-1, 2.2.3.1-2, and 2.2.3.1-5).
4 Conversely, the ATOC preferred transmission sites - all within or close to the Sanctuary - are located on prominate convex portions of the continental slope, and thus assured of rating highly (Figures 2.2.3.1-3 and 2.2.3.1-4). Upon reviewing the coastal bathymetric charts for Washington, Oregon, and California, I located at least 5-6 sites having convex configurations unobstructed by nearby bathymetry. And, some of these sites were close enough to the undesirable sites that the other site criteria would probably not be effected. Thus it appears that the alternate site investigations were incompetent or designed to make the Point Sur site rate the highest. In either case, the credibility of the DEIS/EIR is highly questionable. I-4c

OTHER COMMENTS

There is much evidence of sloppy, inaccurate work. A few examples are:

5 o Many cited references are not listed in the Literature Cited or Bibliography sections. E.g., on just one page (p 4-55), 6 cited references are not listed. TC.

6 o Notes 8 to 10 are missing for Table 3.31-1. TC

7 o Mislabeling of alternate sites on pp 2-19 and 2-20. TC

8 o Can not compare Figures 2.21.2-5 and 2.2.1.2-6. TC

CONCLUSIONS

The ATOC proposed project should not be approved. After a series of public hearings and correspondence from many scientists, environmentalists, and the general public, the DEIS/EIR has failed to adequately address, analyze and resolve the flaws and problems of the system:

o It has not been able to justify that it can produce temperature data that would be meaningful in climatic trend research.

o The MMRP can not resolve the potential harm to marine life, especially the acoustically dependent marine mammals who are protected by the Marine Mammal Protection Act, because the program cannot observe/measure long-term hearing

loss or stress that could cause irreversible damage to endangered and threatened species as well as other marine life essential to the marine ecology.

Deane Oberste-Lehn

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JAY R. MURRAY
9 HYANNIS CIRCLE
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1-28-95

JAY R. MURRAY
9 HYANNIS CIRCLE
SALINA. 3906

Dear Mr. Spikes:

I am writing this letter to protest the proposed ATOC project. As you know, the Acoustic Thermometry of Ocean Climate experiment is designed to give scientists accurate measurements of global warming trends by measuring the speed that sound traverses large ocean basins. By placing a powerful transducer in the SOFAR layer these sound waves can and will travel many thousands of miles to receivers located around the Pacific rim.

While these manmade noises are on their way across the Oceans of Earth the effects they may cause are either unknown or uncertain at best. As the Pacific Ocean is the largest geographical feature on Earth the possible negative effects will be inflicted on countless species, including humans. I will address the human annoyance factor from what I would consider a well informed position as I have experienced low frequency (33-40Hz) transmissions while diving in the Monterey Bay National Marine Sanctuary. The first time I felt-heard these transmissions I was diving at Point Lobos State Park just south of Carmel, Ca. The date was August 25, 1994, the time about 10:00-11:00 A.M.. As I began to descend I was immediately aware my lungs were vibrating from what sounded like a segmented pulse that lasted about 3/4 of a second with a 5 to 10 second gap between transmissions. I had just encountered what has been termed the "Monterey Mystery Noise". Since then I have heard this very invasive, definatly manmade noise at least a dozen times and have been successful in recording the sound very accurately four times. The dates of my recordings are, 8-31-94, 9-23-94, 10-5-94 and 12-5-94. I took the first recording directly to the Navel Postgraduate School located in Monterey, Ca. as I thought they would have the tools to analyze the tape. There I first met Proff. Jim Miller. To make a long story short he didn't give me any accurate data or findings but he did admit that the sound definatly seemed manmade. I have his remarks both in writing and on videotape as we were both interviewed by CNN and other news networks as the public interest in the sounds was intense. Since that time I have purchased thousands of dollars worth of equipment to both record and analyze the sounds myself. I am including several printouts that show the qualities of the "Monterey Mystery Noise". My techniques, equipment and results have been independently checked and confirmed as being accurate by Dr. Kashrow Lashkari of the Monterey Bay Aquarium Research Institute. Dr. Lash, as his friends call him was reluctant to say one way or the other if he thought the noise was manmade or biological for quite some time but has had to admit that there is now no doubt in his mind that my recordings do show manmade

C-61

noise. I sent a copy of my tape to the Applied Physics Lab at the University of Washington and they suggested the noise was produced by wave noise against the breakwater where the dive was conducted. As the tape I sent was a DAT tape copy of my Hi-8 video original the scientists at the A.P.L. were not able to see the sea surface conditions were calm so there wasn't any possibility wave noise caused the offending sounds. A very curious conclusion to say the least.

Being in the water is a very important part of my life. I've been a certified diver since 1966 and have well over a thousand dives in my career. For over a year now I have been employed by Aquarius Dive Shops in Monterey as a tour guide. I am a PADI Divemaster which gives me the opportunity to take up to four people at a time on underwater guided tours of the Monterey Bay area. This to me is a very rewarding experience. To be able to show people from all over the world the wonders beneath the surface of the Monterey Bay National Marine Sanctuary is a very relaxing and fun job. Normally, when we surface, the first words out of their mouths are "Wow! I never knew the colors were so bright and varied!". Or something to that effect. Since I have had several people on tours when we encountered the "Monterey Mystery Noise" I can attest that the first reaction upon surfacing after being subjected to the noise is "What the hell was that?". It takes a beautiful experience and turns it into a annoying, confusing and by my estimation possibly a dangerous situation. The danger coming from a divers attention being diverted from diver safety to thinking about this new, invasive noise-vibration. This is not to mention the section in the EIS/EIR titled "Potential Resonance of Air-Containing Cavities" were the subject of intrathoracic pressure differential is addressed. In the last sentence of paragraph 2 it states, "this intrathoracic pressure is about twice that of the external incident pressure at the resonant frequency, indicating a degree of enhancement of the pressure by resonance. This leads me to believe that the dive tables that we as divers use to calculate our available bottom time will be effected by ATOC transmissions. Our calculations are based on how much nitrogen is forced into our bloodstreams by increased pressures at depth. If these basic rules of diving are violated we risk getting decompression sickness. A very serious and life threatening condition. On page 123 of section 4 the question of "Potential Human Acoustic Annoyance" is addressed. The first sentence of this section states, "Almost all human diving activity takes place within 2km of the shoreline". While this is basically true we have been conducting what we call "blue water" dives for many years and I'm sure they will continue. These dives are conducted far out to sea. Also, there appears to be a very high state of interest from divers as to whether they will be able to hear-feel the ATOC transmissions. As a PADI Divemaster I will be conducting tours to the area of the HX-554 ATOC transducer to both experience the effects of and record the transmissions. If there are any adverse effects on either humans or other species I will immediately notify both the agencies responsible for the transmissions and

1 I-18a

2 I-18a

the organizations involved in stopping the implementation of this global project.

During my interview with CNN on 9-1-94 I stated "When I'm in the water I consider myself a marine mammal". While this is basically true the main difference would have to be that I am not a native species to the ocean and as such would not have senses accutly sensitive to the ocean surroundings as marine mammals would. They must be more aware of waterborne disturbance than I am. I believe that the effects of vibrating lungs would be very
3 invasive and definatly annoying to all the species that will be I-18a
subjected to this experiment. This includes everything from some species of plankton to the largest animal on Earth, the Blue Whale. Right in the middle of this spectrum of species lie all the fish that our human society depend on for food and employment. The ATOC EIS/EIR is devoid of hard data concerning
4 the effects of SOFAR transmissions on sealife. The studies I have I-18a
seen conducted on Seals and Sea Lions by Proff. Schusterman at U.C. Santa Cruz were conducted in air rather than in water. This would negate the effects of potential resonance of air-containing cavities, a major factor. When the ATOC scientists address these unknowns they merely fall back on the duty cycle theory that exposure would be limited in time to reduce overall effects to almost nil. This is not a viable theory in my estimation. While I have been exposed many times to low-frequency transmissions I submit that I have been on a crusade to stop all sound and particularly SOFAR transmissions since the first day I experienced it. I will never forget the sensations these sounds produced and I'm even more sure if you could ask the species effected they would be in opposition to the proposed transmissions. I can't imagine having lungs the size of a whales and having them vibrating while on the hunt for food, a mate or trying to navigate or communicate. At the most recent meeting of the Monterey Bay National Marine Sanctuary Advisory Council even
3 Proff. Daniel Costa suggested the resonance of marine mammals I-18a
lungs is a very valid concern. These remarks were made outside the meeting room in a conversation with myself, Jim Miller from the N.P.S. and a representative from Scripps. Proff. Costa in a presentation at the public hearing in Santa Cruz on Jan.6,1995 said he had just completed the baseline study of marine mammals in the Monterey Bay National Marine Sanctuary. I submit my tapes of the "Monterey Mystery Noise" made during the last five months show the bay was not in an acoustically pristine condition at the time Proff. Costa's studies were conducted. If I must prove this fact in a more structured environment then I am prepared to do that. This is truly the most invasive project the human race has devised with the possible exception of thermonuclear, chemical and biological weapons. The effect of weaponry is immediate and vast while the effects of SOFAR transmissions may be slow, hard to detect and possibly vast as well. For the human race to screw up the oceans merely to accumulate ten year old data seems
5 absurd. There have been very precise real-time measurements taken I-3.b,
by NASA-NOAA satellites that clearly indicate the presence of Global Warming. The NASA and NOAA scientists have stated that we d

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must take action now to limit the emissions of Co2 and other problem gases if we are to limit damage to our atmosphere. We don't have ten years to wait for the results from ATOC.Even at best the data returned from ATOC would simply show that in the time frame from 1995 to 2005 the SOFAR layer had warmed by .1 degrees. In that ten year period we will have dumped millions of tons of pollutants into our precious atmosphere and continued the possible irreversible destruction of our planet. It seems for the ATOC project to get accurate results they will have to conduct continual C.T.D. studies to modify their raw data. Oceanic current, temperature and density cause continual changes in the speed of sound in water so continual monitoring will have to be undertaken. This will prove to be impossible due to logistical environmental and funding factors.

Some of the arguments made by agencies or individuals in favor of the ATOC project are easily defeated if you look at the way the comparisons are made.

1. Proff. Jim Miller in his presentation to the EIS/EIR Public Hearing in Santa Cruz showed a graph comparing the noise of a whale watching boat going directly over Dr. Lashs permanent hydrophone located in Monterey Bay to the sounds expected near shore from the ATOC transducer. This is a very misleading comparison as the distance from the emitting sources is very
6 different. I suggested to Proff. Miller that a more fair I-18a
comparison would be to locate the whale boat at the same distance from the receivers as the ATOC source, say fifteen miles. At this distance the whale boat noise would be nonexistent for all intents and purposes. At least from a divers standpoint you couldn't hear the boat but you certainly could hear the ATOC transmissions. I can say this with relative certainty as divers can definatly hear-feel the "Monterey Mystery Noise" quite clearly although by ATOC scientists believe we shouldn't be able to hear 33-40Hz sounds underwater. This leads me to believe there are some critical problems with the ATOC estimations concerning there predictions of the effects of their proposed transmissions.

2. ATOC scientists say the "Ocean is a very noisy place already" due to shipping,geological,weather and other already existing manmade noise. The only way you can compare high decibel shipping noise to ATOC transmissions is to use a relative amplitude, and distance comparison. The shipping noise is transmitted in the surface water layer and diffuses and
7 attenuates in a relatively short time and distance compared to I-18a
the SOFAR transmissions of ATOC. With receivers placed in the surface layer where almost all life in the seas lives the noise from the supertanker would be undetectable at 100 miles while the ATOC wavefront would still be very powerful and on its way to New Zealand thousands of miles away. Obviously, the SOFAR layer possesses qualities quite unlike surface waters. Comparisons of surface emitted noise and SOFAR transmissions are not reasonable. My suggestions would include requiring all commercial shipping using U.S. ports to implement quiet propeller technology to help

reduce overall ambient undersea noise levels, not adding to the levels dramatically with ATOC transmissions. It isn't just the increase in noise levels but the quality of the sound that concerns me as well. The "Monterey Mystery Noise" is the strangest, most invasive noise I have ever heard underwater. And now that I think about it, above water as well. The noise divers hear consists of shrimp, fish, marine mammal, bubble and transient manmade noise. Not continual blasts of low frequency, lung rattling manmade noise. Most of the other noise the ATOC scientists talk about is natural noise. Wave noise, rain, ice noise, geothermal and tectonic sounds are facts of nature and all species on Earth are used to these sounds when they are exposed on a regular basis. As a Professional diver with over a thousand dives under my belt the difference will be great between ATOC and other noises. We as divers are trained to remain submerged until the sound of passing boats subsides before we surface. Usually a period of a minute or so. This indicates the transient nature of
8 the source. ATOC noise will be impossible to avoid unless you decide not to dive during transmission times. Not a pleasant thought to say the least and possibly a violation of divers rights. I-182

As I stated at the Public Hearing in Santa Cruz, if I am conducting a tour or helping to certify a class of new divers and there is a mishap resulting in someone being injured or worse while there are ATOC transmissions being heard-felt my insurance agency (Vincensia and Buckly) will require me to provide them with all the details of the accident. If, in my opinion the ATOC transmissions produced a lack of attention or other problem then I will suggest blame be placed with ATOC. I'm sure you must realize the possible headlines would cause immediate harm to your project. "Woman dies, ATOC sounds blamed"! It's only a matter of time before a diver is hurt while experiencing ATOC noise. You can be assured of a firestorm of controversy at that point.

To conclude, I must tell you that in my studies of the "Monterey Mystery Noise" I have found the transmissions are made up of a 33-40Hz main wave with a second wave at double the Hz of the main wave. Putting the second wave at 66-80Hz. I have also noticed that at times the main wave is not accompanied by the second wave. This leads both myself and others including Dr. Lash to believe the 33-40Hz wave can be transmitted by itself without the second 66-80Hz included. And visa-versa. At this point I will suggest that the transmission of 66-80Hz sounds in the Monterey area is very interesting since this is the same frequency used by
9 ATOC. While I cannot at this time prove direct involvement of ATOC scientists with the transmission of the "Monterey Mystery Noise" I am quite aware of the similarity of my recordings to the proposed ATOC waveform. When I first started to analyze my tapes it appeared to me as though the sounds were some kind of communication system. Independent researchers now agree with my speculation. This, combined with the obvious SONAR capabilities of the ATOC system lead me to the possible D.O.D. involvement in the project. In my own mind I have come to the conclusion that I-182

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ATOC, while it may yield some results as to ocean temperature, is actually a vast, active SONAR system with capabilities to communicate with subsurface and possibly surface vessels. Be assured I and others will be monitoring ATOC transmissions and comparing them with my tapes of the "Monterey Mystery Noise". If the ATOC waveform is the same or similar to what I have recorded recently then you can be assured I will inform the public and all agencies and organizations of my findings.

I have included data printouts of a dive conducted on 12-7-94 with my dive partner Justin Dubowitz. I have made my tapes available to anyone who wants a copy and to this date have supplied the N.P.S., the Applied Physics Lab at U.W., Dr. Ann Bowles from Hubbs Seaworld Research Institute, MBARI, and several other interested organizations and individuals. This is a standing offer.

I am also including copies of petitions with approximately 200 signatures. A letter mailed to me by a PADI Instructor concerning a dive in July, and all my public presentations involved with the ATOC experiment.

Please consider your actions as to the possible impact of this experiment called ATOC on all the creatures of the seas. It is not a wise or carefully calculated use of our dwindling tax dollars and I will continue to oppose increasing the level of undersea manmade noise. Passive research will always be welcome and encouraged. See you in Hawaii on Feb. 9-10.

Sincerely,

Jay R. Murray

JAY R. MURRAY
9 HYANNIS CIRCLE
SALINAS, CA. 93906

Subject: Acoustic Thermometry of Ocean Climate-EIS/EIR Public Hearing. 1-6-95

I come before you tonight as a PADI Divemaster. I'm an independent contractor hired by one of our local dive stores in Monterey. My duties include taking divers from all over the world on underwater tours of Monterey Bay and the surrounding National Marine Sanctuary. I also help certify new divers that have ranged in age from 16 to 68 years old. Both of these activities involve diving with people who are unfamiliar with the surroundings. Some of these people exhibit marginal diving skills to say the least.

As some of you may know, beginning on August 25, 1994 I have been involved in the monitoring of very unusual low frequency sounds in the Monterey Bay National Marine Sanctuary. These sounds are in the range of 36-38Hz with a main harmonic at approximately 75Hz. These sounds are quite invasive when they are being heard as they tend to cause your lungs to vibrate. This reaction to low frequency sound underwater is addressed in section 4, page 120 of the ATOC EIS/EIR. The section is called "Potential Resonance of Air-Containing Cavities."

In paragraph 2,the EIS states that at different frequencies between 20-100Hz not only will divers experience resonance of air containing cavities but that these sound waves will increase the pressure inside the same air containing cavities. This leads me wonder if being subjected to this sound while diving may have some effect on the standard dive tables that both PADI and NAUI Instructors teach there students. These tables tell us how long we can remain at any given depth. The calculations are based on how much Nitrogen our bodies absorb while underwater due to increased pressures. If these increased intrathoracic pressures are even a minor consideration then this aspect of the project should be investigated and all pertaining information should be released.

In paragraph 3 it states that the resonant frequency of air-containing cavities of divers will increase as a function of depth. Then in paragraph 4 it states that at the surface 20Hz and 100Hz appear to be the critical frequencies. In the Acoustic Engineering Test Summary section B part 3 it is stated that the amount of low frequency energy going to the HX554 transducer had to be limited due to an "undesired" resonance at 18Hz. This is very close to the critical frequency of 20Hz. I would like to know if there was another harmonic at approximately 36Hz. In my studies of underwater acoustics this appears likely.

In my underwater encounters with the "monterey mystery noise" it seems that 36-38Hz produces what I would call a significant response in humans. While I have no idea of the location of the source of the transmissions or the party-parties responsible I can only say that if the ATOC experiment produces the same or similar responses in divers that I will be opposed to the proposed transmissions. Basically they change what should be

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a stress relieving dive into one that produces annoyance and questions regarding what the sound may have been. This diversion of attention concerns me greatly. All divers have different levels of anxiety when underwater and the experience of having your lungs vibrating definatly shifts your thoughts while submerged. I can only suggest that if I'm conducting a tour or helping certify new students and there is an accident while feeling-hearing these sounds that the agency that provides my Divemaster insurance will be quite interested in the details of the mishap.

On page 123 of section 4 there is a section called "Potential Human Annoyance". In this section they state that "almost all" human diving activity takes place within 2 km of the shoreline. I can only say that there have been divers conducting what we call "blue water dives" for many years and I'm sure they will continue. I'm quite sure that if the ATOC project is approved there will much interest from divers in seeing if they can feel-hear the sounds being emitted by the HX-554 transducer used by the ATOC scientists. As a PADI divemaster I am qualified to take up to four people at a time on dive tours. As such I plan on taking certified divers on tours to experience any effects caused by the ATOC source. Be assured there will be divers in the area of your transmissions. If there are any adverse reactions to the noise they will be relayed immediately to all agencies involved with the project and all the organizations questioning the many controversial aspects of this global project.

In closing I would like to say that I have done my best to make people aware of the annoying and possibly dangerous aspects of humans being subjected to low frequency sounds while diving. I have taken this approach because diving and diving safety are my areas of expertise. If I may speak for one moment as a citizen of the United States Of America and a member of the human race, I don't approve of my tax dollars being used to ensonify the oceans of the world. I feel our tax dollars should be used to reduce emissions of known problem compounds into our atmosphere rather than impacting our oceans with an experiment that contains to many unknown factors.The EIS/EIR states there shouldn,t be any significant physiological impacts on sealife but what about the phycological impact of having this waveform transmitted on a longterm basis. I submit that every lifeform that relies on either an air bladder for buoyancy or lungs for breathing will be affected in some way by this project. This includes everything from phytoplankton to the largest living creature on Earth. The theory that a reduced duty cycle lessens the overall impact of the project is absurd. If any lifeform is subjected to resonance of their air containing cavities even once I believe it will be an experience they won't soon forget. I submit myself as proof of that fact.

As I stated earlier, if the ATOC HX-554 transducer produces a reaction similar to what divers have been experiencing for the past five months I will oppose the project and fight for a

termination of all transmissions.

My research and results concerning the "Monterey Mystery Noise" have been independently analyzed and confirmed by one of our local research institutes. If there are requests for copies of my data I would be happy to comply.

Thank you for this opportunity to address the public and the agencies involved with my concerns.

Sincerely,

C-61

Monterey Bay National Marine Sanctuary Advisory Council

1-20-95

Dear Madam Chairperson:

On Dec. 9, 1994 the Advisory council was kind enough to allow me to talk to you concerning my fears and opposition to all high power underwater transmissions of low freqency sound in the Sanctuary. These observations were based on my personal experiences with what we'll call the "Monterey Mystery Noise". Briefly, these sounds were very low frequency, between 33-40Hz and of a pulse duration of approximately .6-.8 seconds every 4-7 seconds. The sensation these transmissions produce in divers is addressed in section 4 page 120 of the ATOC EIS/EIR. This section is titled "Potential Resonance of Air-Containing Cavities". The ATOC scientists throw around allot of numbers that lead you to believe that the 75Hz frequency they plan to use will produce no effects on divers. I can personally attest to the fact that transmissions of 33-40Hz produces vibration in divers lungs-airspaces. This shouldn't be the case according to the data in the ATOC EIS/EIR. Throughout the ATOC EIS/EIR the scientists-collaborators of the document make many guesses as to the possible impact of their proposed action. Very few of the effected species have been studied concerning their response to long term transmission of low frequency sound in their environment. In particular, studies of sound transmitted in the "Deep Sound Channel" are either classified or not available to the general public. When in doubt they merely use the "duty cycle" theory to apparently lower the overall impact of effects in question. The ATOC scientists have repeatedly tried to compare the sounds produced by large freighters and supertankers with the ATOC transmission levels. This is a very unfair comparison in that the shipping noise is generated on the surface while the ATOC source is placed in the deep sound channel. The noise near the surface dissipates much more quickly because of water mixing and other variables while noise emitted in the deep sound channel travels vast distances. As a PADI Divemaster I am well aware that if you are underwater and you hear a boat coming you simply remain submerged until the noise of the boat subsides indicating the boat has passed out of your area. At the recent Public Hearing in Santa Cruz Proff. Jim Miller of the N.P.S. gave a presentation that stressed the relative amplitude of a whale watching boat directly over the hydrophone at a distance of 30 ft.compared with the proposed ATOC noise at a distance of approximately 20 miles. A more fair comparison would be to measure the noise from the boat and the ATOC source from the same distance, say 20 miles. The boat noise would be virtually nonexistent but the ATOC noise would still be on its way to New Zealand, over 6000 miles away. If supertanker noise was being emitted in the deep sound channel then you could compare tanker noise to the ATOC source. The noise from the ATOC source will not remain completely confined within the deep sound channel as it traverses the Pacific Ocean. Unfortunately it will spread to the surface layers where almost all life occurs. In section 4 page

123 there is a section titled "Potential Human Acoustic Annoyance". While it must be quite apparent that I am very annoyed by what I have experienced, vibrating lungs, a definite shift of attention, and a general disruption of normal diving pleasures I personally think we should address what effect potential human acoustic annoyance will have on all the creatures of the seas. You need only imagine what it would be like having a barking dog next door for the next two years at a minimum. Possibly twenty years and not only the Pacific but all the major ocean basins of the world will be effected by this global project. The psychological impact of this noise will be immediate and cumulative. think of trying to communicate, navigate, locate food sources and mates with this longterm manmade noise pervading the environment. Not a pleasant prospect to say the least.

Of major concern to me was the presentation of Proff. Daniel Costa at the Public Hearing of 1-6-95 in Santa Cruz. After citizens had their 3.5 minutes to question the contents of the EIS/EIR, Proff. Costa from U.C. Santa Cruz proceeded to explain how he had just completed what he called a 5 month "Base-Line Study" of marine mammals in the Monterey Bay National Marine Sanctuary. In my opinion the previous 5 months are not a valid baseline period because the bay and its inhabitants have been adversely effected by the "Monterey Mystery Noise". I have spent many days and nights studying the qualities of 33-38Hz transmissions and suggest they and the ATOC source will produce similar reactions. If ARPA and the ATOC scientists don,t suggest an alternative time frame for their baseline study then I will consider my next actions.

The supposed goal of the ATOC project is to study the effect mankind has imposed on our planets atmosphere. These effects are already well documented by both NOAA and NASA using satellite telemetry. By their estimates the Earth is going through a warming period and the trend is expected to continue unless humans can somehow restrict our use of fossil fuels and other compounds that degrade our atmosphere. The time lag between surface heating and detection in the deep sound channel is much too long to be of any help either now or in the future as the data will be lagging behind reality by many years. This puts even exact ATOC measurements at a serious disadvantage to real time studies.

I oppose the ATOC experiment on grounds that there are to many unknowns to subject all the inhabitants of our oceans to this DOD funded project. The EIS/EIR doesn't allay any of my fears and raises many new ones.
The SONAR capabilities of this project should be obvious and may reveal the DOD interest and funding of this experiment. ARPA admits they will use existing U.S. Navy recievers to monitor the transmissions. Why waste expensive hardware they say. While studying the "Monterey Mystery Noise" I suggested to local researchers that it appears the waveform is quite possibly a type of communication as well as a high power, global sonar system

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capable of locating vessels at long distances. At this point I would like to say, my results have been verified by a well known reasearcher from MBARI and he tends to be in general agreement with my findings. It just so happens that the proposed ATOC waveform will be very similar to what we divers were experiencing in the bay and the south coast area except the ATOC transmissions will last for approximately 20 seconds each. Not 3/4 of a second.

Instead of impacting the oceans just to prove we've screwed up the atmosphere lets spend our tax dollars on developing solar, wind, tidal and other clean energy resources. If the NASA-NOAA predictions are correct we must act now to preserve our planet as we know it today.

Also, lets require all commercial heavy shipping to adopt quite propeller technology as what was once classified is now public knowledge thanks to Mitsubishi Corp. Instead of saying the ocean is already a noisy place and some more intrusion won't harm anything lets stop the ATOC project and reduce already existing sound levels. This to me is the proper way to hold the stewardship of the Monterey Bay National Marine Sanctuary and the planet for that matter.

Sincerely,

Kelly Allman
1257 Tenth Avenue
San Francisco, California 94122

Advanced Research Projects Agency
c/o Clayton H. Spikes
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202
ATOC Response

January 28, 1995

Dear Mr. Spikes,

I am a graduate student at San Francisco State University studying cetacean acoustics, and have worked in the marine environment and in bioacoustics for a number of years. This is letter is in response to the Draft Environmental Impact Statement on the proposed Acoustic Thermometry of Ocean Climate (ATOC) project. I am opposed to the project, and have the following comments to make:

This project is not justified in that the proposed methodology to obtain information on ocean climate is not refined, and the potential costs of introducing this type of noise pollution probably outweigh the benefits.

1 The nature of the proposed sound (center frequency 75 hertz, 195 dB, 20 minute's duration) also has potential masking effects that could interfere with communication signals used by marine animals, and perhaps damage their habitat. This could affect overall ocean productivity and the health of marine animals. I-13b,c

The difference between the ATOC sound and the usual noise pollution caused by tankers, etc. is that the ATOC sound is long and not harmonic, and does not provide 'relief, i.e. a break in intensity. A loud crashing sound from an oil tanker is not twenty minutes long, but more like a few seconds to minutes in duration. The ATOC structure could potentially be a very damaging form of noise pollution. The number of transmissions proposed (2% cycle) are excessive, and the number of years proposed for the project (ten) is too long. Perhaps if the experiment was more efficiently designed, information on global warming could be obtained from less data points. The length of the project appears to make the project allow for a tremendous margin for error.

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If we were able to find out more information on global warming, ten years from now might be too late to minimize it's impact (Gribbon 1990). And if we did "prove" global warming is happening, what measures would the United States propose to take to

2 reduce the theoretical causes? Or will another ten year project be dedicated to proving what the causes are? My point is that educated people already have an inkling that global warming might be occurring, as it has many times throughout geological history. We also an relatively clear idea of what the recommended steps are to reduce damage to our way of life. I-3b

This brings me to the proposed pilot study on the impact of the ATOC source on marine mammals. Several papers from the 1993 Proceedings of the Journal of the Acoustical Society of America indicate that there is an impact on several species of marine mammals from the effects of low frequency sounds. We already know that there is an impact of loud sound on many animals (but then again, a copious amount of papers with obvious questions and obvious conclusions could be generated from this project).

While the list of researchers involved on the project is impressive, the aims of the pilot study are equivalent to the information contained in approximately ten doctoral

3 dissertations. How in the name of research do they expect to determine the 1) avoidance or abandonment of previous areas and 2) changes in reproductive behavior in a study that is only a few months long, and surveys only one day per transmission period? With respect to the aerial surveys, one survey per each seven day period when the source is on is not sufficient. Eighty kilometers is a fraction of the distance that can be impacted. I-12a

This is not simply to fault intent of the researchers - it is not possible to obtain this information, even with the methods listed in Table 1. Having spent many hours on boats, I know the difficulties associated with obtaining field data in the open ocean. Unless the conditions are optimal, very little conclusive behavioral data can be obtained form these animals, despite the advanced technological gadgets described. The proposed methods might find out a great deal about the marine animals movements, but it is very unrealistic to expect to find out the information in relation to the impacts from the ATOC source. Which brings me to the next question - what about the area past the 80 kilometer transect, way out, where the researchers will not be doing surveys? Is the sound going to have "no impact" out there? Is the protocol for these areas out of sight, out of mind ? What if one our

4 endangered animals happen to use the channel? We will not be able to tell the fate of these missed data points. I-7e

The reason we do not know enough about the low frequency sounds and their impact on marine mammals is because it is very difficult to measure an "impact"in aquatic large moving animals, especially subtle ones. Even the most polished statistician can be a clueless observer with regard to what a genuinely 'significant' behavioral disturbance on animal would be. The elephant seals are the only animals that will be adequately measured for stress or startle responses because their heart rate will be monitored. But if these are the animals from Ano Nuevo, California, I don't think they are necessarily a good indicator species since much of that population has been extensively handled and studied for many years, and therefore possibly already habituated to a variety of human impacts, and perhaps already stressed.

Another issue that concerns me is the gauge used to measure the impact of low frequency sounds on gray whales on page C-3 of the DEIS. It states that the zone of influence is *typically* 50% of exposed individuals respond with a change of swim direction, with one reference by Malme et al (1985) cited. Now, forgive my curiosity but how do you come up with 50% of the exposed individuals as the appropriate response? When it comes to endangered or threatened animals, is it not important if only 10% would react? Also, how many instances were used to base a typical zone of influence? Depending on the degree of interaction with the animals, subtle behaviors could be overlooked, and statistically ignored.

5 TC App. C

As this project seems to going on full steam ahead, and with many esteemed colleagues in support of ATOC, it is a little disheartening to be in the silent scientific minority. Basically, I am against the project because:

- the pilot study is not long enough and will not answer what it aims to.
- the ATOC project is not justified and must be redesigned with the degree of impact significantly reduced if possible.
- the reason for the Navy's interest in this project has been consistently ignored.

Hopefully we can think of a more environmentally sound way to study the environment.

Sincerely,

Kelly Allman

Kelly Allman

National Marine Fisheries Service
1315 East-West Highway
SSMC III, room 4237
Silver Springs, Maryland 27900
fax 301-713-0376

ATTN: Jennie Drevenak

Jan 30, 1995

Dear Ms. Drevenak:

I am not affiliated in any way with UC Santa Cruz, the Scripps Institute, or the ATOC project. I just wanted to add something to the statements I made at the ATOC hearings in Santa Cruz. All I'm asking is this: Let's just not be stupid.

A big deal has been made of the fact that some marine mammals have shown an avoidance response to sounds of 120 Db (water standard). It turns out that this value was calculated from the known intensity of the noise being made by the ship from which the marine mammals were being observed. This is 100 times quieter than the water standard value for the sound intensity of a ringing telephone. It is, in fact, less than or equal to the background sound intensity during a storm.

The point here is that storms cover hundreds of miles. No marine mammal can swim away from them. If these animals really cannot abide sounds of this intensity, they would have serious problems during storms. Common sense suggests this is unlikely, to say the least. Therefore, in view of the relative quietness of the sound to which an "avoidance response" was shown, it is unlikely that the animals were showing avoidance to the sound itself. It is much more likely that they were showing avoidance to the ship making the sound. The idea being suggested by ATOC opponents that the 120 Db threshold represents some critical threshold value is likely to be without merit.

Based on both common sense and the scientific merits, the ATOC project deserves prompt approval. Let's just not be stupid. In my opinion, both as an engineer and a citizen, most of the arguments against ATOC are based on ignorance, emotion, and stupidity. They are without merit and should be ignored. The few reasonable and valid objections are easily outweighed by the potential value of the project. Let's not let irrational emotional reactions and ignorance interfere with a worthy scientific project.

Thank you for taking the time to review this statement.

Sincerely,

Paul Stuart
2016 Grant St.
Berkeley CA 94703

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FAX MEMO
PAGES TO DATE 1/31/95 TIME 1700
TO CLAYTON SPIKES
FROM CDR TIM PAGE
CO US COAST GUARD MONTEREY
(408) 647-7311 FAX (408) 647-7347

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Monterey Bay National Marine Sanctuary
299 Foam Street, Suite D
Monterey, California 93940

SANCTUARY ADVISORY COUNCIL

January 30, 1995

Mr. Clayton Spikes
Marine Acoustics, Inc
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

I am writing on behalf of the Monterey Bay National Marine Sanctuary Advisory Council regarding the ATOC Draft EIR/EIS.

We have had this topic on our agenda at several Council meetings and there has been extensive discussion on the part of Council members and our formal advisroy groups. Our three working groups - Conservation, Research and Education - have each reviewed the document and their comments are attached. Additionally, a list of concerns raised by the public and brought to the Council, some in an informal manner, is included as well. It is hoped all the comments attached will be reviewed and considered prior to the release of the final ATOC EIR/EIS.

Sincerely,

Karin Strasser Kauffman

Karin Strasser Kauffman
Chair, Monterey Bay National
Marine Sanctuary Advisory Council

Encl: (1) Research Advisory Panel's Statement
(2) Sanctuary Education Panel's Statement
(3) Conservation Working Group's Statement
(4) Common Concerns Raised by the Public

C-64

MOSS LANDING MARINE LABORATORIES
CALIFORNIA STATE UNIVERSITY FRESNO, HAYWARD, SACRAMENTO, SAN FRANCISCO, SAN JOSE, STANISLAUS
P. O. BOX 450
MOSS LANDING, CA USA
95039-0450
(408) 633-3304

19 January, 1995

Karin Strasser Kauffman
Chair, Sanctuary Advisory Council
Monterey Bay National Marine Sanctuary
299 Foam Street, Suite 100, Monterey, CA 93940

Dear Karin:

The Research Activity Panel (RAP) for the Sanctuary met last Friday (13 January, 1995) and discussed the Draft Environmental Impact Statement (DEIS) and Environmental Impact Report (DEIR) for the proposed Acoustic Thermometry of Ocean Climate (ATOC) research project to be located off Point Sur, within the Monterey Bay National Marine Sanctuary (MBNMS). The ATOC Working Group Chair, Deborah Johnston (CDFG), indicated that the group had not had the time to meet and discuss the DEIS/DEIR but solicited input from the RAP. Consequently, Dr. Dan Costa (UCSC), who has been integrally involved with very recent marine mammal surveys and tracking studies in the vicinity of the proposed ATOC study site for the past several months, gave the RAP a brief review of the results of the studies as they pertain to the methodology proposed in the DEIS/DEIR.

After much discussion, during which there was a positive concensus about the ATOC research proposed, the RAP approved the following process: Chair Johnston, in consultation with the RAP Chair, would revise the original (* 24 May, 1994) statement presented to the SAC from the RAP to incorporate the comments from this recent meeting. Once she and I considered the verbiage to be representative, she would e-mail or FAX it to the other ATOC Working Group and RAP members for their consideration, suggestions, and ultimate approval. This process has occurred, with numerous e-mail and FAX communications back and forth.

As a result, 16 of the 22 RAP members provided input. All were in favor of the resulting statement. However, two individuals had additional concerns and were encouraged to present those concerns in writing to ARPA by the 31 January, 1995 deadline. Therefore, the RAP and its ATOC Working Group, have agreed upon the statement on the attached pages.

I will present this position at the upcoming Sanctuary Advisory Council meeting, 20 January, 1995. Deborah Johnston has also agreed to attend to discuss the statement, if necessary.

Sincerely yours,

Gregor M. Cailliet

Gregor M. Cailliet
Professor, MLML
Chair, RAP

cc: Terry Jackson, Manager MBNMS
Aaron E. King, Acting Research Coordinator, MBNMA

* Original RAP statement to SAC regarding ATOC (24 May, 1994)

"The Acoustic Thermometry of Ocean Climate (ATOC) project has recently changed its scope of study by first emphasizing marine mammal research and agreeing to prepare an Environmental Impact Statement (EIS) before initiating their studies on ocean temperature. This is because the currently available information is apparently insufficient to evaluate the potential impact of low frequency sounds on marine mammals and other organisms. The Research Advisory Committee (RAC) supports a rigorous marine mammal research program prior to acoustic climatic research. We encourage acoustic research in the Monterey Bay National Marine Sanctuary that will optimize the operation of the ATOC sound source, thereby enhancing studies to determine the effects of these sounds on marine mammals. We propose that information from such studies will be useful in the EIS process. We further recommend that the RAC be an integral part of the review process for the new marine mammal acoustic study proposal, the results of this study (if approved), and the resultant EIS. We will then be better able to make recommendations to the Sanctuary Advisory Council regarding future ATOC experiment proposals."

RAP Statement on the
Draft Environmental Impact Statement/Environmental Impact Report for the California Acoustic Thermometry of Ocean Climate Project and its associated Marine Mammal Research Program
19 January, 1995

The earth goes through natural temperature changes on a 10,000-year or so time scale. When man's anthropogenic effects are added to the natural global warming, unpredictable and possibly catastrophic changes become possible. Man-induced global warming is perceived to be among one of the greatest environmental threats facing our planet. Our ability to predict the rate of warming, causal agents, and relevant factors controlling global warming is poorly developed. A key component to global climate models is the role played by the oceans. The ability to measure a change in the temperature of the ocean has the potential to enhance our understanding of the interactions between the ocean and the atmosphere as they relate to global warming.

This project provides an opportunity to test synoptic techniques using sound transmission over a large area of the Pacific Ocean to test the hypothesis that global warming is affecting ocean temperatures. The hypothesis of the proposed ATOC project is that these sound transmission techniques can detect changes in the deep ocean temperatures. Temperature changes in the ocean deep waters may be inferred from measurements of integrated sound travel time over broad areas. The DEIS/DEIR provides sufficient and clear details of this research project. The Research Activity Panel (RAP) supports the next phase of the ATOC research project of sound transmittance and Marine Mammal Research Project (MMRP) operation at the preferred sound-source location (Pt. Sur Ridge) in the Monterey Bay National Marine Sanctuary (MBNMS) (Table 1.1.2-1 on page 1-6 of draft document).

The project now has included the MMRP to monitor potential effects to targeted species and provide a mechanism to take immediate action to terminate the sound transmission if and when effects are detected. The MMRP further proposes to take surface measurements of sound levels to verify the finite-element-parabolic-equation model results utilized in the DEIS/DEIR conclusions. Available oceanographic and marine biological data, provided in the DEIS/DEIR (and elsewhere in the scientific literature), suggest that the potential effects of the acoustic signals used in the ATOC experiment will have less than significant effects on marine mammals and other marine life (page ES-11, draft document). In addition, this project will provide much information on the distribution, abundance and behavior of marine mammals.

The first phase of the ATOC project gathered data on marine faunal species composition and numbers in the vicinity of the preferred sound source location. The preliminary results of this study were presented at the public hearing on January 6, 1995 and to the RAP on January 13, 1995. These data indicate that only a few marine mammal species with low frequency sensitivity utilize

habitats in that vicinity. These studies also establish procedures for the effective study of a select group from these species. They also indicate that several species can be successfully studied and that it is feasible to monitor the behavior of tagged animals that traverse the area. Thus, ATOC-source-induced changes in distribution and behavioral responses can be studied in detail during early, controlled sound transmissions that provide a unique opportunity to assess the effects of sound on these marine mammal species. Based on the data presented in the DEIS/DEIR, the RAP concurs that this research project has the potential to address anthropogenic global-warming temperature changes and detect behavioral changes species as detailed in the MMRP.

Regarding whether it is appropriate to conduct the ATOC experiment within the MBNMS, the proposed experiment is within the letter and intent of the MBNMS research mandate. The MBNMS was designated to promote research, education and conservation in this area. This research project is relevant to the MBNMS in light of the deleterious consequences for marine organisms predicted to be likely effects of global warming (e.g., altered climates, collapse of food chains, failure of reproduction, etc.) and whose severity was demonstrated in the Monterey Bay region during the 1982-83 El Nino event. Therefore, the RAP endorses the proposed ATOC 2-year project, including the MMRP at the preferred location as described in the DEIS/DEIR.

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C-64

January 19, 1995

SANCTUARY EDUCATION PANEL
STATEMENT ON THE ATOC DRAFT EIR/EIS

The Sanctuary Education Panel as a whole has chosen to take a neutral position on the proposed ATOC project. Individual panel members will comment separately to express their own opinions on the project independent of the SEP.

This panel is committed to providing objective educational information about the sanctuary and the corresponding management issues in a manner which encourages individuals to reach their own conclusions. We have consciously chosen to place our individual opinions and those of our respective facilities and agencies aside in order to model our goal of objectivity as an educational ideal for the sanctuary.

We do, however, recognize the potential educational value of the research proposed and will restrict our comments to this realm. The draft EIR/EIS states on page 4-8 that "research and education in this field will be stimulated" and on page 4-125 that "the potential for any effect on the education establishment in the area will only be positive in nature". We are in basic agreement with these statements.

Our concern is for the lack of substance and content directed to potential educational components of the proposed research in this document. We strongly recommend the incorporation of a significant
1 educational component into this program. A clear commitment to public education is needed in this research protocol to fully accomplish sanctuary goals of education, research and conservation integration. Sec. 4.5.1.1 TC

We see remarkable potential for the marine mammal research component of this project, both from the scientific and the educational standpoint. We see this as an opportunity to use the project as a model for the integration and collaboration of scientists, educators, the community, students and agency policy makers.

We are on the cutting edge of a new wave in science education in the Monterey Bay Region. Institutions, facilities and schools are joining forces to make science real for students and to create future environmental stewards for our sanctuary. In the immediate future many local schools will be connected to research facilities via a high speed telecommunications network, through the Destination

Tomorrow/Calren program. Already a sanctuary education electronic bulletin board is in place in local schools.

What these programs need are scientists to provide access to their data for students to explore and manipulate and learn about the process of science. What better and more intriguing data than the results being generated from the ATOC Marine Mammal Research Program? By making real-time data on our local marine mammals available to teachers, students and interested community members through education efforts, the positive potential for this project increases exponentially.

We strongly recommend that, if the project is approved to proceed, a formal research education component be incorporated into the project. Through this type of effort we can further sanctuary goals of research, education and informed management.

Dorris Welch-Burman, Chair
Sanctuary Education Panel

C-64

POINTS RAISED BY THE CONSERVATION WORKING GROUP (CWG) ON THE ATOC PROJECT DRAFT EIS/EIR SANCTUARY ADVISORY COUNCIL MEETING 1/20/95

o The CWG strongly supports scientific research within the Monterey Bay National Marine Sanctuary. We are especially supportive of research that results in effective solutions to Sanctuary-related management problems.

o The CWG is very concerned about the potential impacts of low-frequency sound from a variety of already existing sources (especially ship traffic) on marine life. One extremely positive outcome of the debate around the ATOC project is that it has heightened awareness about this issue. Our preference would be for a study to be designed and executed specifically for the purpose of assessing effects on marine life of these existing sound sources. This is a vital area of inquiry, separate from the sole objective of ATOC to measure changes in the temperature of the oceans over time.

o The CWG does generally support the overall goal of the ATOC project to track and model global climate change. However, given the project's global scope, long time frame, its location, and most of all, its uncertainties, the CWG believes that a cautious approach is a prudent approach. We simply do not know what the potential impacts of this sound source are. The DEIS repeatedly concludes that if no evidence for significant impacts exists, the impact is nonexistent. This is a leap of faith which is of concern to many of our conservation working group members and other conservation organizations that provided testimony at the public hearing earlier this month. What conclusions conservation organizations draw about what action to take in the face of those great uncertainties varies. Thus the CWG is not in a position today to put forth a specific consensus position in opposition to/or in support of this project. But what we can communicate today is that there continues to be concern about this project. There are many groups that continue to favor the use of sites that would minimize exposure of marine mammals to the ATOC sound source, well away from protected areas such as the sanctuary. All CWG members agree that the time allotted to review the DEIS of this complex project prior to the public hearing was completely inadequate for making substantive comments at the hearing. Each individual organization on the CWG, as well as many others, will be submitting their own detailed written comments on the DEIS by the end of this month.

2 I-6k

3 I-4b

o The proposed location of the sound source in the Sanctuary does warrant special consideration of the potential impacts on legally protected Sanctuary resources. We support the NEPA and CEQA procedural requirements mandating an environmental assessment. This process is critical to giving the community the tools to consider whether the benefits expected from this project outweigh the risks to marine life.

4 I-4a

o The MMRP — the pilot project and monitoring program — is the proposed tool to investigate and assess the effects of the ATOC sound source on marine life. Thus it is a vitally important tool. Questions have been raised about the relatively short duration of the pilot project (6 months). The CWG is particularly concerned about gaps in the areas of research oversight and monitoring. Unfortunately, the relationship of the pilot project to the initiation of the two-year ATOC feasibility

5 I-6b

study is not clearly defined. For example, as it stands in the DEIS, the criteria for changing project operations should impacts be detected are ill-defined and thus subject to interpretation. Improvements are needed in defining the criteria to be used in determination of significant effects, in defining how a violation of that criteria will change project operations, and in defining who will make determinations of impact. Details and a timeline are needed which address how much time will be devoted to statistical analyses of pilot study results, peer and oversight review of those results, discussion of modifications to the MMRP and potential for extending it in the face of unanticipated results, and for assurance that those modifications will be made before the start of the ATOC climate-phase research. Other than a two-day workshop that would be convened to present and discuss the project findings, there is no protocol to specify how the results of this study will be used to modify, or stop the ATOC project in the event that adverse impacts are detected. Moreover, the evaluation of data from the MMRP, and determination of significant impacts, must be made by a technically qualified group independant of the project, and must be released for public review.

6 I-6k

o Finally, the limits of the statistical power of the pilot project must be recognized, and the monitoring program must be capable of detecting short- and long-term impacts not resolvable by the pilot project. This type of monitoring program must be a prerequisite to initiation of long-term ATOC operations. This must include a mechanism whereby unacceptable effects on marine life detected in the monitoring program would result in changes in project operations.

Submitted On Behalf
of the Conservation Working Group, (CWG)
by Rachel T. Saunders, Center for Marine Conservation
Chair, CWG

Concerns Raised by the Public

The following concerns regarding the ATOC Draft EIR/EIS have been brought by the public to the attention of the Sanctuary Advisory Council:

7 - segmentation of the Hawaii and California Draft EISs I-2

8 - composition and authority of the oversight committee; who are those people going to be Attach. C-8

5 - the short duration (six months) for pilot project on marine mammal component I-6b

6 - how would "adverse impacts" be defined or measured; specifically what standards will be used I-6k

9 - opportunity for public review after the initial Marine Mammal Research Project and prior to full ATOC study kicking in TC

10 - how would a halt be called or ensured if deleterious effects on marine life are indeed detected TC

11 - full exploration and evaluation of alternate sites Sec. 2.2.3

January 29, 1994

25526 Carmel Knolls Drive
Carmel, California 93923

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics Inc.
4 Crystal Park, Suite 981
2345 Crystal Drive
Arlington, VA 22202

Dear Addressees:

The proposed ATOC experiment is not as simple as it sounds, nor is it likely to demonstrate any capability as a means of measuring any trend in global ocean warming, even when expanded to criss-cross all the world's oceans.

The conduction and detection of sound propagation in the sea, over long distances, involves many variables and complications. These limitations are outlined in my white paper which critiques the ATOC proposal, refers to the wealth of data already produced by systems which continue to monitor the global oceans, and suggests that the ATOC proponents be obliged to carry out some "proof of concept" demonstrations by computer simulations using long-range acoustic propagation models and actual monitored and analysed resolutions of ocean variability distributions. These models compute for any specified route the distant arrivals of a multiplicity of the source signal in varying orientations, time lags, and intensities - - more information than could be resolved by any hydrophone array. Examination of such data reveals the general futility in this approach to measuring ocean temperature.

1 I-3d

My White Paper, dated May 26, 1994, was presented to the Monterey Bay Marine Sanctuary Advisory Council, meeting May 27, 1994, and also sent to the UC San Diego Campus Planning Office with cover letter, June 24, 1994. Enclosed is a copy of the White Paper and the cover letter.

The ATOC Draft EIS/EIR, dated November 28, 1994, provides no substantiations to back up astounding claims for categorically measuring ocean temperature. Nor does the Draft do justice to the wealth of alternatives in place, for monitoring ocean temperature variabilities. The premise that "The travel time is a direct measure of the large-scale average temperature between the source and receiver." is unfounded. The travel time relates to the variable path, undulating depths, and traversed temperatures and salinities. Furthermore the paths and signal arrivals are multiple; it is doubtful that this can be sorted out because the paths vary from moment to moment, day to day, season to season, and year to year.

C-65

The only substantiated claim that the Draft makes is that "....low frequency sounds broadcast in the deep sound channel can be detected over great distances." In one paragraph (page ES-3) the draft admits that ATOC may fail to provide any useful climatic information because of the inherent complexities.

It is unfortunate that concern for the marine habitat has taken the spotlight away from the fatal flaw in the ATOC proposal: Ocean temperature cannot be resolved over long ranges by acoustic transmission. It has been tried, and will probably be tried by others who will stumble on this "bright idea".

I find the whole ATOC pitch to be arrogant and insincere, especially in linking the project to long term global warming concerns. It will likely move ahead, hopefully not in the Monterey Bay Marine Sanctuary. The prize of thirty-five million dollars has created a lot of vested interests. Even some mammal concerns appear willing to accept support to study the effects. DoD via ARPA funding will maintain some ocean-acoustic monitoring systems and efforts in signal processing. The opposition has little power against these forces. It is a pity that so much disturbance and division continues to be generated by so unworthy a proposal as ATOC.

Sincerely,

Manfred M. Holl

Manfred M. Holl, Ph.D.

Sent by overnight mail.

Copy: Karin Strasser-Kaufmann
Chair, Sanctuary Advisory Coucil

Sam Farr
Member of Congress

June 24, 1994

Manfred M. Holl
25526 Carmel Knolls Dr.
Carmel, California 93923

Ms. Marilyn Cox
Campus Planning Office, 0086
9500 Gilman Dr.
University of California at San Diego
La Jolla, California 92093

Dear Ms. Cox:

I'm quite disturbed about the merits claimed by the promoters of the ATOC Experiment. My concerns are detailed in the enclosure which I prepared for, and presented to, the Monterey Bay Marine Sanctuary Advisory Council, meeting May 27, 1994.

ATOC claims an astounding capability for categorically measuring ocean temperature. My colleagues and I are wondering what the EIR will offer in the way of explanations and substantiations. In particular, how will ATOC account for variations of path, depth and salinity, in relating travel time to a mean ocean temperature and what would this mean temperature represent ? It is not enough to claim that changes in the travel time directly relate to temperature change along a direct path.

Sincerely,

COPY

Manfred M. Holl, Ph.D.

Enclosure: "A Critique of the Acoustic Thermometry of Ocean Climate (ATOC) Experiment", White Paper Draft dated May 26A, 1994, supplemented by a resume of the author's credentials.

cc: Karin Strasser Kauffman,
Chair, Sanctuary Advisory Council

C-65

WHITE PAPER: This draft update dated May 26a, 1994.

A CRITIQUE OF THE ACOUSTIC THERMOMETRY OF OCEAN CLIMATE (ATOC) EXPERIMENT

The ATOC experiment is not as simple as it sounds, nor is it at all likely to demonstrate any capability as a means of measuring any trend in global ocean warming, even when expanded to criss-cross all the world's oceans.

The time it takes for an acoustic signal to travel from a source at point A (e.g., the Sanctuary) to hydrophones at point B (e.g., off Hawaii) is length of path divided by the corresponding mean sound speed along the traversed path. The path taken by the signal, however, is not direct. It weaves its way, arriving at distant hydrophones not just once but several times, overlayed, and spread over a span of time. And the mean speed along any path is not directly related to any meaningful mean temperature.

The speed of sound in the sea increases, very nearly linearly, with temperature, salinity, and pressure (i.e., depth). Salinity has less leverage than does temperature but does vary by water-mass distributions in space and time. (There is relatively little data to resolve salinity variability in the world oceans.) The depth dependency of the sound speed is paramount. As for the temperature it is generally warmest at, and near, the sea surface where solar warming and heat exchanges with the atmosphere take place. The temperature decreases with depth at a rate which overwhelms the effect of increasing pressure on the sound speed; accordingly the speed decreases with depth. Then, as the temperature begins to level off, the depth effect takes over and increases the speed all the way to the sea bottom. The intermediate depth of minimum speed is an effective sound channel because sound passing through this depth from above or below is refracted back again to recross this level over and over again. This speed profile is an oversimplification in that the temperature does not decrease smoothly from the surface downward: there may be several mixed layers, single and multiple thermoclines, and water-mass fronts and other current-related complexities.

A sound pulse fans out from a source location as a wavefront; the travel of any element of a wavefront defines a path or track called a ray. The emitted downward spread of rays is gradually bent (i.e., refracted) upward to cross levels of minimum speed to be subsequently bent downward again; the upward spread from the source reverses the phases of undulations. As a result the wavefront continuously folds on itself producing caustics (i.e., the folds) and focusings (i.e., sound intensity maxima). Pathways are further complicated for those rays which reach to reflect from the sea surface or ocean bottom; repeated reflections damp out the intensity of these rays. Because the signal follows a spread of pathways, through different temperatures, depths, and distances, the signal arrives at a distant hydrophone in a scatter of angles and arrival times.

Pathways cannot be distinguished by arrival angle because the medium traversed is continuously changing in time due to water movements such as internal waves, ocean currents, upwelling or convergence subsidence, and wind-wave-action mixing near the surface. In its traverse from point A to point B a ray meanders through depth ranges which vary along its course and in time.

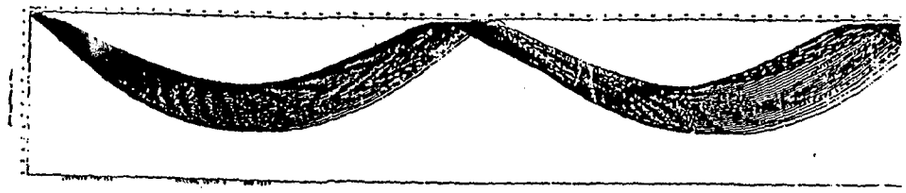

Figure 1. Example of ray tracing for a source at 350 feet and a common sound-speed profile. The depth scale is in thousands of feet (0 to 14) and the range is in miles (0 to 54).

Assuming that a signal-arrival time for a ray can be pinpointed, what has been the distance traveled? If an estimate of the distance could be assumed based on some path statistics what then is the value of the mean temperature along the path? How to separate out the speed variabilities due to the depth undulations? Salinity variability must also be taken into account.

There are additional complications.

While undulating in depth the path is also subjected to horizontal refraction due to transverse gradients of sound speed. The resulting track bows and/or weaves on its way to the hydrophones, depending on anomalies ranging from transient to semi-permanent features including any thermal fronts and eddies. This effect also varies the path traveled from A to B.

Another limitation of ATOC is that the sound in travelling from A to B does not sample the full range of ocean depth along the route, nor does it uniformly sample any one depth along the entire route. A sound source emitted in the cooler upwelling region off Point Sur will be refracted to stay below warmer water regions on route to Hawaii. The depth to which the sound travels will also generally be limited over much of the route.

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Weather in the oceans is comparable to weather in the atmosphere. Major ocean currents are primarily the result of the earth's rotation and the dimensions of the oceans. These currents are strongest near the surface and carry heat energy from low to high latitudes: the return southerly flows to the east are broader and weaker. Major currents, such as the Gulf Stream in the Atlantic and the Kuroshio in the Pacific, are not steady but vary in strength, breadth, and position. They meander and shed pools of warm water to the cooler side, and cold eddies to the warmer sides. These eddies generally drift and decay to match ambient properties. There are also variable deep counter currents.

Winds at the sea surface transfer momentum to the sea producing not only waves whose mixing action results in single and multi mixed-layer depths, but also produce such major effects as coastal and open-ocean regions of upwelling and of subsidence, and anomalous surface currents and phenomena such as El Nino, with durations and effects extending into seasons and years. Internal wave motions, on the other extreme, have periods measured in seconds.

Due to these natural variabilities the travel time for sound from point A to B will vary from pulse to pulse, day to day, within seasons, and year to year. If finding a trend is the only justification for ATOC, how long would it take? What would a trend occuring over a decade, on one route, indicate? If one could detect that the A to B route is warming it may only be due to an excess of warming sections over cooling sections along the route, and offset by regions of cooling outside the route.

To establish an overall trend of ocean warming the heat budget over a large three-dimensional volume of the ocean would have to be mapped and monitored over time, ideally extending over entire oceans and all oceans. Is the ATOC concept meant for this task? Where would sound sources and hydrophone arrays be required in order to criss-cross all corners of the oceans and in what multiplicity? Where can all the ideal sea-mount sitings be found? Consider the cabling requirements, the recording and computer processings. The concept is absurd.

Just what does ATOC hope to accomplish with respect to Global Warming? The assumption is that the Greenhouse Effect of increasing greenhouse gases in the atmosphere will result in a warming trend in the oceans. (An opposing theory is that the Greenhouse Effect will cause more cloudiness to block solar radiation to the sea.) If more heat energy were to enter the sea the result would not necessarily be to raise the heat content: the consequences might be other, such as strengthening the major currents which carry thermal energy from the tropics to polar regions to increase ice melt and warm northern climates. The point is that we don't have much idea about how the oceans, and the atmosphere for that matter, will respond to increases in greenhouse gases.

Climate changes have been occuring throughout the ages from year to year, decades to decades, centuries to centuries, and ages to ages. Some regions experience draught while other regions are flooded. Areas which were once forested are now deserts. Ice ages have come and gone, replaced in turn by warming eras. What were the causes?

Atmospheric weather is strongly affected by the sea-surface temperature, and the sea responds to atmospheric influences such as the surface wind, and to other factors at a slower rate. The atmosphere and oceans are a coupled system. The study of climate changes is complex; the science continues to learn about additional processes which play significant roles, including processes in the biosphere and in the chemistry and physics of the air and sea. But what complex of signals should we anticipate as a result of the Greenhouse effect?

,now

One hope at this time lies in the continuing development of comprehensive computer models of our global system, by several institutions. These models will never be perfect. They differ in design and detail, and will give diverging consequences to adding greenhouse gases to the atmosphere, but they should reveal some notions as to what signals to look for in the atmosphere and oceans. In any case the natural place to look for ocean warming is at the sea surface and this is being well monitored by several agencies in the US and internationally. The sea-surface temperature variability is a major cause of regional climate variations. The current sea-surface temperature distribution over the oceans is an essential input to computer models applied in weather prediction.

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The oceans are being monitored by several agencies in this country and abroad. US programs began rapid development in the 1960's as part of Anti-Submarine Warfare (ASW) defence work. These programs centered on sound propagation in the sea, emphasizing the development of computer programs for mapping sound propagation, and the development of ocean observation and data collection systems and computer analysis systems for analysing temperature and producing sound-speed distributions in all oceans in timely, frequent fashion. (I was closely associated with the development of these capabilities at the Navy's Fleet Numerical Meteorology/Oceanography Center, from 1961 to 1981 as R & D contractor, and later in other capacities until retirement at the end of 1990.)

In mapping sound transmission, by ray tracing, many processes were taken into account. The Long Range Acoustic Propagation model was used with derived sound-speed cross sections over distances including the proposed ATOC route, to map listening ranges, yielding signal arrival angles, travel times, and intensity losses. The novel "The Hunt for Red October" by Clancy, served to acquaint the public with previously-classified ocean sound monitoring capabilities. If there had been any sense in attempting to measure ocean temperature by sound propagation this intensive work would have noted it. Besides, so much direct data was coming out of ocean temperature monitoring systems.

Operational three-dimensional analyses of ocean temperature distributions for a given span of time, are primarily based on concurrent in-situ observations measured during the interval as close to the synoptic time as manageable and collected by satellite relay and other means. Reference climatic baseline analyses are made from archived collections of observations. The Master Oceanographic Observations Data Set (MOODS) contains about four-million temperature site-profiles, down to several hundred meters on average, taken since the turn of the century. The years with greatest coverage are from 1960's into the 80's. The Comprehensive Ocean Atmosphere Data Set (COAD) includes about one-hundred-million reports of sea-surface temperature. The distribution of these observations primarily reflects shipping lanes.

The Navy's Fleet Numerical Oceanography Center in Monterey has been analysing ocean temperature fields in three dimensions daily, for northern and southern hemisphere oceans, for years, on coarse numerical grids. Many regions are also analysed routinely using finer grids. The Navy uses these fields to map sound propagation and, inversely, listening coverage of fixed and deployed hydrophones, by applying acoustic propagation models.

The daily distributions of sub-surface ocean soundings (i.e., in-situ temperature profiles measured by BathyThermographs) are sparse but the information is cumulative: the history fields compiled from FNOC analyses are based on hundreds of thousands of BT's and millions of surface temperature reports. Compilations of eight years (1980-87) of Northern Hemisphere fields, and four years (1985-88) of Southern Hemisphere fields, compiled by the NOAA group in Monterey, show the extent of the large variabilities from month to month and year to year. The oceans are covered with warm and cold anomalies of various scales in space and time: El Nino is a good example of a large scale anomaly.

• • •

Measuring the travel time of sound for the purpose of determining ocean temperature along the route was proposed more than a decade ago in some quarters, and was termed Acoustic Tomography. After much expenditure and no heralded success the promoters have now resurfaced by seeking more funding in the cause of alerting us all to Global Warming. ATOC spokesmen leave the impression than the oceans' temperature has never been taken, that alarming ocean warming may be occuring, and that ATOC is the only way to measure it. Unfortunately they have the advantage of an uninformed public who are stricken with the sorry prospect that the Sanctuary has to be violated. ATOC is an academic exercise which, at most, may make a minor contribution to the study of sound propagation in the sea.

Before ATOC may be permitted to operate their boom boxes in the seas they should be required to produce some "Proof of Concept" demonstrations by simulating the experiment using ocean temperature and salinity data and comprehensive ocean acoustic propagation programs, to the satisfaction of non-vested peer reviewers. This is in addition to producing an acceptable Environmental Impact Report. What must be determined is what contribution can the ATOC system make in conjunction with all other concurrent observations including BT's, synoptic surface reports and sea-surface IR imagery taken by satellites.

Sincerely,

Manfred M. Holl, Ph.D.

P.O. Box 221363
Carmel, California 93922
January 28, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

I am a Big Sur resident concerned about possible long-term cumulative impacts of the proposed ATOC sound transmissions on marine organisms. I attended both hearings in Santa Cruz and have read a substantial portion of the Draft EIS/EIR. While it is clear that the ATOC team has been responsive to public criticism (as evidenced by the reduced duty cycle), the language of the DEIS is sometimes misleading and the presentation unbalanced. Three factors bring the objectivity of the DEIS/EIR into question:

1. The order in which ideas appear in a sentence or paragraph suggests a reversal of priorities, i.e., greater emphasis is placed on the MMRP than ATOC itself, giving the impression that the former is being used to *justify the latter*. For instance,

1 TC

> The goals of the ATOC program are to evaluate potential effects of the ATOC low frequency sound transmissions on nearby marine animals . . . and [emphasis mine] to prove the feasibility of the acoustic thermometry technique for future global ocean climate monitoring programs. (Introduction, p. 7)

I find it curious that the MMRP objective is stated *before* the ATOC objective, In a similar vein, we read that

> Transmissions on that day would last for 20 minutes every 4 hours, which is necessary to study the potential effects on marine mammals . . . (Introduction, p. 5)

2 thus giving the impression that marine mammal studies are the driving force behind the ATOC program. The uncritical reader might infer from this, and from similar statements sprinkled throughout the document, that the principle purpose of the program is to monitor the effects of noise pollution in the ocean, rather than to add to it. I-17

2. The frequent use of language that minimizes or trivializes program impact appears designed to deflect legitimate public concern. For example,

3 TC

> The source sounds would also add *somewhat* [emphasis mine] to the ambient noise levels in the vicinity of the sound source, but *only* during the 2-8% of the time it would be operating. (Executive Summary, p. 10)

Numerous references to existing noise pollution from supertankers, drilling operations, etc., seem to say "Look, this is just a little drop in the bucket." But it is clear from testimony at the hearings that some marine biologists already observe negative impacts,

C-66

such as lowered birth rates, from current noise pollution. These concerns are nowhere reflected in the DEIS/EIR.

3. The misleading use of statistics is perhaps yet another attempt to deflect criticism. Regarding possible encounters of fin, blue, and sperm whales with the ATOC source, we read that

> Statistical analysis gives the estimate that, with a 2% duty cycle, one whale would be exposed to ≥150 dB levels less than once every hundred years. (Executive Summary, p. 8)

and

4 TC

> . . . even elephant seals are sufficiently rare that close encounters with the ATOC source would be unusual (less than one animal exposed to levels of 150 dB or greater, on average, every ten years at a 2% duty cycle). (Executive Summary, p. 9)

While I am not a statistician, I find these statements highly suspect. I've looked unsuccessfully for some explanation of how the authors arrived at these statistics. Do these statements assume that known members of target species are evenly distributed across a given section of ocean? How can we be believe in the validity of such "statistics" when in Section 4.3 we read again and again of how little we know of the distribution and underwater activities of these and other species?

In reading the DEIS/EIR, I am reminded of the commonplace that an investigator is likely to find what he or she expects to find. An environmentalist opposed to a proposal will expect to find adverse impact where the initiating agency does not. A number of statements in the DEIS/EIR reflect the underlying assumption that the ATOC transmissions will have no significant impact. This assumption does not always proceed logically from the immediately preceding material. For instance, in the Executive Summary we find

5 TC

- Sperm whales—relatively little is known about their activities at depth.
- Northern elephant seal—their low frequency hearing capability has yet to be tested.
- Leatherback sea turtles—their density at the proposed source is presumed low.

Yet on the very next page we read the conclusion that in regard to these species, "significant impacts are not anticipated." We find the same conclusion again and again in the discussion of individual species in Section 4.3. The "no-impact assumption" underlies the following statement, in which the order in which the ideas are presented is of particular interest:

> Available information from the limited research carried out to date on the potential effects of low frequency sound on marine animals . . . either indicates minimal impact should be expected from the proposed ATOC sound transmissions, or the measured data are so sparse that the possible effects must be stated as uncertain. (Abstract)

It would be more logical, indeed, more honest, to turn the statement around and add another possibility so it reads as follows:

Available information from the limited research to date . . . are so sparse that the possible effects must be stated as uncertain. This may indicate that minimal impact should be expected, *or, that there may be significant unforeseen impacts.*

This is the possibility that receives little or no discussion in the DEIS/EIR.

In conclusion, I believe that the Draft EIS/EIR contains a built-in bias that minimizes potential causes for concern and contains unwarranted assurances that the program will *not* have adverse impact on marine organisms. I'm not convinced that a six-month MMRP Pilot
6 Study is sufficient to determine possible long-term impacts of ATOC and GAMOT transmissions on target species, let alone on all the species that do not fall under its scrutiny. While I believe a study such as the MMRP research already underway is needed to assess impacts of existing manmade noise pollution on marine organisms, I urge the National Marine Fisheries Service to deny ATOC's application for a Scientific Research Permit. I-6b

Sincerely,

Jean Widaman

Jean Widaman, Ph.D.

cc: National Marine Fisheries Service
Representative Sam Farr

RECEIVED
1-30-95

Advanced Research Project Agency
Marine Acoustics, Inc.
2315 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Clayton Sykes:

I am writing to express my opposition to the ATOC project.

Since it seems that both the impacts and the benefits are uncertain — why do it?

Would you submit yourself to such an experiment based on the sequencies of this study?

How would you like it if a fire alarm was set off in your house and you couldn't do nothing to escape the blaring alarm?

Well, I've asked you 3 questions — do you have any answers? (oops, one more question),

Sincerely,

Mike A. Dunn

Austin, TX.

C-68

RECEIVED
1-30-95

Advanced Research Project Agency
Marine Acoustics, Inc
2345 Crystal Dr.
Arlington VA 22202

Clayton Spikes,

I'm writing to oppose the Acoustic Thermometry of Ocean Climate project.

The adverse effects this project could have on marine life (i.e. whales dolphins etc.) are not only uncertain, but it seems to me that it ~~seems~~ adverse effects are probable. The Ocean eco system is already damaged enough by all the pollution that's cuccently being dumped into it without adding noise pollution to the mix.

1 If the ATOC experiment is intended to study global warming then the public has the right to know every aspect of the experiment. I-1

Is the ATOC a military experiment? I demand to know.

Sincerely,

Shaun Stenshol

P.O. Box 684694
Austin TX 78768-4694
512) 469-0431

C-69

RECEIVED
1-30-95

Advanced Research Project Agency
Marine Acoustics, Inc
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes:

Please stop the ATOC project. The effects on marine mammals could be very great. If the intentions of this project is to deal with climate change. then it should be delt with directly. The $35 million could be used to fund clean energy and energy efficiency. Thank you for your time. I know you will do the right thing.

Sincerely yours,
Sean Dawson

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

RECEIVED
1-30-95

To Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The Draft Enviromental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed. 1

Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS as uncertain. It is impossible to estimate the irreversible effects of high decibel, low fequency sound on marine mammals such as gradual deafness and damage to reproductive and immune systems. I-15

Scripps Institute has received 35 million dollars from DOD to research global warming. If global warming was the true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other responcible 2 I-1

efforts to reduce our impact on global climate. The "classified" nature of ATOC project indicates that it has nothing to do with global warming, and suggests that ATOC is a military operation to imp submarine detection, and make use of SOSUS listening arrays which would otherwise be shut down.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely Yours,

Rebecca Ivy

Rebecca Ivy

RECEIVED 1-30-96

Mr Spikes:

Where do you get off claiming that you went to research global warming trends by using low frequency sonard. It sounds more likely that there is some military reasoning behind it because if you were truly concern about global warming trends you should be pushing hard for clean, alternative
1 energies like solar and wind. How much more damage should marine life have to endure at the hands of people like you? You reap what you sow Mr. spikes and if you ~~truly~~ don't want to return as ~~some~~ a cockroach, I suggest you come clean with your true intentions and do something that is truly worthwhile for the well being of human kind, animals and the environment.

Sincerely

Virginia L. Dollar

Virginia L. Dollar
5854 Wildwood Ln.
Douglasville, Ga. 30135

RECEIVED 1-30-96

Clayton H. Spikes
Advanced Research Project Agency
Marine Acoustics, Inc.
2348 Crystal Drive
Arlington, Virginia 22202

I am in opposition to the ATOC project of inputting sound waves through to ocean, under the guise of Global Warming Research. There is no way to estimate the damage to Marine
1 Mammals and other ocean life. Do not inflict this torture on I-1 species that you are not willing to endure yourself. There is widespread belief in the public that this is just a military experiment on detecting submarines. I would appreciate a response on this matter. Thank you in advance.

(Jim Lawrence)
9649 Sunnyside Ave N.
Seattle WA 98103

C-73

RECEIVED 1-30-95

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

Jan. 24, 1995

Clayton H. Spikes,

I am opposed to the ATOC project. The Draft Environmental Impact Statement is inadequate to allow ATOC to proceed.

We are uncertain what effects this project will have on marine life and the research benefits this will give us.

I think the 35 million dollars that Scripps Institute has received for research on global warming would be best spent on studying energy efficiency and other efforts to reduce our effect on the global climate.

Sincerely,
Patrick Tim

C-74

RECEIVED 1-30-95

Advanced Research Project Agency
Marine Acoustics Inc.
2345 Crystal Dr.
Arlington, Virginia 22202

To Clayton H Spikes,

I am completly opposed to the ATOC project. Global warming is a fact, all agree, wake up and smell the coffee and quit spending all our money on stupid hair-brained ideas like this.

Thank you for your consideratio
Byron Frank Hsu

C-75

RECEIVED 1-30-95

Dear ATOC:

It has come to my attention that you plan to broadcast "loud" underwater sounds in Monterey Bay. It seems that your rationalization for doing this is unfounded.

As I understand it you want to conduct this experiment in order to learn more about global warming. It seems to me that we already have ample information to suggest a warming trend around the world.

I have also heard reports of some funding for you coming from the Pentagon. Could it be that this experiment has some military interests behind it. If so I urge you to reconsider your actions. This experiment will be damaging both to the mammals, or any fish, with sonar. As I'm sure you realize. Stop the trend!!

1

2

Sincerely,

Kenneth E. Thompson
2727 NE 55th St.
Seattle, WA 98105

C-76

RECEIVED 1-30-95

To Clayton H. Spikes:

I am appalled with the ATOC project; the Draft Environmental Impact statement is inadequate to allow ATOC project to proceed.

I believe that the risks to marine animal life by high decibel testing outweigh the "uncertain" benifits of the testing.

Scripps Institute has received .55 million dollars from the DOD to "research global warming;" however, if global warming was the true priority, then the expenditure of tax dollars would be better spent on clean energy.

It is clear that the true intentions of ATOC have not been revealed to the public & further analysis must occur before this project is allowed to proceed.

Sincerely,
Thomas Willaid

P.S. I would appreciate a respond.

Thomas Willaid
4235 12th Ave NE #104
Seattle WA 98105

C-77

RECEIVED 1-30-95

Clayton H. Spikes,

I am writing in regards to the ATOC project. I am opposed to this proposal because of the unknown effects it will have on Marine mammals. My understanding is that it is to research global warming. Wouldn't the 35 million dollars be best
1 spent on clean energy sources or research on alternative energies? The 35 million I-1
dollars is from the DOD. It's seems suspious that the department of defense is interested in global warming. Perhaps ATOC is a military operation to improve submerine detection and make use of the SoSuS listening arrays which would otherwise be shut down, but of course our own government wouldn't lie to us, would they.

Sincerly

Shri Russell
8731 Phinney Ave N. #3
Seattle, WA 98103

C-78

RECEIVED 1-30-95

1/24/95

From: Trevor Koug
207 1/2 10th Ave
Seattle, Wa 98

Mr. Spikes,

I am writing because I am concerned about the ATOC program to test for global warming. My first concern is for the marine mammals. As you know, whales and dolphins use sound for communication food finding, and food stunning and the ATOC may disrupt these capabilities.

My second concern is global warming. The evidence
1 that global climate change is happening continues to mount. I-36
Floods, droughts, hurricanes, and changes in traditional weath patterns are increasingly frequent. One more study is just going to take ~~time~~ precious time and resources wha the world needs action. Alternative energy resources are readily available, like solar and wind power, and we should invest more in research and development of newer, safer, more efficient sources of energy.

Also, it has come to my attention that the ATOC I-1
2 is partially classified, which is ridiculous. Global warming research should be shared with the population of the world because it's a planetary problem. Classified equipment and results of studies suggests to me that this may be a partia military operation.

Please delay the ATOC project until it's intentions are fully available to the public and the world.

Patiently I am awaiting a response,

Trevor Koug

RECEIVED 1-30-95

To Clayton H. Spikes:

I am writing to express my opposition to the ATOC project.

Both the adverse impacts to marine life and the "research benefits" are stated
1 in the DEIS as uncertain. It is I-11a
impossible to estimate the irreversible effects of high decibel, low frequency sound on marine mammals, such as gradual deafness.

Since the DOD has given 35 million
2 dollars to the Scripps Institute for I-1
the ATOC project. It is clear that this project has nothing to do with global warming.

I would like a response.

Sincerely
Brian S. Beneke
830 BARNETT St.
Apt 6
Atlanta, GA 30306

RECEIVED 1-30-95

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS, INC.
2845 CRYSTAL DRIVE
ARLINGTON, VIRGINA 22202

I AM OPPOSED TO THE ATOC project. THE DEIS IS NOT ADEQUATE TO ALLOW THIS PROJECT TO PROCEED.

THE IMPACTS TO MARINE MAMMAL POPULATIONS IS NOT UNDERSTOOD. IF GLOBAL WARMING IS THE PROBLEM, SPEND THE $35 I-1
1 MILLION ON CO_2 REDUCTION. WHEN WE REALLY KNOW THE NAVY IS PUMPING MONEY FOR SUBMARINE DETECTION WE SEE THE REAL ISSUE. STOP THIS PROJECT.

SINCERELY
Daniel J. Rod
835 NW 80TH
SEATTLE WA 98107

C-81

RECEIVED 1-30-95

1265 Briarcliff N.E.
Atlanta, GA 30306
25 January 1995

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Dr.
Arlington, VA 22202

Dear Mr. Spikes:

I am writing to express my opposition to the ATOC project. I urge you to extend the public comment period.

Global warming has been proven many times over. Tax dollars would be better spent on clean energy, energy efficiency, and other efforts to reduce our impact on the global climate. The "classified" nature of the project indicates that it has nothing to do with global warming. It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

1 I-1

Sincerely yours,
Ann C. White
ANN C. WHITE

C-82 RECEIVED 1-30-95 1.24.95

To: Clayton Spikes,

I am in great opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) isn't strong enough, ~~and~~ as the adverse impacts to Marine life and the "research benefits" are uncertain. What I'd like to know is: Does the DEIS adequately justify the need for this type of marine mammal research?

1 I-15

It is obvious that proponents of ATOC are rushing the project along, so that the final EIS is scheduled for release only 30 days after the close of the public commentary period! This is not enough time.

2 I-142

Sincerely,
Laurent Lipkin

RECEIVED 1-30-95

Dear Mr. Spikes,

I am shocked and amazed that the Scripps Oceanographic Institute, in concert with others, is planning to spend $ 35 million of Taxpayer money to conduct
1 an experiment on global climate change. There are many I-3:b
potential adverse effects of this experiment, but in my mind this is beside the point. The simple fact is that signs of climate change are everywhere, from the increased incidence of El Niño to the inexplicable disappearance of an entire circulation pattern in the North Atlantic. If you want to give taxpayers their money's worth you should redirect this money towards stopping climate change.
Thank you for your consideration in this matter.

Yours for well-spent Tax money,

Robert Johnson
68 Waddell ST Apt. 2
Atlanta, GA 30307

RECEIVED 1-30-95

January 25, 1995

Clayton H. Spikes
Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

I am writing to express my opposition to the ATOC project and to urge an extension to the public comment period. It is my understanding that the purpose of the project is to research whether global warming is a reality. As such, it is a complete waste of valuable
1 tax dollars that could be used to target the known I-3:b
causes of global warming (aka "climate change"). Overwhelming scientific evidence clearly verifies that global warming is, in fact real, as well as imminent.

In addition, the Draft Environmental Impact Statement states that the adverse impacts to marine life as well as the research benefits from the project are uncertain, at best. To assess the potential irreversible
2 effects of high decibel, low frequency sound on marine I-1:5
mammals is virtually impossible. There is no need to risk devastating the life of our precious marine mammals in order to spend millions of tax dollars to prove something that is already backed by sound

scientific research.

The public is sick and tired of our tax dollars going to support research project after research project, report after report, assessment after assessment. WE DON'T HAVE ANY MORE "RESEARCH" TIME TO WASTE - WE NEED A GLOBAL WARMING PROJECT THAT INVOLVES IMMEDIATE ACTION TO PROMOTE CLEAN ENERGY, ENERGY EFFICIENCY AND OTHER SIMILAR EFFORTS.

Finally, the public is not as aware of this issue as is necessary to allow effective comments. I-142
Extend the period for public comments so that taxpayers have a chance to effectively assess the situation.

Sincerely,
Joanna Smith

334 Bill Ridledge Rd
Winder, GA 30680

RECEIVED 1-31-95

Mr Clayton A. Spikes,
I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project. The DEIS has reported its uncertainty in terms of possible damage to marine mammals.
You ought to be ashamed of trying to play god.
If you wish to address the problem of global warming, I suggest you redirect some money towards investigating clean an energy sources.

Sincerely,
Elisa Baker
18 Birch Cst.
Rochester, NY
14607

RECEIVED 1-30-95

Laura Marino
43 Birch Crescent Apt. 1
Rochester, N.Y. 14607

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Dr.
Arlington, Virginia 22202

To Clayton H. Spikes:

I am writing to oppose my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

1 Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS as uncertain. I-15
It is impossible to estimate the irreversible, effects of high decibel, low-frequency sound on marine mammals such as gradual deafness and damage to reproductive and immune systems.

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming
2 was the true priority, then the expenditure of tax dollars I-1
would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global climate. The "classified" nature of the ATOC project indicates that it has nothing to do with global warming, and suggests that ATOC is a military operation to improve submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis ~~must~~ must occur before this project is allowed to proceed.

I would greatly appreciate a response.

Sincerely yours,
Laura E. Marino

RECEIVED 1-30-95

TO CLAYTON SPIKES:

I AM OPPOSED TO THE ATOC PROJECT. IT IS CLEAR THAT THE ENVIRONMENTAL IMPACT STATEMENT IS INADEQUATE, AND THE PROJECT SHOULD NOT BE ALLOWED TO PROCEED.

BOTH THE ADVERSE IMPACTS TO MARINE LIFE AND RESEARCH BENEFITS SAID IN THE EIS ARE STATED AS UNCERTAIN. IF GLOBAL WARMING IS TRULY THE PRIORITY THEN WE SHOULD BE SPENDING ME MONEY ON LOWERING CO_2 EMISSIONS (AS WELL AS OTHER GLOBAL WARMING GASSES).

I AM ALSO CONCERNED ABOUT THE SOURCE OF YOUR FUNDING. IF DEPARTMENT OF DEFENCE IS WILLING TO LAY OUT $35 MILLION, SUCK CAN ALL BE
1 SURE THIS PROJECT IS NOT FOR ALTRUISTIC REASONS I-1
THIS IS OBVIOUSLY RESEARCH INTO SUBMARINE BASED TECHNOLOGY, AND OUTDATED TECHNOLOGY AT THAT.

AS A TAXPAYER I DEMAND THAT THE TRUE INTENTIONS OF ATOC BE REVEALED TO THE PUBLIC AND MORE ANALYSIS MUST BE CARRIED OUT BEFORE THIS IS ALLOWED TO PROCEED.

CASE EDWARDS IV

RECEIVED
1-30-95

January 26, 1994

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Dr.
Arlington, Virginia 22202

To Clayton H. Spikes:

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS are uncertain. It is impossible to estimate the irreversible
1 effects of high decibel, low frequency sound I-122,b
on marine mammals such as gradual deafness and damage to reproductive and immune systems.

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was the true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global environment and climate. The "classified" nature of the ATOC project indicates that it has nothing to do
2 with global warming, and suggests I-1
that ATOC is a military operation to improve submarine detection and make use of the SOSUS listening arrays

C-88

which would otherwise be shut down.

It is clear that the intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely Yours,

Michelle Roffman

Michelle Roffman
47 Nicholson St.
Rochester, NY 14620

C-89

25 Jan 95

RECEIVED 1-30-95

Mr. Spikes –

I am writing to express my opposition to the ATOC project.

I think the money would be more wisely spent on peace projects and energy efficiency aside from the unknown effects on marine life.

Sincerely,
Gerry Murdy
10478 Wayne Rd.
Livonia, Michigan
48150

C-90

RECEIVED 1-30-95

To Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the "research benefits" are stated in
1 the DEIS uncertain. It is impossible to estimate I-112,b
the irreversible effects of high decibel, low-frequency sound on marine mammels such as gradual deafness and damage to reproductive and immune systems.

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was the true priority, then the expenditure of tax dollars would be better spent on clean, energy efficiency, and other responsible efforts to reduce our impact on the global climate. The "classified" nature of the ATOC project indicates that it has nothing to do with global warming, and suggest
2 that ATOC is a military operation to improve I-1
submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely yours

C-91

TRACY GORTON
501 ALBERTA AVE
ROCHESTER NY 14609

Advanced Research Project Agency
Marine Acoustics, INC.
2345 Crystal Drive
Arlington, Virginia 22202

Clayton H. Spikes:

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS
1 as uncertain. It is impossible to estimate I-12a,b
the irreversible effects of high decibel, low-frequency sounds on marine mammals such as gradual deafness and damage to reproductive and immune systems.

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was a true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global climate. The "classified" nature of the ATOC proposed indicates that it has
2 nothing to do with global warming and suggests that ATOC is a military operation I-1
to improve submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down.

It is clear that the true intentions of the ATOC have not been revealed to the public and further analysis must occur before this proposed project is allowed to proceed.

Sincerely Yours,
Tracy Gorton

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS INC.
2345 CRYSTAL DRIVE
ARLINGTON, VIRGINIA 22202

C-92

RECEIVED
1-30-95

CLAYTON H. SPIKES,

I WISH TO EXPRESS MY CONCERN AND OPPOSITION TO THE ATOC PROJECT. THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) IS INADEQUATE TO ALLOW THE PROJECT TO PROCEED AS PLANNED.

TO START, THERE EXISTS THE "UNKNOWN" FACTOR OF ADVERSE EFFECTS ON
1 MARINE LIFE, AS WELL AS ~~THE~~ "RESEARCH BENEFITS". IT IS IMPOSSIBLE I-12a,b
TO ESTIMATE THE IRREVERSIBLE AND LONG-TERM EFFECTS OF HIGH-DECIBEL, LOW-FREQUENCY SOUNDWAVES ON MARINE MAMMALS, SUCH AS DAMAGE TO THE IMMUNE AND REPRODUCTIVE SYSTEMS AND GROSS DEAFNESS. THIS PROJECT COULD PROVE DETRIMENTAL TO OUR OCEANS.

IN ADDITION, THE SCRIPPS INSTITUTE HAS RECIEVED 35 MILLION DOLLARS FROM THE DOD TO "RESEARCH GLOBAL WARMING". IF GLOBAL WARMING IS TRULY THE PRIORITY, THEN THE USE OF TAX DOLLARS WOULD BE MUCH BETTER FOCUSSED ON ~~[illegible]~~ FURTHER DEVELOPING RENEWABLE ENERGY SOURCES AND ENCOURAGING/DEMANDING A MORE "LOW-IMPACT" LIFESTYLE IN DAY-TO-DAY LIFE. THE
2 "CLASSIFIED" NATURE OF ATOC IMPLIES THAT THIS HAS NOTHING TO I-1
DO WITH GLOBAL WARMING, RATHER A MILLITARY OPPERATION INTENDED TO IMPROVE SUBMARINE DETECTION, A GROSS MISDIRECTION/ MISSUSE OF CRUCIAL TAX DOLLARS.

DO PRIMARILY TO THE EGGETIVELY MISLEADING SECRECY OF THE PROJECT; I REQUEST THAT THE PROJECT BE HALTED.

SINCERELY

P McGuire

C-93

RECEIVED 1-30-95

Cynthia Simon
501 Averill ave.
Rochester, NY 14607

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Dr.
Arlington, VA 22202

To Clayton Spikes:

→ I oppose the ATOC project

1 * I demand an extension to the public comment period! I-142

2 * The long-term effects of this project cannot be determined! I-122

3 * The intentions of the project are unclear, I-1 and suspicious!

This is an outrage.

STOP THE PROJECT
GLOBAL WARMING IS PROVEN
DO NOT DESTROY THE OCEAN TO "STUDY" THE PLANET
& CONCEPT IGNORANT, ISN'T IT?

Cynthia Simon

C-94

RECEIVED 1-30-95

Dear Clayton H. Spikes. Jan. 26, 1995

At first I thought that the ATOC project was a good idea, but now my views have change. It's a great idea to use sound waves in the ocean to find if there has been a warming trend, but the question is will it effect ocean mamals?

Whales use these waters too. In fact they were there first. I urge you to stop the ATOC program until you can show proof that it doesn't pose a problem to the wild life.

Please consider the termination of the project until you study its effects on Whales and other sea mamals.

Sincerely,
Bill Sparks
139 Tobey Rd.
Pittsford, NY 14534

C-95

RECEIVED 1-30-95

To Clayton H. Spikes:

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement is too inadequate to allow the project to proceed as planned.

To begin, the adverse affects on marine life, as
1 well as the research "benefits" are described in the I-12a
DEIS as being unknown. It is impossible to determine the irreversible and long-term effects of high-decible, low-frequency soundwaves on marine mammals.

Furthermore, the Scripps Institute has received 35 million dollars from the Department of Defense to "research global warming." This combined with the fact
2 that certain aspects of the ATOC are "classified" by I-1
the pentagon leaves the study's true purpose much in doubt.

I urge you to make the ATOC's full purpose public, and extend the deadline of the public comment period. Anything less is unacceptable.

Thank you,

Michael Dugan

C-96

RECEIVED 1-30-95

January 27, 1995

ARPA
c/o Mr. Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

I am writing today to express my concern over the proposed ATOC experiments earmarked to be conducted in the national Monterey Bay Sancutary.

After reading the Environmental Impact Report as well as other literature published on ATOC, it seems that other alternatives which are less harmful to the fragile marine life are being overlooked. As a result, I have a few questions that I feel need to be answered before the experiment is carried out.

1. Have locations, other than the Sancutary, been considered? Have other experiments, in particular the one published in the New Scientist Journal (Winter 1994) that utilizes satellites and has the capablitity to monitor the oceans and provide information on temperture fluctuations much more effectively than the ATOC experiment could without the devastating side-effects, been considered? I-42a
2. Lastly, why hasn't the possiblity of conducting the experiment at 50 db rather than 190 db (which is significantly more damaging to the marine life) been seriously addressed and explored? I-52

Given the above, I implore you to do everything in your power to reconsider ratifying this dubious experiment until these questions are fully and adequately addressed.

Thank you for your immediate attention to this matter.

Sincerely,

[redacted]
749 Telly St.
Monterey, CA 93940

C-97

RECEIVED 1-30-95

1/29/95

Advanced Research Project Agency,
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes,

I am concerned that the Draft Environmental Impact Statement on the ATOC experiment is incomplete and the research benefits are, as stated in the Draft, uncertain.

I ask you: why risk permanent damage to marine mammals?

Please respond to this letter!

Sincerely,

Chuck Barbieri
1500 Dhu Varren Rd
Ann Arbor, MI. 48105

Advanced Research Project Agency
c/o Clayton H. Spikes.
Marine Acoustics, Inc.
2345 Crystal Dr.
Arlington, VA 22202

C-98

RECEIVED 1-30-95

Corey J. Conn
1621 South Blvd.
Ann Arbor, MI 48104

RE: ATOC : • inadequate DEIS,

1 • not effective in addressing climate change causes, I-3d

2 • inappropriateness of military secrecy to climate research. I-1

• NAVAL communications study subject to examination and termination per budget priorities.

CANCEL THIS LAME PROJECT NOW!

C-99

1/25/95
Santa Cruz, CA.

RECEIVED
1-30-95

Advanced Research Projects Agency
Mr. Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA. 22202

Mr. Spikes,

I have taken some time to peruse the Draft EIS/EIR for the ATOC project. It is an impressive document, quite lengthy, and I realize that its preparation must have taken a considerable amount of time. Still, it does not change the way I feel about the ATOC project. In my opinion, the planned ATOC project is one of the most useless, ridiculous and heinous proposals of the decade. I'm not even sure I fully believe that its purpose is to study global warming and/or the effect of sound on marine mammals. As a surfer I spend a fair amount of time with marine mammals. I don't need to bombard them with noise to know that they're not very fond of it. In fact, most fools who've been bit by a seal will sheepishly admit to having barked at it.

Seriously though, what *do* surfers know about the ocean and its creatures!? Our knowledge of the ocean does not come from studying scholarly books or journal articles and dissecting or observing sea creatures - either in labs or nature. Our knowledge comes from being - fully immersed in the oceans waters, doing - something that is inexplicable to someone who hasn't done it and feeling - alternately humbled and empowered by the raging waves. Have you ever stood in the curl of a wave Mr. Spikes? It is an unforgettable experience. You know you're in imminent danger yet somehow you feel secure. Time stands still as the water whirls around you and the thunderous roar can only be compared to the sound of a jet engine at take-off. Yet the roar of the waves is natural, not man made, and one of the only sounds that belongs in the ocean. Along, of course, with the cry of the gull, the underwater avalanche, the bark of the seal and the haunting songs of whales and dolphins. Man made sounds do not belong in the ocean - even in the interest of "science". To be brutally honest, Mr. Spikes, the complete experience of surfing is so sensual, so spiritual, so dynamic and exhilarating and such an active meditation that it makes scientific studies seem like only so much fluff and trivia.

We have polluted the oceans of our world for far too many years; with our toxic chemicals and radiation, our garbage and shit and the obnoxious noise of our machines. It is time to stop. I'm not sure what the real purpose behind the ATOC project is but the bottom line is...any further noise pollution of the ocean and subsequent harassment of her creatures is entirely unacceptable.

My contention is not that surfers know any more or less about the ocean than scientists or marine biologists but that our knowledge is very different from theirs. We enter Mother Ocean on *Her* terms and know Her power intimately. One thing all surfers know, deep in our hearts, is that the ocean and her creatures are a vast, inexplicable mystery. As surfer to scientist my suggestion is this: Let it go and let the mystery be.

Sincerely,

Paul Keegan

Paul Keegan

C-100

RECEIVED
1-30-95

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS INC.
2345 CRYSTAL DRIVE
ARLINGTON, VIRGINIA 22202

TO CLAYTON H. SPIKES:

I AM STRONGLY OPPOSED TO THE ATOC PROJECT PRIMARILY BECAUSE I AM NOT CONVINCED BY ANY DATA AVAILABLE THAT THE EFFECTS OF HIGH DECIBEL, LOW-FREQUENCY SOUND WAVES WILL NOT HAVE HARMFUL AND IRREVERSIBLE IMPACT ON MARINE MAMMALS.

THE 35 MILLION DOLLARS EARMARKED FOR GLOBAL WARMING RESEARCH IS AN ABSOLUTE WASTE SINCE I-3b
1 THERE IS ALREADY INDISPUTABLE EVIDENCE OF DRAMATIC CLIMATE CHANGE. PERHAPS THE FUNDS WOULD BE BETTER SPENT TO TRY REVERSING THE OBVIOUS TRENDS.

FINALLY, THE "HUSH-HUSH," CLOAK AND DAGGER ENVIRONMENT THAT SURROUNDS THIS WHOLE PROJECT
2 SEEMS TO SUGGEST AN UGLY ULTERIOR MOTIVE. I-1
MAYBE GLOBAL WARMING IS JUST A STRAW MAN & THE REAL GOAL IS TO SHORE UP THE MILITARY, i.e. IMPROVING SUBMARINE DETECTION AND TO SALVAGE THE OUTDATED SOSUS LISTENING ARRAYS THAT ARE PROPOSED FOR SHELVING. I DON'T TRUST THE INTENTIONS OF THE ATOC.

YOURS DISTRUSTINGLY
ALVIN R. GENDRE

C-101

RECEIVED 1-30-95

1/25/95

Clayton H. Spikes

I am outraged at the idea of the A.T.O.C project. East of all the research benefits are uncertain, at best! On top of this the 35 million dollars is earmarked from the DOD suggests that the DOD is not concerned about global warming. Since when has the DOD been interested in Global Warming? I feel the least you could do is extend the public comment period. But then again I would only expect you to extend the public comment period if you have nothing to hide.

1 I-1

Thanks,

Edward Salmond

30 [illegible]

[illegible] CA 92309

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS INC.
2345 CRYSTAL DRIVE
ARLINGTON, VIRGINIA 22202

C-102

RECEIVED 1-30-95

To Clayton H. Spikes,

I am writing to express my concern regarding the A.T.O.C. project. I would strongly urge for the public comment period to be extended. I urge this extention for the reasons following. The adverse effects of the experiment on marine mammals remains uncertain. The true intentions of the A.T.O.C. experiment remains unclear. If global warming is truly a concern, why not invest our tax dollars in clean renewable energy. I understand that certain aspects of the A.T.O.C. remain classified by the pentagon. This suggests to me that this is actually a military experiment designed to improve submarine detection. Therefore I feel further analyses should be made before we proceed.

1 I-1

Yours truly,
Kevin Kelly
KEVIN KELLY

KEVIN KELLY
85-23 56TH AVE
ELMHURST, N.Y 11373

C-103

Advanced Research Project Agency
Marine Acoustics. Inc
2345 Crystal dr.
Arlington, Va 22202

1-26-95

RECEIVED 1-30-95

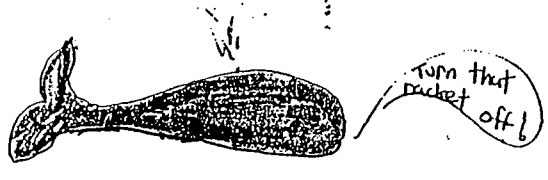
To Clayton H Spikes,

I am writing to urge you to halt the ATOC project. The Draft environmental Impact study, the length of the public comment period, and the stated reasons for this project are all inadequate justification for proceeding with this project.

If you cannot halt the project now, at least extend the public comment period, so more people like myslelf I-14 1 can have the opportunity to notify your department of their opposition to thes ATOC project.

Thankyou

Con Papamichael
163 Ludlow St
NY NY 10002



C-104

RECEIVED 1-30-95

K. Reed
163 Ludlow St
NY, NY 10002

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes,

I am writing in opposition to the proposed ATOC project.

The supposed benefits and information are insufficient.

Due to the negative effect(s) this project will have on marine life, I strongly urge you not to continue with it.

I will be watching this issue closely.

Sincerely,

Kirsten Reed

C-105

January 26, 1995

RECEIVED 1-30-95

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, VA 22202

To Clayton H. Spikes:

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS as uncertain. It is impossible to estimate the irreversible effects of high decibel, low-frequency sound on marine mammals such as gradual deafness and damage to reproductive and immune systems. 1 I-126

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was the true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global climate. The "classified" nature of the ATOC project indicates that it has nothing to do with global warming, and suggests that ATOC is a military operation to improve submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down. 2 I-1

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely,
Paul N Clarke

Paul Clarke
135 Perry St. #16
New York, NY 10014

C-106

RECEIVED 1-30-95

Patrick Perkins
13561 Capitol Road
Grass Valley, CA
95945

Advanced Research Project Agency
c/o Clyton Spikes
Marine Acoustics Inc.
2345 Crystal Drive
Arlington, Virginia
22202

RE: ATOC project Environmental Impact Statement

Dear Mr. Spikes;

I believe that the EIS for the ATOC (global warming) project is inadequate. The current EIS does not adequately address the full impacts of sending the proposed underwater frequencies from the Monteray Bay area.

The current EIS specifically states that the impacts to marine mammals is uncertain. I am concerned that the emission of low frequency sound waves through the ocean may cause adverse impacts to marine life. These impacts range from premature loss of hearing and damage to the reproductive systems of whales and other marine mammals. 1 I-15

It is my understanding that the purpose of preparing an Environmental Impact Statement is to clearly determine what the potential environmental impacts are prior to conducting a project, yet your EIS states that these impacts are uncertain.

Your impact statement must address the impacts that your project will have on the marine life.

Sincerely,

Patrick Perkins

C-107

Jan. 24, 1995
376 Ellis St. #307
San Francisco, CA 94102

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22209.

To Clayton H. Spikes:

I just learned of the Acoustic Thermometry of Ocean Climate (ATOC) project and I disagree with the plan on many points.

First, we already know enough about global warming to know that the solutions are clear. Why not spend my $3.5 million on implementing clean energy choices. Wind power, solar power and renewable resources have also been researched enough. It's time to change to them! 1 I-3b

Second, sending soundwaves through the ocean cannot help but damage marine life. It is not our place to tamper with. Imagine loud ~~noises~~ signals emitted every four hours for 20 minutes in your office, just to see how you'd react.

Third, I learned of this project today. The deadline for comments is Jan. 31. The report will be released one month later. This is inadequate. If you are going to pretend to include the public, at least make it believable. 2 I-142

I demand more public notice and a longer comment period. I demand that you take time and respond to my comment.

Eagerly awaiting your reply,

Adele A. Mackevicius

C-108

Jan 24, 95

To Clayton H. Spikes:

I am writing you to express my opposition to ATOC. I feel that the DEIS is inadequate to allow this project to proceed.

I also urge you to extend the public comment period.

The research benefits that the DEIS have stated are uncertain. 1 I-15

Also the irreversible effects of high decibel, low frequency sound on marine mammals such as gradual deafness & damage to reproductive & immune systems are not a very peaceful way to live with nature. I know you agree with this. You are one of our caring human race.

Peacefully Yours
Curtis A. Pierce

C-109

1/26/95

RECEIVED 1-30-95

To whom it may concern:

In regard to the ATOC experiment, I am totally against it. I feel it is a waste of money, first of all because even if there is global warming or if it is detected what can be done to reverse it?? I also feel it is dangerous and unfair to put our sea life through this experiment. 1 I-3.b

Please reconsider and scrap this experiment. Certainly the money can be used in a more useful manner. Our oceans need to be protected from pollution and abuse from over fishing, that would be a worth while use , or on research of the many illness' that plague our country.

Thank you for the opportunity to express my feelings.

Mrs. Veronica Burns
945 Old Stage Road
Salinas, CA 93908

We urge you to get more information on Alzheimer's disease.
Compliments of Alzheimer's Disease Research, 15825 Shady Grove Rd., Suite 140, Rockville, MD 20850

C-110

RECEIVED 1-30-95

To Clayton A. Sparkes:

I am writing to express my opposition to the ATOC project. The 1 Draft Environmental Impact Statement I-14 is extremely inadequate to allow the ATOC project to proceed. I urge you to extend the 45 comment period.

Both the adverse impacts to 2 marine life and the "research benefits" are stated in the DEIS as uncertain. It is impossible to estimate the unavoidable effects of high decible, low-frequency sound on marine mammals such as gradual diagnosis and damage to reproductive and immune systems. I-12b

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was the true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other

responsible efforts to reduce our impact on the global climate. The "classified" nature of the ATOC project indicates that it has nothing to do with global warming, and suggests that ATOC is a military operation to improve submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely yours,
Julie A Earsing

3 I-1

RECEIVED 1-30-95

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS INC.
2345 CRYSTAL DRIVE
ARLINGTON, VIRGINIA 22202

TO: CLAYTON H. SPIKES

DEAR SIR,

I AM WRITING TO EXPRESS MY OPPOSITION TO THE ATOC PROJECT. THE DRAFT ENVIRONMENTAL IMPACT STATEMENT/EIS IS INADEQUATE TO ALLOW THE PROJECT TO PROCEED AS PLANNED.

1 FIRST OF ALL, THE ADVERSE EFFECTS ON MARINE LIFE, AS WELL AS THE "RESEARCH BENEFITS", ARE DESCRIBED IN THE DEIS AS BEING UNKNOWN. IT IS IMPOSSIBLE TO ESTIMATE THE IRREVERSIBLE AND LONG-TERM EFFECTS OF HIGH-DECIBEL, LOW FREQUENCY SOUNDWAVES ON MARINE MAMMELS, THIS DAMAGE COULD INCLUDE GRADUAL DEAFNESS, AS WELL AS DAMAGE TO REPRODUCTIVE AND IMMUNE SYSTEMS. THIS PROJECT COULD FURTHER DEVESTATE THE RAPIDLY DEPLETING HEALTH OF OUR OCEANS. I-122, b

FURTHERMORE, THE SCRIPPS INSTITUTE HAS RECIEVED 35 MILLION DOLLARS FROM THE DOD TO "RESEARCH GLOBAL WARMING". HOWEVER, IF GLOBAL WARMING WAS THE TRUE PRIORITY, THEN THE USE OF TAX DOLLARS WOULD BE MUCH WISELY SPENT IN THE AREAS OF CLEAN ENERGY AND ENERGY EFFICENCY, AS WELL AS OTHER RESPONSIBLE EFFORTS TO REDUCE OUR IMPACT ON GLOBAL CLIMATE. ALSO, THE "CLASSIFIED" NATURE OF THE ATOC IMPLIES THAT THIS HAS NOTHING TO DO WITH GLOBAL WARMING, RATHER IT IS A MILITARY OPERATION INTENDED TO IMPROVE SUBMARINE DETECTION, WHICH IS A GROSS MISUSE OF TAX DOLLARS.

IT IS CLEAR THAT THE TRUE INTENTIONS AND CONSEQUENCES
2 OF ATOC HAVE NOT BEEN REVEALED TO THE PUBLIC AND I THEREFOR I-1
REQUEST THAT THIS PROJECT BE HALTED!

THANK YOU,
STEPHEN J. DURKEE

STEPHEN J. DURKEE
73851 LLOYD
SOUTH LYON MI. 48178

C-112

DANN McCRIGHT

1077 APPLE COURT • CONCORD, CALIFORNIA 94518
PHONE NUMBER (415) 689-8959

RECEIVED 1-30-95

1/24/95

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes:

I am writing to express my opposition to the Acoustic Thermometry of Ocean Climate (ATOC) project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

1 Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS as *uncertain*. The National Academy of Sciences had concluded that the lack of scientific evidence on the impacts of ATOC makes it impossible to estimate the irreversible effects of high decibel, low-frequency sound on marine mammals such as gradual deafness and damage to reproductive and immune systems. I-15

Whales and other marine animals are critically dependent on sound for social communication and food finding. This project will not benefit ocean animals. I-142

2 Additionally the intent of the ATOC experiment is not clear to the public. I urge an extension of the public comment period.

Thank you.

Sincerely,

Dann McCright

C-113

To whom it may concern:

Regarding ATOC

We're against this experiment!

RECEIVED 1-30-95

1 We feel there's enough evidence to assume global warning is occurring, so let's take the time and money to address it directly now. Is it really necessary to harm the ocean life with some elaborate testing that may just waste time and not prove anything. I-3 b

Sincerely,

Tom & Tracy DeDore
1357 Floyd Ave
Sunnyvale, CA 94087

C-114

ARLENE ALLEN

RECEIVED 1-30-95

JANUARY 21 1995

I oppose the ATOC project.
The DERS is inadequate

The irreversable affects of high dacible
1 low frequency sounds on marine I-15
mammals +(perhaps on humans)
have not been determined.
Preceding is irresponsible

Sincerely

ARLENE Q. ALLEN
70 GROVE STREET NEW YORK CITY, N.Y., 10014 USA
PHONE - (212)243-3060 FAX - (212)243-3061

Printed on Recycled Paper

C-115

1/24/95
KEVIN JOHNSON
1000 OAK ST. #
SAN FRANCISCO CA 9

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS, TXC.
2345 CRYSTAL DR.
ARLINGTON, VA 22202

TO CLAYTON H. SPIKES:

I AM IN OPPOSITION TO THE ATOC PROJECT. THE DRAFT ENVIRONMENTAL IMPACT STATEMENT IS INADEQUATE TO ALLOW THE ATOC PROJECT TO PROCEED.

THE ADVERSE IMPACTS TO MARINE LIFE FAR OUTWEIGH ANY POSSIBLE RESEARCH BENEFITS. IT MUST BE DENIED.

SINCERELY,

KEVIN E. JOHNSON

C-116

3828 22nd. St.
San Francisco, CA 94114

January 24, 1995

RECEIVED 1-30-95

Clayton H. Spikes
Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

I am writing to voice my opposition to the ATOC project. The DEIS is inadequate to allow the ATOC project to proceed.

We are uncertain of the impacts of the tests on marine life; and the benefits with respect to the purposes of the project do not justify the 35 million dollar expenditure. The tax-payers money would be better spent on clean energy, energy efficie and other responsible efforts to reduce our impact on the global climate.

1 The "classified" nature of the project and the close ties between the DOD budget and the ATOC indicate the project might be supporting military objectives IF so, the public deserves full and immediate disclosure. I-1

Thank you,

Peter J. Carr

C-117

Dear A.T.O.C.,

RECEIVED 1-30-95

Stop Now!, Before it's too late to correct your mistakes. Do not continue to Reasses the known. Clean energies are current available. Why Not spend a dime or two that way huh! Sounds are used by many types of Marine life, life that links to us as survival of many species. Thanks.

Matthew,

C-118

RECEIVED 1-30-95

January, 24, 1994

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spikes:

I am writing you to express my concern and opposition to the ATOC project. Does the Draft Environmental Impact Statement adequately justify the need for this type of marine mammal research, or the need for the ATOC project?

The adverse impacts to marine life as well as the
1 "research benefits" are stated in the DEIS as uncertain. I-15
It is impossible to estimate the irreversible effects of high decibel, low frequency sound on Marine Mammals.

If Global Warming were the true priority of the project, then the 35 million dollars that was given by the DOD to the Scripps Institute, would be better spent on clean energy, energy efficiency and other responsible efforts to reduce impact on the global climate.

2 Before this project is allowed to proceed, further analysis must occur as well as an extension on the I-142 public comment period. I look forward to recieving a response.

Sincerely yours,
KERRY B. MURNANE
3828 22nd St.

C-119

RECEIVED 1-30-95

To Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS as uncertain. It is impossible to estimate the irreversible effects of high decibel, low-frequency sound on marine mammals such as gradual deafness
1 and damage to reproductive and immune systems. I-122, b
Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was the true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global climate. The "classified" nature of the ATOC project indicates that it has nothing to do with global warming, and suggests that ATOC is a military operation to improve submarine
2 detection and make use of the SOSUS I-1
listening arrays which would otherwise be shut down.

over →

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely,
Jane Gire
Jane Gire
1388 47th Ave
San Francisco, CA
94122

P.S. Please respond in writing.

C-120

File No.: G

ADDENDUM FOR

RECEIVED 1-30-95

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS, INC.
2345 CRYSTAL DRIVE
ARLINGTON, VIRGINIA 22202

1/24/95

TO CLAYTON H. SPIKES:

I AM STRONGLY OPPOSED TO THE ACOUSTIC THERMOMETRY OF OCEAN CLIMATE EXPERIMENT. I DO NOT BELIEVE THAT THE DAMAGING EFFECTS ON MARINE LIKE OF THIS PROCEDURE HAVE BEEN ADEQUATELY STUDIED AND IDENTIFIED. I DO NOT BELIEVE THAT WE HAVE THE RIGHT TO IMPOSE POTENTIALLY HARMFUL TESTS ON AN IMPORTANT PART OF OUR ECOLOGY IN THE CALIFORNIA AREA. ALL CREATURES OF THIS EARTH HAVE THE RIGHT TO COEXIST PEACEFULLY WITHOUT THE INTERFERENCE OF ADVERSE TESTING DONE IN THE NAME OF GLOBAL ENHANCEMENT.

1 SINCE THIS POTENTIAL PROGRAM WAS NOT WIDELY DISCUSSED AND INFORMATION WAS NOT WIDELY DISSEMINATED TO THE PUBLIC, I URGE YOU TO CONSIDER OUR EXTENSION OF THE TIME FRAME FOR GATHERING PUBLIC COMMENT. I-142

SINCE SO MANY OTHER POTENTIAL PROGRAMS FOR COMBATING GLOBAL WARMING ALREADY EXIST AND COULD BE IMPLEMENTED WITHOUT THE HAZARDS TO A DELICATE ECOSYSTEM. I WOULD PREFER THAT MY TAX DOLLARS BE USED TO FUND THESE ALTERNATIVES. I WOULD ESPECIALLY PREFER TO SEE THE ALTERNATIVE CLEAN ENERGY SOURCES SUBSIDIZED AND EXPANDED.

LET US NOT FORGET THAT WE SHARE THE EARTH WITH MANY LIFE SYSTEMS, ANY OF WHICH MAY BE CRUCIALLY NECESSARY FOR OUR OWN SURVIVAL. IT WOULD NOT BE WISE TO UNNECESSARILY DISRUPT THIS PRECIOUS ECOSYSTEM IN THE NAME OF SAVING IT. I WOULD NOT WANT TO BE THE ONE TO UNKNOWINGLY PULL OUT THE CORNERSTONE AND CAUSE THE ENTIRE EDIFICE TO COLLAPSE.

SINCERELY YOURS,

Yvonne W. Lessmann
YVONNE W. LESSMANN

Steven B. Lessmann
STEVEN B. LESSMANN

C-121

RECEIVED 1-30-95

To Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement ('DEIS) is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the 'research benefits' are stated in the DEIS uncertain. It is impossible to estimate

1 the irreversible effects of high decibel, low-frequency sound on marine mammels such as gradual deafness and damage to reproductive and immune systems. I-12 a,b.

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was a true priority, then the expenditure of tax dollars would be better spent on clean, energy efficiency, and other responsible efforts to reduce our impact on global warming. The classified nature of ATOC project indicates that it has nothing to with global warming,

2 and suggest that ATOC is a military operation to improve submarine detection and makes use of the SOSUS listening arrays which would otherwise be shut down. I-1

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely,

"Advanced" Re

C-122

RECEIVED 1-30-95

To Clayton H. Spikes;

I am writing to express my opposition to the ATOC Project. To combine military research with global warming research; bankrolled by the pentagon and executed by the Scripps Institute of Oceanography is Absurd, unethical, and anti-intellectual and extremely ~~perverted~~ anti-nature. Scripps Institute has received 35 million dollars for DOD. and that is illegal. You are a den of theives supported by Corporate mafia and a militant-milita of thugs. Quit your jobs, stay home and meditate for the sake of Humanity, peace, Justice, and truth

xoxxoox

C-123

14 Shagbark Way
Fairport, N.Y.
January 26/1995

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia

To Clayton Spikes,

I am writing to express my vehement disapp of the ATOC project. The idea of wasting 35 million dollars to prove what common sense and 300 climate scientists around the world have found to be true, namely that GLOBAL WARMIN IS HAPPENING, is insanely misguided. The potential damage to Pacific marine mammals makes this insane idea an absolute travesty. I urge you to seriously reconsider ATOC's purpose and potential consequences. This money should be spent to stop global warming rather than study it further at the risk of our fellow creatures. Thank you for your time and consideration in this critical matter.

Sincerely,

Chris Busby

Chris Busby

C-124

RECEIVED 1-30-95

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, VA 22202

Jan 24, 1995

Mr. Spikes:

I am writing to express my opposition to the ATOC project.

The DEIS does not adequately support the purported benefits of this "research." The money being allocated for this study of Global Warming would be better spent on addressing the causes of global warming.

Also, the effect of this research on marine mammals ~~may be~~ a negative, and therefore, should not be undertaken.

Love,
Tad Cyl

C-125

1/24/95

RECEIVED 1-30-95

To Clayton H. Spikes

I am opposed to the ATOC project.

It is to my knowledge that the DEIS has stated the impacts to marine life are adverse. These animals were here before us and belong here far after. I object until more proven facts are available to public.

Thank you

Lisa Anderson

Lisa Anderson

C-126

RECEIVED 1-30-95

To Clayton H. Spikes,

I am writing to express my opposition regarding the ATOC project. The Draft Environmental Impact Statement is negligent to allow the ATOC project to proceed. Factors that boil the obvious impacts to Marine life and the "claimed benefits" are stated in the DEIS as uncertain. It is impossible to estimate the irreversible effects of
1 high decibel, low-frequency sound on marine mammals such as gradual I-12
deformed and damage to reproductive and immune systems. Scripps 2, b
Institute has received 35 million dollars from the DOD to research
global warming. If global warming has the true gravity, then the
expenditure of tax dollars would be better spent on climate change, energy
efficiency, and other responsible efforts to reduce our impact on the
2 global climate. The "classified" nature of the ATOC project indicates I-1
that it has nothing to do with global warming, and suggests that
ATOC is a military project to improve submarine detection and rule
use of the SOSUS listening arrays which would otherwise be shut down.
It is clear that the true intentions of ATOC have not been revealed to
the public and further analysis must occur before this project is
allowed to proceed.

Sincerely yours,
Tessy A. Johnson

C-127

RECEIVED 1-30-95

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS, INC.
2345 CRYSTAL DRIVE
ARLINGTON, VA 22202

1/24/95

TO: CLAYTON SPIKES,

AS A CITIZEN OF THE UNITED STATES, I AM WRITING TO VOICE MY WELL INFORMED OPINION OF OPPOSITION TO THE ATOC PROGRAM. THIS PROPOSED PROJECT IS INAPPROPRIATE SIMPLY BECAUSE OF THE POTENTIAL DAMAGE IT COULD DO TO THE MARINE ENVIRONMENT, ESPECIALLY IN THE AREAS SET ASIDE TO PROTECT VARIOUS MAMMALS IN THE OCEAN. THIS PROJECT WOULD STUDY THE OCEAN FOR EVIDENCE OF GLOBAL WARMING'S EFFECTS
1 BUT I HIGHLY DOUBT THAT ANY FINDINGS WILL DO MUCH GOOD TO I-3b
CHANGE THE PATH THAT SOCIETY HAS TAKEN WHICH LEADS TO CLIMATE CHANGE. WHAT WE NEED IS ACTION TO STOP THE WARMING OF THE EARTH! SPEND YOUR (MY) MONEY ON THAT AND DON'T RISK LOSING SOME OF THE LAST GREAT THINGS HERE LIKE WHALES AND DOLPHINS!! AS FAR AS I'M CONCERNED THE EVIDENCE IS IN... 95% OF THE SCIENTIFIC COMMUNITY AGREES WITH THE GLOBAL WARMING THEORY SO STOP STUDYING AND TAKE POSITIVE ACTION! YOU ARE IN A POSITION TO MAKE A POWERFUL STATEMENT WHICH COULD LEAD TO HOPE FOR OUR FUTURES AND OUR CHILDREN'S!

SINCERELY,
Eric Hanson

Advanced Research Project Agency C-128
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

1/24/95

RECEIVED 1-30-95

To: Clayton H. Spikes,

I am writing in opposition to the ATOC project. It is well known that the DEIS is inadequate to let the ATOC project to continue.

It is my belief that before this project should be allowed to continue the adverse effects which could I-12a,b
1 be caused to marine life should be more thoroughly investigated. Some of the possible effects include gradual deafness and damage to the reproductive and immune systems.

An estimated thirty five million dollars have been recieved by the Scripps Institute from the Department of Defense to research "global warming". I don't
2 buy the line that "global warming" is the real concern. I-1
Couldn't the interests of global warming be better spent on things such as clean energy?, energy efficiency?.

In conclusion, I believe that this "study" should be looked into before it is allowed to commence.

Please take this plea seriously, marine life needs our help.

Thanks for reading,

C-129

RECEIVED 1-30-95

AMBAG

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

(408) 883-3750 FAX (408) 883-3755

Office Location: 445 Reservation Road, Suite G, Marina
P.O. Box 809, Marina, CA 93933-0809

January 12, 1995

Cindy Rogers
University of California-San Diego
Campus Planning Office
108 Administrative Complex
La Jolla, California 92093

RE: MCH #019503: Draft Environmental Impact Report/Statement for California Acoustic Thermometry of Ocean Climate (ATOC) and its Associated Marine Mammal Research Program

Dear Ms. Rogers:

AMBAG's Regional Clearinghouse circulated a summary notice of your environmental document to our member agencies and interested parties for review and comment.

The AMBAG Board of Directors considered the project on January 11, 1995 and has no comments at this time. However, we are forwarding the enclosed comments on this project that we have received from other agencies or interested parties.

Thank you for complying with the Clearinghouse process.

Sincerely,

Nicolas Papadakis
Executive Director

Enclosures

NP:dis

RECEIVED
JAN 24 1995
CAMPUS PLANNING

#507

MONTEREY BAY
Unified Air Pollution Control District
serving Monterey, San Benito, and Santa Cruz counties

INTERIM AIR POLLUTION CONTROL OFFICER
Doug Quetin

24580 Silver Cloud Court • Monterey, California 93940 • 408/647-9411 • FAX 408/647-8501

December 28, 1994

RECEIVED
JAN - 5 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

CLEARINGHOUSE ITEM #019503

SUBJECT: DRAFT EIR/EIS FOR CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT

Dear Mr. Spikes:

Staff has reviewed the Draft Environmental Impact Report/ Statement for the California ATOC project, a two-year demonstration that would produce acoustic soundpaths in the ocean's sound channel to measure average ocean temperatures. This would include locating a 260 watt output acoustic sound source 21.5 miles off of Pt. Sur at a depth of 3,000 feet and installing equipment in a deeper offshore location to monitor sounds for research purposes. Staff has the following comments:

1. Page 4-130, para. 2. The analysis should state how many vessels and aircraft would operate during a worst-case scenario and conclude whether their emissions would exceed 150 lb/day of ROG or NO_x, the criterion of significance for ozone precursors within the North Central Coast Air Basin. T C

2. Page 5-18, para. 5. The EIR/EIS should note that the ATOC project is exempt from the federal general conformity rule. T C

Thank you for the opportunity to review the document. If you have any questions, please do not hesitate to call Douglas Kim of our planning staff.

Sincerely,

Janet Brennan
Senior Planner, Planning and Air Monitoring Division

cc: Nicolas Papadakis, AMBAG
File: 3442
PAM/dk

Agenda Item #5.B.

CHAIR: Fred Keeley, Santa Cruz County
VICE CHAIR: Alan Styles, Salinas
DISTRICT BOARD MEMBERS
Jack Barlich, Del Rey Oaks
Edith Johnsen, Monterey County
Oscar Rios, Watsonville
Larry Cain, San Juan Bautista
John Myers, King City
Simon Salinas, Monterey County
Curtis Graves, San Benito County
Tom Perkins, Monterey County
Walt Symons, Santa Cruz County

C-129

STATE OF CALIFORNIA — PETE WILSON, Governor

GOVERNOR'S OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO, CA 95814

January 17, 1995

MARILYN E. COX
UNIVERSITY OF CALIFORNIA, SAN DIEGO
CAMPUS PLANNING OFFICE, 0006
9500 GILMAN DRIVE
SAN DIEGO, CA 92093-0006

Subject: ACOUSTIC THERMOMETRY OF OCEAN CLIMATE SCH #: 94063061

Dear MARILYN E. COX:

The State Clearinghouse submitted the above named environmental document to selected state agencies for review. The review period is closed and none of the state agencies have comments. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call at (916) 445-0613 if you have any questions regarding the environmental review process. When contacting the Clearinghouse in this matter, please use the eight-digit State Clearinghouse number so that we may respond promptly.

Sincerely,

Michael Chiriatti, Jr.
Chief, State Clearinghouse

#

C-130

RECEIVED
1-30-95

January 25, 1995

Advanced Research Projects Agency
Clayton Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes,

The Fishermen's Marketing Association represents commercial groundfish and shrimp trawl fishermen from San Pedro, California to Bellingham, Washington.

I recently learned of the California Acoustic Thermometry of Ocean Climate Project from a Moss Landing (California) fisherman that happened to be reading a San Jose (California) newspaper which contained a notice of a public hearing. I mentioned the circumstances by which I learned of this project only because I feel it indicates the extent that the fishing industry has been considered as this project was developed.

1 I read the DEIS with two concerns in mind. The first was - what would the impact of this project be upon the fish of the surrounding area as to their physical well being and behavior? I-5e
2 The second issue was - how would the project interact with commercial trawling in the proposed area? I-5e

I found the section of the DEIS which discussed the hearing abilities of fish to be interesting. I was impressed with the amount of research on the hearing abilities of fish the authors were able to cite. Unfortunately, none of the work had been conducted on species which would be found in the proposed area, nor was any of the research conducted for a similar duration as the proposed study.

3 The DEIS should address life history of the species found in the proposed area. This treatment should include not only the basic size, age, maturity type of information, but also address issues such as the annual on-shore/off-shore migrations, spawning locations, and feeding patterns. Of particular concern is the impact of the "noise" on the behavior of spawning rockfish (Sebastes). These animals have internal fertilization and release live larvae after around a six month gestation period. Could the "noise" disrupt the fertilization of females or cause a premature release of larvae? I-5e

The second issue relates to how the project will impact commercial trawling or how

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C-130

trawling will impact the project. Trawl gear is a sock shaped net which is towed on or near the ocean bottom. The gear is generally fished following fathom contours. Although the gear is mobile, it often has limited maneuverability. Obstacles on the
4 bottom need to be avoided or they become entangled with the gear. The selected area is actively fished. The proposed piece of equipment could easily become damaged or lost if encountered. I-5e

5 The DEIS should discuss the success and failure of other types of projects which have deployed equipment on the ocean floor. The likelihood that the equipment will survive the duration of the project should be addressed. I-5e

I believe that the DEIS should address both of the issues I have raised and present the information for comparison between each of the alternative sites. If the impact on the fish in the area or conflict with other users will jeopardize the equipment, perhaps different approaches to ocean thermometry should be explored.

I wish to thank you for this opportunity to comment on this DEIS and look forward to reviewing a revised and final document. If you have any questions or wish to discuss my concerns please do not hesitate to contact me.

Sincerely,

Peter Leipzig
Executive Director

c.c. Board of Directors

C-131

RECEIVED
1-30-95

1/21/95

I am writing to express my opinion concerning on the proposed research you are to do with accoustic frequency emmisions. These tests which will take place in the ocean will have negative effects on
1 marine mammals who rely on sound to direct themselves. I-9a
The 125 decibals used by your research is loud enough to cause permanent hearing loss for the surrounding marine mammals. Hearing loss is just one of the many ill effects this testing with sound in the ocean may have on ocean wildlife.
This proposed project which is suppose to test for

C-131

2 global warming is really testing for submarine detection. More I-1
analysis must be put into this before our tax money is spent on it. It is ethically wrong to state your research is for one purpose when it is really for something totally different. By going ahead with this proposed project you are not only hurting the ocean wildlife, you are also hurting the public. I suggest that our tax money be spent on more well thought out research that doesn't deceive the public. Thank you for your consideration.

Sincerely,

Marilyn A Lynch

C-132

THE LEAGUE
OF WOMEN VOTERS
OF THE MONTEREY PENINSULA

RECEIVED
1-30-95

January 27, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

SUBJECT: DEIS/DEIR FOR THE CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT AND MARINE MAMMAL RESEARCH PROGRAM (SCIENTIFIC RESEARCH PERMIT APPLICATION P557B)

Dear Mr. Spikes:

The League of Women Voters of the Monterey Peninsula has reviewed the DEIS/DEIR for the proposed project which is

(1) a basin-scale research effort to use acoustic signals in the sea's deep "sound channel" to provide precise measurements of temperature on an ocean basin scale and

(2) an investigation of the potential impacts of low frequency sound sources on marine mammals and sea turtles at both the California and Hawaii source sites.

The Marine Mammal Research Program includes a six month pilot project followed by an evaluation to determine how best to continue the project. ATOC climate-related transmissions will begin subsequent to the pilot project. As noted on page 1-20, "...the ATOC project is experimental and is subject to fundamental uncertainties about the extent to which acoustic means can detect ocean climate changes" and results from the near-term program will be used to design a long-term network. The League has the following comments on the DEIS/DEIR:

1. The project description should be clarified. On page 1-5 the document states, "ATOC climate-related transmissions will begin only if the system is determined to be safe for marine animals (emphasis added)". However, on page 2-2 the document states, "ATOC feasibility operations would not commence until after a Marine Mammal Research Program Pilot Study has been performed and reported on by marine biologists (approximately 180 days). Which is the more accurate and complete project description?

1 TC

BOX 1995, MONTEREY, CALIFORNIA 93942 408-648-VOTE

C-132

2. The MMRP Pilot Study is itself listed as a mitigation measure for 11 impacts (CEQA Mitigation Measures A-1, 3-1, 4-2, 5-2, 6-1, 7-1, 8-1, 9-1, 9-2, 10-1, and 11-1,). Since the MMRP is part of the project and a study to determine project impacts, it is not a legitimate mitigation measure under CEQA. An appropriate mitigation measure would include a provision that ATOC would not proceed unless it is determined by the MMRP that it will not have significant adverse impacts on marine mammals.

2 I-6n

3. The FEIS/FEIR should clarify how long-term impacts on marine mammals are to be determined since the MMRP is only a six-month pilot project.

3 I-12a

4. The five alternatives analyzed in detail only address alternative locations for ATOC and not alternative technologies or combination of alternative technologies. All alternative technologies were rejected by definition because they do not meet the project's objective of using acoustic thermometry.

4 I-5a

The alternatives analysis should be based on a broader project description which includes other data collection research technologies, not just acoustic thermometry, for determining climate changes. CEQA also requires that the alternatives analysis "shall focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of insignificance, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly [CEQA Guidelines, Section 15126 (d)(3)]".

5. The document contains contradictory statements and findings which should be resolved. For example, on page 4-15 its states, "As stressed in this EIS/EIR, available information on subsea noise and its biological impact ranges from incomplete to nonexistent, depending on the species being considered." Appendix C-4 states, "The marine mammal research program (MMRP) described here is motivated by the paucity of data regarding the possible impact of low frequency sounds on marine animals; therefore, it is difficult to predict levels, areas, and scales of influence." On the other hand, the document states on page 4-15, "As set forth below, the ATOC project and MMRP are not anticipated, in most cases, to result in adverse effects on biological resources...".

5 TC

6. The DEIS/DEIR states, "There are no significant irreversible environmental changes which would be involved in the proposed action should it be implemented...Furthermore, the project will not result in significant irreversible changes to the marine environment because the protective measures included in the proposed project protocol will prevent an irreversible harm to marine mammals or other organisms in the affected environment (Appendix C)." We assume the following provision in Appendix C is the referenced protective measure: "Sound production will be suspended if any of the acute or chronic responses (Table C-1, line 6; animal dead or disabled; increase in number of animals

struck by vessels; injurious behavior; repeated/prolonged activity; abnormal number of animals present/absent; abnormal mother-calf activity; cessation/disruption of significant biological activity; animals obviously and consistently avoid area when source "on; do not return when it is "off") are observed."

6 I-69

Based on Table C-1, sound production would not be suspended if the following behavioral responses occur: change in swim pattern/direction; change in ventilation rate; change in vocalization pattern/rate; change in surface behavior including feeding, socializing, nursing, aerial behavior, changes in diving behavior including dive depth and duration; and long term changes including habituation and displacement. Thus, by inference, the DEIS/DEIR suggests that these changes would not be significant. The FEIS/FEIR should specifically address whether or not these changes constitute significant adverse or irreversible impacts on the marine environment.

7. Finally, we concur with the recommendation included in the document that a DEIS/DEIR be prepared for any long-term network that is proposed. We also recommend that an opportunity for public review of the results of the MMRP pilot study be provided prior to commencement of ATOC operations.

Thank you for the opportunity to review the document.

Sincerely,

Janice O'Brien
President

MARINE MAMMAL COMMISSION
1825 CONNECTICUT AVENUE, N.W. #512
WASHINGTON, DC 20009

RECEIVED
1-30-95

27 January 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, has reviewed the Draft Environmental Impact Statement/Environmental Impact Report [hereafter referred to as the DEIS] for the California Acoustic Thermometry of Ocean Climate Project and its associated Marine Mammal Research Program with respect to the goals and provisions of the Marine Mammal Protection Act and the National Environmental Policy Act. The Commission offers the following comments concerning the assessment of the possible direct and indirect effects of the California Acoustic Thermometry of Ocean Climate Project [hereafter referred to as the California ATOC Project] and its associated Marine Mammal Research Program on marine mammals and their habitat.

General Comments

The DEIS provides a generally thorough summary and assessment of available information concerning the species and numbers of marine mammals that inhabit the described study area and how the various species may be affected by high-intensity, low-frequency sounds. It concludes that (a) available information generally is insufficient to reliably predict possible adverse effects, particularly on species that routinely dive to depths greater than 200-300 meters and themselves produce low-frequency sounds, and (b) any effects are likely to be insignificant. As noted below, the basis (e.g., assumptions, supporting data, and analyses) for concluding that effects are likely to be insignificant is not always clear.

The title of the DEIS indicates that it provides an assessment of the possible environmental impacts of both the California ATOC Project and its associated Marine Mammal Research Program. The protocol for the Marine Mammal Research Program is described in Appendix C. The possible effects of the various elements of the Marine Mammal Research Program on marine mammals and other components of the ecosystem(s) of which they are a part

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are not assessed explicitly in either Appendix C or the text of the DEIS.

The first paragraph on page 8 of Appendix C indicates that the primary objectives of the Marine Mammal Research Program are "1) to assess potential effects of ATOC signals on the distribution, ecology and behavior of marine animals, and 2) to examine the general ecology and behavior of marine animals off central California." Section 1.2.1 of the DEIS indicates that the objectives of the Marine Mammal Research Program are to --

"• detect and evaluate potential effects of ATOC source sound transmissions on marine animals, particularly marine mammals and sea turtles.

"• identify mitigation measures to avoid the potential disruption of behavioral patterns of local marine animals, particularly marine mammals and sea turtles.

"• use the acoustic capabilities of the ATOC system to explore the potential effects of other sources of low-frequency noise (such as ships and boats) on local marine animals, particularly marine mammals and sea turtles."

1 TC I-3a

The DEIS indicates on page 1-1 that, under the Marine Mammal Protection Act, permits are required for activities that would result in taking marine mammals by harassment or other means as defined in the Act and that two permit options were potentially available to authorize taking of marine mammals in the course of the proposed ATOC project. The two options noted are (1) a scientific research permit authorizing the take of marine mammals in the course of bona fide research to improve basic knowledge of the biology or ecology of marine mammals or to identify, evaluate, or resolve a marine mammal conservation problem; and (2) a "small take" exemption authorizing the unintentional taking of small numbers of marine mammals incidental to activities such as the ATOC project. The DEIS does not, but should, note that there is a third possible option for authorizing the taking of marine mammals that are within their optimum sustainable population range, namely obtaining a waiver of the Marine Mammal Protection Act's moratorium on taking.

2 TC

The fourth paragraph on page 1-1 states that --

"[i]n 1993, Scripps was informed by the National Marine Fisheries Service (NMFS), Office of Protected Resources, that a scientific research permit (SRP), rather than an incidental take permit, would be the preferred approach. This choice was guided, in part, by NMFS's concern that additional scientific research

to evaluate the potential impacts of low-frequency source transmissions on marine mammals is needed."

As the Marine Mammal Commission understands it, the determination by the National Marine Fisheries Service that the preferred approach would be a scientific research permit, rather than a "small-take" exemption, was based upon a determination that available information was insufficient to make the findings necessary to issue a small take exemption. Thus, while not noted explicitly in the previously referenced objectives of the Marine Mammal Research Program, one of the program objectives presumably is to obtain sufficient information to determine whether marine mammals are likely to be harassed or taken otherwise incidental to the proposed California ATOC Project and, if so, whether the take can be authorized by a small-take exemption.

3 TC

With regard to the preceding point, sections 101(a)(5)(A) and (B) of the Marine Mammal Protection Act specify that small take exemptions are to be granted if the Secretary [of Commerce in this case], after notice and opportunity for public comment: (1) finds that the taking of marine mammals to be authorized would have a negligible impact on the affected species or stock, and would not have an unmitigable adverse impact on the availability of such species or stock for subsistence taking by Alaska Natives; and (2) prescribes regulations setting forth (a) permissible methods of taking and means for effecting the least practicable adverse impact on the affected species or stock and its habitat, and (b) requirements for monitoring and reporting such taking.

The Marine Mammal Commission recommends that the EIS be expanded and revised to (1) explicitly note the relevant provisions of section 101(a)(5) of the Marine Mammal Protection Act; and (2) explain the rationale for believing that the Marine Mammal Research Program will provide the information necessary to determine whether marine mammals may be taken incidental to the California ATOC Project and, if so, whether the taking can be authorized by a small take exemption. With respect to the latter point, the EIS should explain the basis for believing that the Marine Mammal Research Program will provide the information necessary to (a) make the required finding that the authorized taking would have a negligible impact on the affected species or stocks, and (b) prescribe monitoring and reporting requirements. As possible the EIS should indicate the statistical tests that will be used to analyze and help interpret the study results and analyses that have been done to determine whether the planned studies are likely to provide sufficient information to draw statistically meaningful conclusions.

4 TC

The enclosed paper, while somewhat outdated by the 1994 Marine Mammal Protection Act amendments, explains the intents and provisions of section 101(a)(5) of the Act and may be helpful in

this regard.

Specific Comments

Page ES-2, par. 2: Here and elsewhere, the DEIS notes that "[o]nly two sound sources are currently proposed..." and "[i]t is proposed to operate these sound sources from 2% to 8% of the time (they will be silent from 92% to 98% of the time)...." The DEIS does not indicate whether the sound sources would be operated concurrently and, if not, whether marine mammals, sea turtles, fish, etc. in areas between the two sound sources could be exposed to sound from these sources for more than 2% to 8% of the time as indicated. 5 I-12c

Page ES-3, par. 1: The first sentence in this paragraph states that "[f]ollowing this initial demonstration period, any future facilities or operations will be subject to additional environmental review and permitting." As noted earlier, if the Marine Mammal Research Program indicates that marine mammals could be harassed or be taken otherwise as a result of the proposed ATOC project, such taking could be authorized by a "small take" exemption if certain conditions are met. Such takes are covered by a letter of authorization, rather than a permit. To avoid possible misunderstanding, it might be useful, here and elsewhere in the DEIS, to change references to "permits" and "permitting" to "authorization." 6 TC

Page ES-3, par. 5: Here and elsewhere the DEIS states that the ATOC sound source intensity is comparable to, or lower than, that produced by large container ships and supertankers. These statements appear to infer that marine mammals, sea turtles, fish, etc. already are exposed to, and are not affected by, high-intensity, low-frequency sounds such as those that would be used in the ATOC project. This inference would be justified if (a) comparable sounds generated at the ocean surface by ships and in the deep sound channel by the ATOC sound sources dissipate at the same rates; (b) background noise levels are similar in both transmission paths; (c) animals will respond similarly to moving and stationary sound sources; (d) there is reason to believe that marine mammals, sea turtles, fish, etc. are not affected adversely by high-intensity, low-frequency sounds produced by surface ships; and (e) there are no additive or threshold effects (i.e., effects are linearly related to intensity and exposure time and in no way influenced by prior exposure).

Such inferences either should be removed or should be supported with appropriate literature citations, data, and analyses. Minimally, the EIS should be expanded to describe: differences in low-frequency sound transmission patterns and dissipation rates from surface versus deep water sources; possible differences in the types and levels of background noises that might mask and affect responses to surface-generated and 7 I-7c

deep water-generated sounds; possible differences in response to narrow- and broad-band sounds; and how the perceptions of and responses to low-frequency sounds may vary if the sound source is stationary versus moving.

Page ES-3, last par.: The third sentence in this paragraph states that "[c]limate-related transmissions will only begin if the system is determined to be safe for marine mammals and other sea life." The DEIS does not indicate what would be considered "safe." As noted earlier, the Marine Mammal Protection Act provides that taking of small numbers of marine mammals may be authorized if it would have a negligible effect on the affected species or population stock. To avoid precipitating questions as to whether "safe" means "negligible effect," it might be useful to revise the referenced sentence to read something like "[c]limate-related transmissions will only begin if the system is determined likely to have no effects, or only negligible effects, on marine mammals and other sea life." 8 TC

Page ES-4, par. 1: The third sentence in this paragraph indicates that "[d]uring the Pilot Study, source transmissions will stop if the marine biologists observe adverse effects meeting the source termination guidelines of Appendix C." Paragraph 3 on page 7 of Appendix C states that --

> "If the study results indicate that the sound transmissions are unlikely to have significant adverse, unacceptable short-term effects, they will be used to help design a long-term program to determine if the operational ATOC program has unacceptable long-term effects. The following would be considered unacceptable long-term effects, if directly linked to ATOC sound transmissions:
>
> "• avoidance or abandonment of previous high-use areas;
>
> "• increase in at-sea observations of dead animals or strandings of either live or dead animals in association with sound-caused hearing damage or other trauma;
>
> "• increased incidence of emaciated animals and stress and associated disease;
>
> "• decrease in calving/pupping rates and/or total population size" [emphasis added].

9 TC App. C

For the reasons noted above, the referenced sentences usefully might be revised to read something like: "[i]f the study results indicate that the sound transmissions are likely to have negligible short-term effects, they will be used to help

design a long-term monitoring program to verify that the operational ATOC project has negligible long-term effects. The following would be considered non-negligible long-term effects...." Also, the EIS should explain what would and would not be considered evidence of a direct link to ATOC sound transmissions. TC App. C 10

Page ES-6, par. 1: The last sentence in this paragraph states that: "[a]n air standard level of 58.5 dB is equivalent to the 120 dB water standard level which has produced some minor detectable changes in the behavior of certain marine mammals." Information described and cited in the body of the DEIS supports the statement that 120 dB sound levels in water have produced detectable changes in the behavior of certain marine mammals. However, the information provided and cited in the text does not claim or support the claim that the detected changes were "minor." Therefore, either the word "minor" in the referenced statement should be deleted or the basis for the conclusion should be described more clearly. TC 11

Page ES-8, carryover par. from p. ES-6 and first complete par.: Here and elsewhere, the DEIS indicates that the effects of sound on marine mammals will depend upon the frequency range and intensity of the sound, the hearing sensitivity of the marine mammal and the length of time it is exposed to the sound, the species and number of animals exposed to the sound, and their depth and frequency of diving. It does not, but should, note that, for some species, the most important variable may be the types and functions of the sounds produced by the animals and how production and use of those sounds may be affected by ATOC sound transmissions. TC 12

Page ES-8, par. 1: Here and elsewhere, the DEIS indicates that large whales (that can hear low-frequency sounds) are relatively rare in the vicinity of the ATOC sound source, therefore, few encounters with sounds that may have adverse effects are likely. The conclusion appears to be based upon two unstated assumptions, neither of which may be valid. The first is that large whales are distributed randomly or uniformly in the ocean such that sighting rates, converted to average density per unit area, provide a reasonable index of the number of animals likely to enter or be present in the potential zone of influence. The second assumption is that none of the potentially affected species will be attracted to the ATOC sound source. The first assumption almost certainly is invalid since most species of whales have aggregated, rather than uniform or random, distributions. The second assumption is one that the Marine Mammal Research Program should be designed to assess. TC 13

Page ES-9, sen. 2: This sentence indicates that, when animals capable of detecting low-frequency sounds are in the deep TC 14

sound channel when the ATOC sound source is transmitting, the transmitted sounds could be "audible at a considerable distance." The DEIS does not, but should, indicate what is meant by "a considerable distance."

Page ES-9, par. 2: Here and elsewhere, the DEIS assumes that elephant seals are distributed randomly or uniformly in the ocean and are not likely to be attracted to the ATOC sound source so that "close encounters with the ATOC sound source would be unusual (less than one animal exposed to levels of 150 dB or greater, on average, every ten years at a 4% duty cycle)." The assumptions may not be valid. If they are not valid, the conclusion that close encounters with the ATOC sound source would be unusual also may be invalid. TC 15

Page 1-6, (Table 1.2-1): This table indicates that a preliminary report of the results of the pilot Marine Mammal Research Program will be completed and provided to all concerned parties (ARPA, Scripps, NMFS, MMC, NMML, MBNMS SAC, etc.) by September/October 1995 and that the monitoring phase and the ATOC feasibility operations will begin in October/November 1995. Authorization to begin the ATOC feasibility operations presumably will require a determination that the pilot study has confirmed that the ATOC sound transmissions likely will have negligible effects on marine mammals. The DEIS does not, but should, clearly indicate what would be done if the pilot study fails to confirm that the ATOC sound transmissions are likely to have negligible effects on marine mammals. TC 16

Page 1-21, (Marine Mammal Research Program Objectives): For the reasons noted earlier, the Marine Mammal Commission recommends that this and other sections of the EIS be expanded to explicitly note that one of the program objectives is to confirm the expectation that the ATOC sound transmissions will have no effects or negligible effects on the distribution, survival, or productivity of marine mammals. TC 17

Page 2-12, (Figure 2.2.1.2-5): Here and elsewhere, the DEIS indicates that the zone of influence for species with poor and good low-frequency hearing will be no more than 10 and 25 km, respectively. The DEIS does not, but should, describe studies that will be done to verify the accuracy of the estimated zones of influence for different species -- e.g., to verify the estimates of expected sound levels at different depths and distances from the sound source. TC App. C 18

Page 2-54, (Table 2.4-1): The part of this Table evaluating the various alternatives, with respect to the Marine Mammal Research Program, appears to assume that the research program would be carried out as presently planned and described in Appendix C. The Marine Mammal Research Program could be restructured to become an integral part of all but the "no TC 19

action" alternative. Therefore, either further explanation should be provided or the Table should be revised.

Page 3-16, par. 5: Here and elsewhere, the DEIS indicates, incorrectly, that northern fur seals have been designated by the Marine Mammal Commission as "depleted" under the Marine Mammal
20 Protection Act. The Commission does not have statutory authority TC to make such regulatory decisions. The National Marine Fisheries Service is the regulatory agency responsible, under the Marine Mammal Protection Act, for fur seals and other pinnipeds, and the agency that made the referenced designation.

Pages 3-17 and 18 (Table 3.3.1-1): The body of this Table
21 references 12 notes. Only nine notes are provided. Further, two TC are numbered 6, and two are numbered 7.

Page 3-30, pars. 1 and 2: This section does not, but should, differentiate between northern fur seals that are part of the pupping colony on San Miguel Island, and may therefore be resident throughout the year in waters offshore central TC
22 California, and the female and juvenile fur seals that annually migrate to and from rookeries in the Bering Sea and therefore are present in waters off north and central California only in the winter and early spring.

Pages 4-1 through 4-131 (Environmental Consequences): As presently drafted, this section of the DEIS assesses the possible environmental consequences of the ATOC Project using guidelines adopted by the Regents of the University of California to give effect to the California Environmental Quality Act (CEQA). Page 4-1 indicates that under CEQA guidelines, three types of environmental impacts are identified: 1) beneficial impacts, 2) significantly adverse impacts, and 3) less than significant impacts. These terms are not defined in the DEIS, and are not discussed with respect to the criteria, listed on page 7 of Appendix C, proposed for judging unacceptable effects under the Marine Mammal Protection Act.

For the reasons noted earlier, the Marine Mammal Commission recommends that the EIS provide proposed criteria for judging possible non-negligible impacts on marine mammals and that these criteria be used to assess the possible effects of the proposed
23 ATOC Project on marine mammals. Perhaps the simplest way to do TC this would be to expand the introduction of Section 4 of the EIS to relate the terms "significant adverse impacts" and "less than significant impacts" to the criteria set forth on page 7 of Appendix C.

Pages 4-13 and 4-14: This section describes a range of potential impacts on marine mammals. It does not, but should,
24 discuss the possibility, however remote, of animals being killed TC or physically injured as a result of the proposed ATOC Project

and the related Marine Mammal Research Program. Also, it would be easier to judge the merits of both the impact assessment and the Marine Mammal Research Program if the brief summaries of possible impacts on marine mammals provided here were expanded to identify the research that would be done to verify and resolve any uncertainties concerning the conclusions.

Page 4-18 (Table 4.3.1.1.1-1): This table could be made
25 more useful by adding a column indicating the known or presumed I-82 biological functions of the vocalizations listed in the column titled "Signal Type."

Page 4-22, par. 1: This paragraph states "[p]rovided that the above assumptions/criteria are correct and, as research indicates, that sei, minke, humpback, gray, and right whales dive TC to depths no greater than 500 m, it appears unlikely that any of
26 these animals would experience direct effects, such as TTS or PTS." It would be helpful if the EIS noted explicitly what would be done to verify that the assumptions and criteria are in fact correct.

Page 4-22, par. 2: Here and elsewhere, the DEIS concludes that there is a very low probability of blue whales or other large whales coming close enough to the ATOC sound source to be exposed to sound levels that could cause temporary or permanent hearing threshold shifts. As noted earlier, this conclusion appears based upon assumptions that large whales are distributed randomly or uniformly throughout their seasonal ranges and that there is no possibility that whales will be attracted to the ATOC sound source. The first assumption almost certainly is invalid. As noted in the last paragraph on page 3-21 of the DEIS, blue
27 whales, for example, often are found in relatively large TC aggregations. Although unlikely, it is not possible from the information provided in the DEIS to conclude that large whales (or other species of marine mammals) will not be attracted to the ATOC sound source. The EIS should note these assumptions explicitly and should indicate the research that will be done to confirm that they are valid.

Pages 4-24 through 4-27: This section does not, but should, describe available information concerning the effects of various TC
28 types of sound and other disturbance on cetacean vocalization patterns (e.g., call type, rate, and intensity).

Page 4-32, par. 4: This paragraph states that "...in light of the number of mysticetes that may be exposed and the relatively brief and intermittent nature of the ATOC source transmissions, masking effects are uncertain, but presumed to be
29 less than significant." The information presented supports the TC conclusion that "masking effects are uncertain." However, it is not clear what is meant by "less than significant." Also, the rationale for presuming that the masking effects will be less

10

than significant is not evident.

Page 4-33, par. 4: The first sentence in this paragraph states that "[t]he proposed ATOC sound source site is not known to be a primary feeding area for any mysticete species, and it is expected that any potential effects on prey species would be incremental and affect only a small portion of their range." The words "[t]he proposed ATOC sound source site" presumably mean the 30 estimated zone of influence around the proposed ATOC sound source site, not the source site itself. If this is the case, the statement presumes that both mysticete whales and their prey will not be affected beyond the estimated zone of influence for mysticete whales -- e.g., the concentrations of humpback whales and blue whales that have been seen feeding in the Gulf of the Farallones and Monterey Bay and the populations of prey species in these areas are beyond the possible zone of influence. These assumptions, and studies being planned to verify them, should be noted explicitly. TC

Page 4-45, (Table 4.3.1.2.1-11: The utility of this table could be improved by adding a column listing the known or 31 possible functions of the various types of vocalizations listed in the column titled "Signal type." I-82

Page 4-50, par. 1: Among other things, this paragraph states that "[t]he average annual density of sperm whales in the study area is estimated at less than one animal for every 1,000 square kilometers." As noted earlier, there is no reason to 32 believe that sperm whales or other large whales are distributed uniformly or randomly throughout their range. Therefore, using such average density estimates as the basis for assessing possible impacts may lead to wrong conclusions. TC

33 Page 4-51, par. 4: This paragraph appears relevant to the EIS for the ATOC sound source in Hawaii, not California. TC

Page 4-52, par. 3: The second sentence in this paragraph states that "[g]iven the relatively low sensitivity of odontocetes to low-frequency sounds (with the possible exception 34 of sperm and beaked whales) and the relatively low density of these species, the impact is expected to be minimal." It is not evident what is meant by "minimal impact." TC

Page 4-53, par. 2: The fourth sentence in this paragraph states that "[a]lthough there is no evidence of any long-term impacts to odontocetes from sounds comparable to the ATOC sound 35 source, the lack of reliable information justifies the assumption of an impact for purposes of this EIS/EIR, but at less than significant level." As noted earlier, it is not clear what types of impacts would be "less than significant." TC

Page 4-56, last complete par.: This paragraph does not, but

11

should, discuss the types and possible functions of sounds produced by sperm whales, the possibility that ATOC sound transmissions could cause sperm whales to stop vocalizing, and 36 what effect cessation of vocalization might have on feeding, reproduction, etc. Also in this paragraph, the next-to-the-last sentence cites vessel surveys done by Hill and Barlow (1992) in California, but references "Hawaiian waters." TC

Page 4-65, par. 3: Again, it is not clear what is meant by 37 the term "less than significant." Also, the rationale for concluding that physical auditory impacts on pinnipeds will be less than significant is not evident. TC

Page 4-67, par. 1: This paragraph indicates that "[i]f elephant seals are responsive to low-frequency sounds, the 38 potential for adverse behavioral impacts is present, but should be minimal." It is not clear what is meant by "minimal." Likewise, the rationale for the determination is not evident. TC

Page 4-67, par. 2: This paragraph states that "[a]lthough there is not evidence of any long-term impacts to pinnipeds or fissipeds from sounds comparable to the ATOC sound source, the lack of reliable information justifies the assumption of an unknown impact for purposes of this EIS/EIR, but at less than a 39 significant level." As noted earlier, it is not clear what is meant by the term "less than significant level." Also, the rationale for the conclusion that possible impacts will be less than significant is not evident. TC

Appendix C (Research Protocol for the California Marine Mammal Research Program of the ATOC Experiment)

The Marine Mammal Research Program described in this section appears conceptually sound and, if carried out as described, seems reasonably likely to meet the stated research objectives.

The third paragraph on page C-4 indicates that there are three phases to the planned research: "1) preliminary baseline data collection period, prior to any ATOC transmissions (now projected for 1995), 2) a Pilot Study (when ATOC transmissions would be manipulated to assess effects on marine mammals), and 3) a monitoring period (when transmissions are optimized for ATOC feasibility operations; i.e., climate studies)." The effectiveness of the Pilot Study will depend, in part, upon the adequacy of the baseline data collected during phase 1. Similarly, the nature and extent of monitoring studies necessary during phase 3 will depend largely upon the results of phase 2.

Table 1.1.2-1, on page 1-6 of the DEIS, indicates that phases 1 and 2 of the research program are expected to be 40 completed in March 1995 and October 1995, respectively. The basis for concluding that these first two phases of the research TC

program can be completed by the referenced dates is not, but should be, explained either here or elsewhere in the EIS. Also, it would be helpful if the specific objectives of each of the three phases were identified.

Page C-5, last par.: This paragraph indicates that, to maximize the number of sampling periods during the pilot study, ATOC sounds will be transmitted six times per day for four days, and then there will be seven days of no transmissions. This experimental design appears to assume that any effects of the sound transmissions will be fully dissipated before the end of the seven-day no-transmissions period, and that data collected during the seven-day no-transmissions period will provide a baseline that can be used to determine the nature and extent of cause-effect relationships. The rationale for these assumptions, and what will be done to confirm that they are correct, are not, but should be, explained. 41 TC

Page C-7, par. 1: For the reasons noted earlier, the second and third sentences in this paragraph might usefully be revised to more clearly reflect the relevant provisions of section 101(a)(5) in the Marine Mammal Protection Act. 42 TC

Pages C-20 through C-28 (Satellite and Recoverable Tag-Based Behavioral Studies): This section indicates that four types of tags would be used to help document normal behavior, and detect possible ATOC-related changes in the behavior, of northern elephant seals, California sea lions, blue whales, and leatherback turtles. The four types of tags are 1) time-depth recorders; 2) satellite-linked time-depth recorders; 3) acoustic data loggers; and 4) standard radio tags. In some cases, the tags to be used are in the conceptual or developmental phases. The DEIS does not, but should, indicate the extent to which meeting the program objectives is dependent upon successful development and deployment of these tags. Also, it does not, but should, explain the rationale for the number of tags proposed to be used. 43 TC

* * * * *

I hope that these comments and recommendations are helpful. If you have questions about any of them, please let me know.

Sincerely,

John R. Twiss, Jr.
Executive Director

cc: The Honorable William W. Fox, Jr., Ph.D.

C-134

RECEIVED 1-30-95

Michael Harris
Photographer/Writer
30 Front St
Santa Cruz, CA 95060
(408) 454-9100

January 24, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Folks,

I wish to comment on the ATOC EIS.

I take a great interest in this project for a few reasons. Chief among these is a public service: my seat on the education panel for the marine sanctuary.

I have reserved comment up to now, so I could listen to all parties and study the issue. After listening to both public hearings, reading the EIS, and discussing the project with various people, I have formed an opinion that I wish to convey to you.

I think the ATOC experiment is a sound and justified project in our marine sanctuary. I do not think it is harmful. I think it holds great promise for an expansion of sheer knowledge about our oceans and atmosphere, and the effects we may be bringing to them both. I think it is a proper experiment to hold in the Monterey Bay National Marine Sanctuary.

I find the objections raised by the speakers at both hearings, after listening to Dr. Munk's answers at the second hearing, to be genuine in intent, but wrongly decided.

I believe ARPA and SERDP and SCRIPPS brought trouble on themselves by not asking for an EIS early on in the project's conception. This "oversight" only triggered suspicions in some quarters that the whole effort was a ruse by our military for another military operation. I believe this blunder may have set the ATOC project against itself to everybody's loss.

With this in mind, I wish to underscore the recommendation of the *Sanctuary Education Panel (SEP)* on this issue, which is: the final EIS and the project itself, if adopted, should incorporate a strong educational component. This may sound a little odd to the project principals, since many are educators themselves. What I mean, is that data gathered be offered as soon as possible to the lay public. Caution by scientists about error and conclusions must be weighed against suspicions by the public over what, actually, is going on.

I have one more observation. If the speakers at the two hearings are any measure of a "public" opposed to the project, a refrain might be heard to future projects that runs like this: science is not to be trusted.

I think Norman Mailer first observed this in a book of his over twenty years distant, *Fire on the Moon*: that a counter culture has been sowed in reaction to science and technology, with the result, in this instance, that every graph raised by the ATOC proponents to illustrate a point, will be ill-read by those who orient themselves by emotions.

For my "two cents," the emphasis on global warming in the project is less convincing that the "run of the mill" data on small climate fluctuations, such as el nino events.

In any event, I support the ATOC experiment.

Sincerely,

Michael Harris

C-135

RECEIVED 1-30-95

1/29/95

Advanced Research Project Agency
Marine Acoustics, Inc
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H. Spicer:

This letter is to voice my opposition to the ATOC project. The intent of this project is dubious and the Environmental Impact unknown.

Neither the research benefit nor the effects on marine life are certain. Broadcasting low frequency sound at these levels has the potential for inestimable damage to marine mammals. Especially in the richly populated areas of Northern California.

Could an uncertain scientific study possibly be worth such risk? I think not. Please see to it that the period for public comment is extended at least until the true intentions of ATOC are revealed for further analysis.

Sincerely,

K. K. Swift

C-136

Jan. 23, 1995

Dear ATOC Hearing Scientists,
c/o Santa Cruz Board of Supervisors

RECEIVED 1-30-95

Many dangerous and deadly things have been done in the name of Science in conjunction with "National Defense", and I have attached a sampling of cuurent articles that points directly to what "Visionaries" see for our future, the Evolution of "Non-Lethal" Weaponry. On the one hand, the United States is already the World's largest Arms Dealer; on the other hand, the Pentagon's business is concooting schemes to put out the hot spots it thereby creates. Any dissent is declared subversive or put off till all the hapless victims are dead, in most cases. In the meantime, we Humans have arrived at the top of the Endangered Species List with our DNA and Immune Systems compromised. Diseases sound a Climate Alarm; even Sea Mammals now have AIDS-like illnesses.

Please stop the dangerous nonsense and check on what past experiments or current tests are "doing us in". It is certainly in "our National Interest" to DEFEND the Environment against further onslaughts by high-rolling Gamblers who have gotten terribly accident-prone. The Natural World is not Humanity's "Guinea Pig".....It is our duty to no longer be gullible, as Rachel Carson was right. I am old enough to remember the last time when the World was a cleaner, safer, splendid place for Children to grow up in. Let that be our Goal, not some unrealistic GAME. Now that's an interesting Project !

Dolly Alley

Dolly Alley
2627 Mattison Ln. #46
Santa Cruz, Ca. 95062

C-137

RECEIVED 1-24-95

360 N. Winton Rd
Rochester, NY 14610

Advanced Research Project Aggy
Marine Acoustics, Inc.
2345 Crystal Dr.
Arlington, VA 22202

Dear Mr. Spikes;

I would like to express my opposition
1 to the ATOC project because of the adverse effects I-1
on marine mamamals. I object to the "classified"
nature of the experiments. I feel government
research should be made public.

Please inform me of how the funds
for the testing are to be spent, and exactly
where they came from.

I admit that I do not know much about
this issue, therefore I am requesting specific
information.

Sincerely,

Jenna Potter

C-138 RECEIVED

Mr. Clayton Spikes: 1/24/95

Thank you for the chance to express my concerns
and comments on an issue of great importance to me.
As an individual who loves the ocean and its inhabita
while I believe that the benefits of ATOC may
may not be beneficial, I feel that ATOC may not
worth the risks to marine organisms.
It would be much more reasonable to me to see t
site of ATOC in an area with relatively very f
marine mammals so the risks would be minimized.
I feel this project should be conducted only if the
following criteria are met:
1) Outside experts and community representatives must
1 conclude that the pilot study shows any potential I-6c
impacts of ATOC to be acceptable;
2) the criteria for terminating ATOC transmissions must
2 be defined more clearly, yet remain flexible enough to I-6g
allow for appropriate action in light of unexpected impa
3) citizens at large and environmentalists must play
3 significant role in determining what the termination crite App.C
should be and when they have been met.
Again, I would favor the use of sites that would min
imize exposure of marine mammals to the ATOC sou
4 source, well away from marine protected areas such I-4b
as the Monterey Bay Nat'l Marine Sanctuary.
ATOC must fully adhere to all CEQA and NEPA
5 guidelines. these guidelines are what give the scientific I-14c
community as well as the public the tools to decide
whether the benefits that are expected from this
project outweigh the risks to marine life.
Finally, let me say that although I am a scient
or researcher, I have been able to make what I h
ave intelligent comments because I am a member of m
of the groups who are also extremely concerned abo
our oceans and their inhabitants.
Lets adopt a more humble attitude based on a
respect for the complexity and mystery of the ocea
and its inhabitants. Thankyo.

Sincerely,
John Pompeii

C-139

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS INC.
2345 CRYSTAL DRIVE
ARLINGTON, VIRGINIA 22202

RECEIVED 1995

DEAR MR. SPIKES,

I AM AGAINST THE PROPOSED ATOC PROJECT. PLEASE EXTEND THE PERIOD FOR PUBLIC COMMENT. THE ADVERSE EFFECTS ON
1 MARINE MAMMALS ARE UNCERTAIN. THE DRAFT ENVIRONMENTAL IMPACT STATEMENT DOES NOT ALLEVIATE THAT UNCERTAINTY. I-14a
2 THERE HAVE BEEN QUESTIONS ABOUT POSSIBLE MILITARY USES OF THE TECHNOLOGY. PLEASE ALLOW FOR A LONGER I-1
PERIOD TO DEBATE THE ISSUE. DELAY THE FINAL EIS.

SINCERELY,
GARY GRUBER
Gary Gruber

Advanced Research Project Agency
Marine Acoustics Inc.
2345 Crystal Dr.
Arlington, Va. 22202

RECEIVED 1995

C-140

Mr. Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The draft Environmental Impact Statement (DEIS) is grossly inadequate to allow the project to proceed as planned.

1 First of all, the adverse effects on marine life, as well as the "research benefits", are described in the DEIS as being unknown. It is impossible to estimate the irreversible and long term effects on high-decible, low-frequency soundwaves on marine mamals, such as irreversible gradual deafness and damage to their immune systems. Therefore, this project could disrupt the fragile health of ocean ecosystems. I-12 a,b

Furthermore, the Scripps Institute has received 35 Million dollars from the DOD to "research global warming." If ATOC is global warming was the true priority, then the use of tax dollars would be more frugally spent in the areas of clean energy and improved energy efficiency, as well as additional efforts to reduce our impact on the global climate. Also the "classified" nature of ATOC operates under implies that this has nothing to do with global warming, rather it is a military operation intended to improve submarine detection, this is a gross misuse of crucial tax dollars.

2 It is obvious that the true consequences and intention of ATOC have not been revealed to the public and I therefore request that this project be halted immediately. I-1

Sincerely,
Christopher Clarke Public Interest Law
1028 Fuller Street apt. 303
Ann Arbor, Mich. 48104

C-141

RECEIVED

Dear mr. SPikes.

When The Deficit is ever increasing, and corners being CUT TO CURTAIL overstending, how can you JustifY WastING TaxPayers Dollars on your PeT ProJeCTS TO See if You Can Cause interNal/ hemoraging in marine Mammals? Save Our money for Problems on our land And with our CITIZens. STOP stending it liberallY

An OutRaged TaxPayer.
JAmes WILSon

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia 22202

C-142

RECEIVED

To Clayton H. Spikes:

I am writing this letter because I am strongly opposed to the ATOC project. This military-funded experiment to broadcast loud, underwater sounds in Monterey Bay for 10 years to "study" global warming is absolutely ludicrous. Certain parts of ATOC are "classified" by the Pentagon and over a million dollars has already "laundered" to the US Navy. Why would
1 global warming be "classified" information if it affects us all? This information actually suggests that ATOC is a military experiment intended to improve submarine detection. It's bad enough that the environment is being destroyed, marine mammals are being harassed, and our schools are severely underfunded. We do not need to spend millions of dollars to prolong the cold war. Life on this planet is way more important. I mean all life; not just a few paranoid elite. I would like a response to this letter please. I-1

Sincerely,
Julie Greiner

Julie Greiner
3607 Wilshire Ter.
San Diego, CA 92104

C-143

RECEIVED 1/31/95

Gwyn Codenhead
2266 Bollinas St
San Diego CA 92107
January 27, 1995

Advanced Research Project Agency
Marine Acoustics Inc.
2345 Crystal Drive
Arlington, Virginia 22202

To Clayton H Spikes:

I am writing to you concerning the ATOC project, a which I am opposed. The draft EIS is very inadequate to allow this project to continue. It does not adequately justify the need for this type of Marine Mammal Research, because 1 the effects on marine mamnals are uncertain I-1 and may prove to be harmful.

Why is the funding for Global Climat Change being provided by the Dept of Defense anyways? Why isn't the 35 mill going towards renewable/sustainable fuel sources such as solar & wind - instead the are indications its being used for submari detection by the military.

Before this ATOC project is allowed to proceed further analysis is needed and its true use needs to be exposed to the public.

Gwyn Codenhead

C-144

RECEIVED 1/31/95

ARPA
Marine Acoustics, Inc
2345 Crystal Drive
Arlington, Virginia 22202

Bryon Scott M.S.
3904 4th Ave
San Diego, CA 92103

Attn. Spikes,

I am opposed to the ATOC project. I think military expansion into the Oceans is ill conserved.

Leave the marine animals alone.

You are liars.

The intentions of the ATOC experiment have not been made clear to the public.

Sincerely
Bryon Scott M.S.

C-145

Dearest Gentle person.

RECEIVED 1-31-95

Please weigh carefully your response to A.T.O.C. The golden rule applies to more then just humans. Being that the impact of high frequency, low decibels waves are uncertain and we don't want to look back again and say. OH no! we did it again. Because, I do not believe we have our priorities straight, do not allow the SOSUS project to procead. experiments are something short term that can be undone. Thank you.

C-146

Mrs Roger Conklin
642 Santa Cruz Ave
Salinas, CA. 93901-3915

RECEIVED 1-31-95

January 25, 1995

To: Advanced Research Projects Agency

Re: ATOC PROJECT

I am writing to express my concern over the proposed project by your agency to install sonar equipment in the Monterey Bay Sanctuary.

It is my understanding that your program has not yet successfully undergone an environmental impact assessment.

It is also my understanding that nothing is known about possible negative effects on the
1 oceanic mammalian population. Proper hearing is I-15
an important factor in their survival. To threaten this capacity is a serious matter.

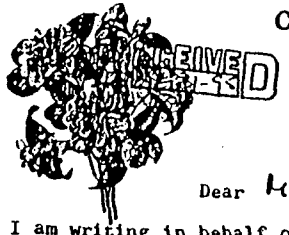
Monterey Bay Sanctuary should remain what its name implies it to be: a sanctuary for all
2 marine life. I-42

I feel you must find a way to assure us that you will not be causing harm to marine mammals before you are allowed to proceed with your experiments.

Helen Conklin

Helen Conklin

C-147



Jane K S Mio
215 Mountain View Ave, Santa Cruz, CA 95062

Dear Mr Clayton Spikes

I am writing in behalf of the "ATOC" project.Please note,that I amextremly opposed to the persuit of this project for the following reasons:

I) My taxdollar is being spend on an item,which is questionable in its benefit for humans and marine life
1 due to the difficulty of achieving proper data from the sound channel,which is subject to many external interferences.According to the EIS the sound channel is hard to target.It seems,that my taxdollar would be more successfully spend on immediate education. I-3f

2)As a mother I was not asked to be a scientist to determine the stress level of my children when they were exposed to intruisive noise.I could tell when they were getting overloaded by their nervousness,unfocused behaviour and decrease of learning ability.Considering that ATOC is intending to expose marine life to intrusive noise,I don't see,why other organisms would't respond the same way my children did.I had the choice to remove my children from the noise source-Marine life doesn't.

3)The conduct Of the ATOC project seems very questionable.The scientists are ever so eager to conduct the re-
2 search in spite of the guidelines and requests from the public.As far as I am informed the ATOC project was supposed to wait for the EIS,but it went ahead with its research in international waters in front of Mexico,before the publication of the EIS.I am not clear why this project is exempt from laws and permits and why they are allowed to install equipment before receiving okay. I-14c

My sense of justice and fairness is being challenged by the conduct of the people involved,who are obviously ignoring law,permits public hearings and experts opposition.

You are my delegate in this matter and I ask you consider my opinion as an important messege.Thank you

Yours Jane Mio

C-148

BARKLEY DAVID SMITH
LANDSCAPE DESIGN
P.O. Box 7061
Carmel, California 93921
(408) 372 2905 fax 372 0217

Advanced Research Project Agency
Marine Acoustics Inc.
2345 Crystal Drive
Arlington, Virginia, 22202

Dear Clayton H. Spikes,

I am rushing to complete this letter before the last date of the public comment period. I wish to add my voice in opposition of the ATOC project. It has not been adequately demonstrated to me that the intent of the project is
1 purely for the science of researching global warming, given that the Dept. of Defense has been a major funding source for the project. I would like the DOD to account for their interest in this experiment. Also, for me , if not at purely a instinctual level, I am concerned about the possibly irreversible effects of high
2 decibel, low frequency sound on marine mammals, while the possible benefits such research is stated in the DEIS as *uncertain*. I-1 I-15

I would urge an extension of the public comment period. Such a move
3 will allow the issue to be fully aired and dispel the perception that the ATOC project is being steam rolled through the review process. I-142

Sincerely,

Barkley Smith

C-149

1-27-95

To Crayton H. Spikes:

RECEIVED 2-9-95

I am writing to tell you my feelings on the ATOC project. It is a proven fact that global warming is a serious problem in our environment. I feel that if we want to help in any way we have to stop this project.

Sincerely Yours,

Lesley Paddock

C-150

Dear Mr Spikes:

RECEIVED 1-31-95

I am writing to express my concern about the ATOC projects in both Monterey Bay and Hawaii. If both the research benefits and the impacts in marine life are uncertain, as according to the draft of the environmental impact statement, why is the ATOC project allowed to proceed? If the ATOC's intentions are truly bent on global warming research, it seems to me that the money could be better invested in developing safe, clean renewable energy technologies such as solar and wind power, which could be used as alternatives to fossil fuels. I have difficulty understanding why the project is allowed to go on based on such spurious preparation and military funding.

I would appreciate a response.

Yours,

Douglas H. Ross

C-151

1-24-95

To Clayton H. Spikes,

RECEIVED 1-31-95

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the research benefits are stated in the DEIS as uncertain. It is impossible to estimate the irreversible effects of high decibel low frequency sound on marine mammals as gradual deafness and damage to reproductive and immune systems.

Scripps Institute has received 35 million dollars from the DOD to research global warming. If global warming was true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global climate.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely Yours,

Senida Sferdian

C-152 RECEIVED 1-31-95

Jan. 24, 1995
4239 5th Ave NE
Seattle, WA 98105

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, VA 22202

Mr. Spikes:

It's time to stop this crazy ATOC project. In this time of fiscal austerity, a pork barrel project such as this does not even warrant a cursory examination!

All mainstream scientists now agree that global warming is taking place. Money for so-called "research" should instead be devoted to solving the problem!

Sincerely yours,
Kevin C. Gleeson

C-153

RECEIVED 1-31-95

MONTEREY BAY AQUARIUM®

Advanced Research Projects Agency
c/o Clayton H Spikes
Marine Acoustics, Inc.
Four Crystal Park, Ste 901
2345 Crystal Dr.
Arlington, VA

January 27, 1995

Dear Mr. Spikes,

I am writing to you to voice my support for the California Acoustic Thermometry Of Ocean Climate (ATOC) Research. I have read the Environmental Impact Report and Statement as well as attended a discussion by Dan Costa on the Marine Mammal Research Program.

I believe that this research is valid. My one concern is that the MMRP includes the monitoring of Humpback whales as well as the other marine mammals mentioned in the EIR.

Since the operation of the sound source will only be on 2%-8% of the time, it will have very few adverse affects on marine mammals. This research would be an important contribution to studies on the "greenhouse effect". Please initiate research on ATOC.

Sincerely,

Barbara Utter
Aquarist

886 Cannery Row Monterey, CA 93940-1085 Telephone (408)648-4800 FAX (408)648-4810

C-154

RECEIVED 1-25-95

January 27,1995

Advanced Research Project Agency
Marine Acoustics Inc.
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes,

I am writing to express my opposition to the ATOC project. I believe the Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS to be uncertain. I urge you to enlist the precautionary principle since it is impossible to estimate the irreversible effects of high decibel, low frequency sound on marine mammals such as gradual deafness and damage to reproductive and immune systems.

Although Scripps Institute has received 35 million dollars for global warming research the "classified" nature of the ATOC project indicates that this has nothing to do with global warming research. Money would be better spent on clean energy, energy efficiency and other efforts to reduce our impact on climate; these are known ways to prevent global warming.

It is evident that the true intentions of the ATOC are being kept from the public and a much more extensive analysis must occur before this project can be properly assessed.

Sincerely yours,

Pamela Wellner

Pamela Wellner

C-155

RECEIVED 1995

Advanced Research Project Agency
Marine Mammals, inc.
2345 Crystal Dr.
Arlington, Virginia 22202

To Clayton H. Spikes:

I am writing this letter to express my obsition to the ATOC Protect. The Draft Environmental Impact Statement (DEIS) is inadequate to allow The ATOC Protect to proceed.

I am concerned with the impact that this would have on marine mamal and animal life. I'm concerned that it will cause problems with thier hearing and their navigational tools.

To my understanding the frequencies that you will be broadcasting will be extremely low and way too loud. With my understanding of frequencies and acoustics This could cause severe Health problems to any living creature.

I Strongly urge you to reconsider your decision to go ahead with this Protect. I think that research needs to be done about Global warming, Since it exists, but this is an extremely stupid idea.

Ira Camp
Ira Camp

C-156

RECEIVED 1995

January 23, 1

To Mr. Clayton H. Spikes,

I am writing to voice my opposition to the ATOC project. The impact statement is inadequate to allow for the project to proceed.

Because the adverse impacts to marine life are as yet still clear it is imperative to halt the project until definitive answers are available. The effects of high decibel noise on marine mammals must also be taken into account.

Also, ATOC's true intentions have not yet been revealed to the public, as evidenced by the "classified" nature of the project. I feel a great deal of further probing should be done before the project is allowed to continue. Thank you for your time.

Sincerely yours,
Rahul Krishnaswamy
RAHUL KRISHNASWAMY
502 MIDVALE Ave.
L.A. CA 90024

C-157

RECEIVED
1-31-95

Barbara Jackson
1190 Seventh Street #20
Santa Cruz, CA 95062

January 8, 1995

Dear Mr. Clayton H. Spikes:

1. The comment is made in, "Executive Summary":

"MINOR EFFECTS ON GROWTH RATES OF ONE SPECIES OF SHRIMP HAVE BEEN OBSERVED IN LABORATORY EXPERIEMENTS..."

In a letter sent to the National Fishery Service addressed to Dr. William Fox (May 26, 1994), referring to studies related to stress (and Dr. Selye considers noise a stressor) I, specifically, included one of his numerous observations of the effects being:

"YOUNG ANIMALS CEASE TO GROW!"

Along with my summary as appropriate to ATOC, I included a copy of his book," Stress of Life".

11. You seem to be suffering under the illusion that hearing loss is the only auditory problem and high volume the only factor of concern. WRONG!

Please find, enclosed, information on TINNITUS. Feel free to contact Dr. Elliot Rosenberg, MD * for information on HYPERACUSIS. Since we find noises such as windchimes, ticking of a clock and/or turning of a page etc.etc. a significant disturbance your, supposedly, benign comparisons for volumes involved with ATOC are a joke!

Two addresses:

* Dr. Elliot Rosenberg
2 South Belle Drife
West Long Branch, New Jersey 07764

HYPERACUSIS NETWORK
444 Edgewood Drive
Green Bay, Wisconsin 54302

Yours truly,

Barbara Jackson

C-158

Comments on the DEIS/EIR for the California ATOC Project and MMRP

Peter L. Tyack
Center for Advanced Study in the Behavioral Sciences
25 January 1995

I was a member of the Committee of Low Frequency Sound and Marine Mammals of the National Academy of Sciences and am a member of the Advisory Board of the ATOC MMRP. The following are my concerns regarding this DEIS. Many have already been brought up by the National Academy report or by recommendations of the ATOC MMRP Advisory Board. However, the following are my own personal comments on this document.

Comparing levels of sound in air and underwater

The ATOC EIS/EIR is inconsistent in dealing with the issue of how to compare levels of sound in air and underwater. The main body of the EIS generally avoids comparisons of air vs water levels. However the executive summary does make these comparisons in an attempt to suggest that criticism of this project was based upon errors in comparing sounds in air and underwater. This section is correct in pointing out how to compare pressure vs power in the two media. However, Table ES-1 and related text (pp ES-5 and ES-6) clearly imply that power is the appropriate acoustic feature for perception of loudness and for auditory damage. This leads to a water standard that has much higher pressure levels for comparisons with the air standard. When the Committee of Low Frequency Sound and Marine Mammals of the National Academy of Sciences considered this issue, we did not include the power correction in such a table, but noted the different relationship between pressure and power in the two media. There are insufficient data on either hearing loss or perception of loudness in marine mammals to justify choice of one feature over another (pressure vs power). This part of the EIS is not correcting a misconception as much as pushing a particular hypothesis about biological impact that has not yet been subject to empirical testing. There is no biological justification for suggesting that an animal above the ATOC source would experience a moderately loud sound similar to being in a kitchen with a disposal running. I would urge that these misleading comparisons be struck from the EIS.

1 I-9d TC

p 1-1 I am confused by the statement that NMFS requested Scripps to obtain a Scientific Research Permit instead of an incidental take authorization for the ATOC project. It would be helpful to include the NMFS request along with enough information to conclude the following about their policy: Does this extend to the whole ATOC project or just the different parts of the MMRP that each have their own permit? What about other scientific or commercial projects that may incidentally impact marine mammals but are not primarily to study marine mammals? Do they need a permit to operate? If so, what kind? Can any scientific or commercial group apply for a blanket scientific research permit for their activity as long as they hire biologists to study the impact?

2 TC

p 1-4 and 1-5; Table 1.1.2-1
The Advisory Board of the ATOC MMRP commented in items 20 of the recommendations from the 13 June 1994 meeting:

> The Board was advised that a preliminary but substantive report on the reactions of mammals to the ATOC sounds may be needed within 1 month after the end of the MMRP-controlled phase. This report will be needed to support a decision as to whether the regularly-scheduled ATOC phase can begin. The Board notes that *this decision will be one of the most significant and potentially controversial decisions to be made during the entire project.* The Board suggests that the MMRP, NMFS, and other interested parties agree (a) on the types of information and level of detail that will be required, and (b) a realistic schedule for completing this report

3 TC

The EIS should include these details. The board suggested in items 20 and 21 of the report that it will be extremely difficult to analyze data from the six month Pilot Study in one or a few months. The earlier years of MMRP observation have taken at least one year to analyze. The Advisory Board noted that a "quick look" capability would need to be planned into all stages of the project, with considerably increased demands on the MMRP. I do not see that this has been added. The Advisory Board recommended that this kind of "quick look" should have limited objectives and it was "unrealistic to expect the MMRP to complete a substantive analysis of all types of behavioral reactions, and to prepare a comprehensive report suitable for expernal review, within 1 month after the end of data collection." The DEIS takes a much broader stance and states that "ATOC climate-related transmissions will begin only if the system is determined to be safe for marine animals." What if the Advisory Board is correct and the MMRP requires more time for such a determination? What are contingency plans if analysis takes longer? What if the preliminary report is inconclusive? Who makes decisions about potential impact? The EIS should provide more detail on these critical issues.

Table 1.1.3-1
Many of the levels of whale sounds in this table are significantly higher than typical reports published in the scientific literature. Please give references to published sources, and state whether these are maximum values or some estimate of central tendency. Maxima are not the most reliable numbers. If there is a strong reason not to use a central estimate, something like an upper quartile would be more reliable. This table and associated text do not mention that gray whales responded more strongly to continuous sounds like the ATOC source compared to impulse sounds such as an airgun array. The levels reported in Table 4.3.1.1.1-1 differ in many species from Table 1.1.3-1, and seem a fairer representation of the literature. Please change Table 1.1.3-1 to be consistent with Table 4.3.1.1.1-1.

4 TC

p 2-6 and 2-7
Modeling acoustic propagation is a tricky business. The significant changes in predicted propagation in different ATOC documents attest to these problems. It is therefore

important to verify predicted values with empirical data. The ATOC MMRP Advisory Board recommended the following in item 16 from its 13 June 1994 meeting:

> The research protocol should include details as to how ATOC and the MMRP will verify sound levels (and signal-to-ambient ratios) received from the ATOC source and other human activities at locations where marine mammals are observed.

5 App.C TC

This is particularly important in the shoreward direction for the California ATOC project, because it determines whether migrating gray whales may be impacted and whether recreational human divers can hear the ATOC sound. What are the plans to ground truth the models? Will the ATOC project perform initial tests to ensure that inshore areas where gray whales migrate could not possibly be exposed to the 110-120 dB levels demonstrated to cause avoidance reactions in migrating gray whales? Will this be done in the absence of whales? Will there be any monitoring to ensure lack of impact on migrating gray whales?

p 2-15 and 2-16

6 I-4b TC

While it makes sense to choose a site rich in marine mammals for MMRP, the opposite holds for ATOC. The EIS should either separate source site criteria for MMRP and ATOC or give a detailed explanation about why that is impossible or ill advised.

Section 4.3

The section on scientific uncertainty cuts to the quick of the problem with marine animals and noise. We currently do not have data to predict what levels of the ATOC sound and corresponding ranges from the source may cause auditory damage or behavioral disruption. The MMRP proposes to answer both questions for target species, but these data are not available for the EIS yet. It seems to me that the finding of no adverse impact in the EIS is premature. If there are sufficient data to find no impact, why spend 10% of the project funding on the MMRP? The EIS should give more detail about procedural issues related to completing the EIS process before data is made available from the MMRP.

7 I-15

The analysis of hearing loss assumes that exposure to levels <150 dB will not cause a problem. This is extrapolated from human data. Hollien who produced these studies is quoted on p 4-21 as arguing that lower levels than this may cause temporary hearing loss. It may not be conservative to extrapolate from studies of underwater hearing in human ears (which are adapted for hearing in-air) to ears of marine mammals which are adapted for underwater hearing. Terrestrial mammals tend to show temporary shifts in their thresholds of hearing (TTS) when exposed to sounds 80 dB or more above their hearing threshold. Whether a similar dynamic range is characteristic of ears underwater is challenged by Hollien and has never been tested for marine mammals. Until such data are provided, I believe that it is over-confident to assume no impact to exposures < 150 dB. The Advisory Board provided the following comments on this point:

8 I-7h

> ATOC documents assume that hearing damage and/or TTS will not occur if received levels of ATOC sounds are below 150-160 dB re 1 μPa. The Advisory Board notes that this assumption may or may not be true, but that there are no supporting data from marine mammals. This and other auditory parameters may very widely among the main marine mammal groups.

I applaud the addition of auditory experiments to the MMRP, but question the 150 dB criterion retained in the DEIS. We simply do not have any data on what levels or ranges from the ATOC source might affect the hearing of marine animals.

I believe that Table 4.1-1 is correct in calling the impact of the ATOC sound on mysticetes and deep diving low frequency odontocetes "uncertain" given this profound lack of data. I do not understand why the impacts to most other marine animals are listed as LSM or LSNM, since our ignorance is just as profound for most of them. Table 4.1-1 (fn 1)

9

The DEIS emphasizes that the 5-min ramp up period is a significant mitigating measure because animals near the source could use this interval to swim away and avoid full exposure. The Advisory Board had questions about how well the suggested mitigation would work:

> The Board noted that the "ramp-up" approach depends on largely-untested assumptions about how marine mammals near the source would respond. The objective is to include, during operational ATOC emissions, a ramp-up scheme that induces any mammals that are very close to the source to move away before the source reaches full power. .... Ultimately ramp-up duration and rate should be related to minimum swimming speed and radius of biologically significant effects.

The DEIS appears to make questionable assumptions on this regard: "The potential for auditory injury or deafness for any species of fish is anticipated to be negligible, given the fact that the 5-min ramp-up period will allow sufficient time for their departure from the area prior to onset of the main transmission."(p 4-96) This conclusion ignores potential problems such as (1) lack of avoidance of the ramping sound (2) combinations of slow-swimming speed and large radius of impact (3) residency of animals in the impact zone (4) difficulty in determining the correct direction for avoiding the source in a complex exposure field. Clearly many of these assumptions need to be tested before the ramp up is viewed so confidently as a successful mitigation. The EIS should address these concerns. I-6m

10

The DEIS is inconsistent in generalizing expectations of no impact from humans to most marine vertebrates while limiting expectations of demonstrated impact to each particular species that happens to have been studied. For example, the study of Lagardere (1982) is reviewed in the DEIS, leading to a prediction that growth and reproduction of shrimp may be impacted at exposure levels of 120 dB or more. This is one of the few such studies on any marine animal, and there are few features unique to shrimp associated with heightened sensitivity to sound. Yet the DEIS concludes "other than potential minor decreases in shrimp productivity, no direct short-term impacts to invertebrates are anticipated." (4-

11 TC

102) I do not understand why no impact is anticipated on the hundreds of species that live in this area but whose sensitivity to sound has not been studied. The final EIS must take a more balanced approach to these issues.

p 4-27

The summary of responses of migrating gray whales to noise states: "marine mammals often exhibit avoidance reactions when an industrial noise level reaches 120 dB" (p 4-27) This is not quite correct. While 50% of whales avoided continuous sounds at levels of 117-123 dB, depending upon the stimulus, the most sensitive 10% avoided drill ship sounds at levels of 110 dB. The 120 dB level is the one at which 50% of gray whales responded, not the level at which the first ones started to respond. Most of the world's gray whales migrate inshore of the ATOC source. Whether the 110 dB contour overlays the gray whale distribution is critical for predicting impact. If gray whales respond to the ATOC source as they do to drill ships, then the most sensitive 1/10 of the 20000 migrating whales that were within the 110 dB exposure zone during transmissions might show behavioral disruption. The choice of 120 dB contours to predict no impact is not correct. Even 110 is not conservative, it is consistent with disruption of 10% of the whales. Monitoring of migrating gray whales and of the actual inshore sound levels is very important, since most of the species migrates relatively close to the predicted impact zone. The methods for such a study are cheap and effective.

TC

12 I-7a

C-159

BOARD OF SUPERVISORS

COUNTY OF SANTA CRUZ

GOVERNMENTAL CENTER

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JANET K. BEAUTZ, FIRST DISTRICT
WALTER J. SYMONS, SECOND DISTRICT
MARDI WORMHOUDT, THIRD DISTRICT
RAY BELGARD, FOURTH DISTRICT
FRED KEELEY, FIFTH DISTRICT

January 26, 1995

Clayton H. Spikes
Advanced Research Projects Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

RE: COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT FOR THE CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT AND ITS ASSOCIATED MARINE MAMMAL RESEARCH PROGRAM

Dear Mr. Spikes:

On January 24, 1995, the Santa Cruz County Board of Supervisors adopted a resolution in support of comments developed by Planning Department staff on the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the California Acoustic Thermometry of Ocean Climate (ATOC) Project and its associated Marine Mammal Research Program. The comments and supporting resolution, attached for your use, recommend selection of Alternative 2, the No-Action alternative.

Of deep concern to the County of Santa Cruz is the potential for long term cumulative impacts to the tourism and recreational commercial fishing industries which will indirectly impact the local economy. The draft EIS/EIR fails to adequately address indirect economic impacts. In addition, given government budget concerns, Santa Cruz County contends that it would be fiscally imprudent to proceed with the ATOC Project because of the large number of uncertainties and the possibility that no measurable benefits may be gained. 1 I-5e

Selection of the No-Action alternative will allow for a delay of sufficient length for the collection of necessary baseline information and completion of further research to provide convincing demonstration that the ATOC Project will not have adverse impacts on any marine life or the marine ecosystem as a whole.

Thank you for your thoughtful consideration of our comments.

Sincerely,

FRED KEELEY, Chair
Board of Supervisors

FK:ljr
Attachments

cc: CDR Terry Jackson, Monterey Bay National Marine Sanctuary
Rachel Sanders, Center for Marine Conservation
Vicki Nichols, Save Our Shores
Clerk of the Board
Planning Department

0404185

ATTACHMENT 1

COMMENTS OF SANTA CRUZ COUNTY ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT FOR THE CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT

The County of Santa Cruz takes this opportunity to submit to the Advanced Research Projects Agency (ARPA) of the Department of Defense, the following comments on the draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the California Acoustic Thermometry of Ocean Climate (ATOC) Project and its associated Marine Mammal Research Program (MMRP). Staff's review of the draft EIS/EIR has identified serious flaws in the document which will need to be addressed before any final action is taken to approve the project.

The indirect economic impacts to coastal local governments resulting from fishery and tourism resource impacts is an issue of great concern. As are most coastal counties, Santa Cruz County is economically dependent on it's tourism and recreational and commercial fishing industry. Any impact to important fish and marine mammal resources and their prey species, including avoidance or other behavioral changes, will result in impacts to the County as well. The discussion of indirect economic effects in the draft EIS/EIR is extremely inadequate in regards to this issue. 1 I-5e

Given the significant controversy and the large number of uncertainties surrounding the ATOC project as designed, coupled with the possibility that no measurable benefits may be gained, Santa Cruz County contends that it would be imprudent to proceed with the ATOC Program at this time. A delay of sufficient length is needed to allow for the collection of necessary baseline information and refinement to the monitoring methodology for the detection of sound source effects and evaluation of their impacts on all marine life.

Santa Cruz County recognizes the critical importance of defining the nature of "global warming" but feels that any substantial long term project designed to measure this phenomena must be held to the same high standards of environmental responsibility as would any industrial private enterprise project. The relatively pristine and unexplored nature of the Pt. Sur area which abounds with marine life, as acknowledged by it's inclusion in the Monterey Bay National Marine Sanctuary, necessitates the need to proceed with caution.

The County's comments which follow are respectfully submitted as part of our continuing interest and involvement in the environmental review process for the ATOC project.

SPECIFIC COMMENTS

Section 2.2.3.2, Page 2-18

2 "...this potential site would be 70 km west of the Washington coast and can be considered a deep-water site that is located in a region of known adverse weather conditions ("roaring 40's")." TC

The "roaring forties" occur in the Southern Hemisphere at 40 South latitude, not in the North Pacific Ocean.

Section 3.3.7, page 3-59

3 This section, which presents information on threatened, endangered and special status species that may occur in the study area, fails to mention the coho salmon (Oncorhynchus kisutch) populations in Scott and Waddell Creeks, Santa Cruz County. These fish have been listed by the State of California as a candidate species for threatened status. In addition, the National Marine Fisheries Service is expected to list Pacific coho stocks, in the near future, as threatened under the Endangered Species Act. TC

Section 4.2.1.1, Page 4-10

4 CEQA Mitigation Measure 1-2: ATOC facilities would be removed at the end of the experiment, to the extent economically and practicably feasible. Concur

If the ATOC cable and source were not to be removed, they could potentially become an obstacle to commercial fishing due to gear conflicts.

Section 4.2.1.1, Page 4-11

5 CEQA Mitigation Measure 2-2: The ATOC project will coordinate with other oceanographic and acoustic research efforts, and U.S. Navy activities, to ensure that scheduling and operational conflicts are avoided. TC

The ATOC project should also coordinate with the commercial fishing industry during important seasonal fisheries, such as the commercial salmon fishery, to avoid user conflicts related to fish dispersal and avoidance behaviors.

Section 4.3.2.2.1, Page 4-88

CEQA Mitigation Measure 10-1: The MMRP will monitor fish stock assessments to attempt evaluation of the potential for increased predation on fish, in relation to ATOC source sounds.

How would the action in the above listed mitigation measure be accomplished? This action is not discussed in Appendix C, Research Protocol for the California Marine Mammal Research Program (MMRP). The County questions whether it is even possible to obtain fish stock assessment data in a manner timely enough to accomplish the intent of this mitigation measure. Regardless, it would not be possible to correlate a decrease in fish stocks to increased predation caused by sound transmissions, using fish stock assessment data. It is ludicrous to offer the above action as a mitigation measure. TC 6

Section 4.3.2.2.1, Page 4-91

The cited study by Pearson et al., (1992) is not listed in the EIS/EIR bibliography (Appendix A). However, this discussion confirms behavioral impacts could occur and further highlights the need for more studies to determine the long term effects of repeated sound transmissions and resultant dispersal and avoidance behavior.

In comments previously submitted on June 14, 1994 by the County of Santa Cruz in response to the Notice of Intent to Prepare an EIS, a previous study by Pearson et al., (1987) was cited for its findings related to fish dispersal behavior in response to acoustical energy. This study looked at the reaction of rockfish to sound produced by a single airgun. Rockfish schools located from one to eleven miles from the sound source exhibited behavior changes. Their dispersal resulted in a decline in fishing vessel catch-per-unit-effort of 52.4%. This study correlates sound related behavioral effects with indirect economic impacts. TC 7

Section 4.3.2.2.1, Page 4-92

CEQA Mitigation Measure 11-1: The MMRP will monitor fish stock assessments to attempt evaluation of the potential for impacts to the behavior of fish, particularly sharks, in relation to ATOC source sounds.

How would the action in the above listed mitigation measure be accomplished? This action is not discussed in Appendix C, Research Protocol for the California Marine Mammal Research Program (MMRP). The County questions whether it is even possible to obtain fish stock assessment data in a manner timely enough to accomplish the intent of this mitigation measure. Regardless, it would not be possible to correlate a decrease in fish stocks to impacts from behavioral changes caused by the sound transmissions. This action is not what CEQA intends for mitigation measures. TC 8

Section 4.3.2.2.1, Page 4-93

The draft EIS/EIR states, "If fish do react to noise from human activities by reduced use of certain areas, there is often insufficient reliable and systematic data collected to document the trend." It is further stated, "... cases of partial, or even complete, abandonment of disturbed areas may, in fact, be more commonplace than expected (Richardson et al., 1991)." 9 TC

Again, this further supports the County's premise that long term dispersal or avoidance behavior will ultimately impact the local economy.

Section 4.3.2.2.3, Page 4-96

> "... the 5-min ramp-up period will allow sufficient time for their departure from the area prior to onset of the main transmission."

While this statement was made in the context of dismissing the potential for auditory injury to fish, it also highlights the fact that behavioral changes such as dispersal and avoidance are expected to occur. The fact that the sound transmissions will be of long duration and continuously repeated raises the questions of whether marine life would completely abandon the disturbed area for the entire life of the project.

> "Observations show that while these fish may experience temporary behavioral disruption, no permanent negative impacts are expected and they too should habituate to the regular transmission sounds." 10 TC

This conclusion that fish will habituate to the transmission sounds is not supported by the discussion in Section 4.3.2.2.1.

Section 4.3.2.6, Page 4-110

This section on threatened, endangered and special status species fails to mention the local coho salmon (Oncorhynchus kisutch) populations that have recently been listed by the State of California as a candidate species for threatened status. See 3.3.7

In addition, it is erroneous and misleading to base the conclusion that there is no potential for direct, indirect or cumulative effects on the endangered Sacramento River winter-run chinook salmon (Oncorhynchus tshawytscha) on the stated premise that, "...chinook salmon's primary oceanic habit at area is generally located to the north of the proposed action site (approximately 500 km away), in the northeast Pacific fishing area." It is well documented that these fish seasonally occur throughout the study area. 11 TC

Oncorhynchus is misspelled in paragraph 3.

Section 4.3.2.7, Page 111

Contrary to what is stated, the County of Santa Cruz contends that the project is not consistent with the Management Plan for the Monterey Bay National Marine Sanctuary (MBNMS). According to the MBNMS Management Plan, the purpose of Sanctuary research activities is to improve understanding of the Monterey Bay area environment, resources and qualities, and to resolve specific management problems. In addition, current regulations prohibit flying motorized aircraft, except as necessary for valid law enforcement purposes, at less than 1000 feet. The Research Protocol for the MMRP (Appendix C) reports than aerial surveys would be flown at 230-270 m altitude. 12 TC

Section 4.4.1, Page 4-114

The discussion on indirect effects on the economic environment is extremely weak. The County of Santa Cruz does not agree with the assignment of "less than significant" impacts to commercial/recreational/potential fisheries (Table 4.1-1). Avoidance or other behavioral changes can be expected and will result in changes in habitat utilization and loss of traditional fishing grounds. This in turn could cause additional problems from increased fishing pressure in other areas. 13 I-8c

The commercial and recreational fishing industries consist, for the most part, of individually owned family businesses. These small operations are predicated upon renewable seasonal fish resources and are not able to sustain losses which are over several seasons in duration.

Previously experienced user conflicts between the commercial fishing industry and seismic exploration vessels off California, caused by acoustic sound impacts as well as gear conflicts, were mitigated by seasonal restrictions of seismic exploration activities during important fishing seasons. Locally, it would be important to cease sound transmissions during the commercial salmon fishing season to avoid indirect economic impacts related to fish avoidance or other behavioral changes. Santa Cruz County recommends, for inclusion as a mitigation measure, the scheduling of sound transmission restrictions during important fishing seasons. 14 I-5c

The County of Santa Cruz does not agree with the assignment of "no significant" impact to recreational activities/tourism (Table 4.1-1). Again, the likelihood for dispersal behavior or abandonment of the area by marine life will result in impacts to the area's whale-watching, recreational fishing and recreational diving enterprises, as well as to all of the associated businesses which rely on these activities to bring tourists into the area. 15 I-5e, 18a

Section 5.4.3, Page 5-12

The statement that the ATOC program and the MMRP are consistent with the MBNMS Management Plan is not true. It is stated in the MBNMS Management Plan that the purpose of Sanctuary research activities is to improve under-

standing of the Monterey Bay area environment, resources and qualities, and to resolve specific management problems. In addition, current regulations 16 prohibit flying motorized aircraft, except as necessary for valid law enforcement purposes, at less than 1000 feet. The Research Protocol for the MMRP (Appendix C) reports than aerial surveys would be flown at 230-270 m altitude. TC

CONCLUSION

Given the large number of uncertainties surrounding the ATOC project and the possibility that no measurable benefits may be gained, Santa Cruz County contends that it would be imprudent to proceed with the project as designed. The lack of existing information on marine life response to low frequency sound precludes the ability to make informed decisions on probable impacts. A delay of sufficient length should be required to provide for the collection of baseline information and the completion of further studies on the effects of low frequency sound on marine life.

In conclusion, the County of Santa Cruz recommends Alternative 2, the No Action alternative. This would allow time for the collection of baseline data on the proposed sites and for further studies to provide convincing demonstration that the activities proposed will have no significant adverse impact on any marine life or the marine ecosystem as a whole.

BEFORE THE BOARD OF SUPERVISORS
OF THE COUNTY OF SANTA CRUZ, STATE OF CALIFORNIA

RESOLUTION NO. 34-95

On the motion of Supervisor Beautz duly seconded by Supervisor Wormhoudt the following Resolution is adopted:

RESOLUTION IN RESPONSE TO THE DRAFT EIS/EIR FOR THE ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROGRAM AND ITS ASSOCIATED MARINE MAMMAL RESEARCH PROGRAM

WHEREAS, the Advanced Research Projects Agency of the Department of Defense and the University of California, San Diego have solicited comments on the draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Acoustic Thermometry of Ocean Climate (ATOC) Project and its associated Marine Mammal Research Program (MMRP); and

WHEREAS, low frequency sound producing equipment installed off Pt. Sur, California (within the Monterey Bay National Marine Sanctuary) would transmit acoustic signals for 20 minute durations at a maximum of every four hours over a two year period, with possible continuation for a period of ten years of more; and

WHEREAS, sufficient baseline information with which to assess sound induced behavioral and physiological impacts to marine life does not exist; and

WHEREAS, the County of Santa Cruz relies, to a significant degree, on a coastal-dependent economic base which is built upon the tourism and recreational and commercial fishing industries; and

WHEREAS, the County of Santa Cruz recommends Alternative 2, the No Action alternative to allow time for further research to provide convincing demonstration that the ATOC Project will not have adverse impacts on any marine life.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED that the Board of Supervisors of the County of Santa Cruz by adoption of this resolution hereby supports the comments developed by County staff; and

RESOLUTION IN RESPONSE TO THE DRAFT EIS/EIR FOR THE ACOUSTIC THERMOMETRY OF OCEAN CLIMATE PROJECT
Page 2

BE IT FURTHER RESOLVED AND ORDERED that copies of this resolution and attached comments shall be transmitted by the Chairperson of the Board to the Advanced Research Projects Agency of the Department of Defense prior to the January 31, 1995 deadline.

PASSED AND ADOPTED by the Board of Supervisors of the County of Santa Cruz, State of California, this 24th day of January, 1995, by the following vote:

AYES: SUPERVISORS Beautz, Symons, Wormhoudt and Keeley
NOES: SUPERVISORS Belgard
ABSENT: SUPERVISORS None
ABSTAIN: SUPERVISORS None

FRED KEELEY
Chairperson of the Board of Supervisors

ATTEST: SUSAN M. ROZARIO
Clerk of the Board

APPROVED AS TO FORM:
County Counsel

STATE OF CALIFORNIA)
COUNTY OF SANTA CRUZ) ss
I, SUSAN A. MAURIELLO, County Administrative Officer and ex-officio Clerk of the Board of Supervisors of the County of Santa Cruz, State of California do hereby certify that the foregoing is a true and correct copy of a resolution passed and adopted by said Board in the minutes of the said Board. In witness whereof I have hereunto set my hand and affixed the seal of said Board this 24th day of January 1995.
SUSAN A. MAURIELLO, County Administrative Officer
By Deputy

DISTRIBUTION: County Counsel
Planning Department - Resources Section
County Administrative Office

RECEIVED
1-31-95

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January 30, 1995

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c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Campus Planning Office
University of California, San Diego
108 Administrative Complex, 0006
La Jolla, CA 92093

Re: **Comments on Draft Environmental Impact Statement/ Environmental Impact Report for the California Acoustic Thermometry of Ocean Climate Project**

To Whom it May Concern:

On behalf of our clients, Natural Resources Defense Council, Earth Island Institute, Marine Mammal Fund, and Coastal Advocates, we submit the following comments regarding the Draft Environmental Impact Statement/ Environmental Impact Report for the California Acoustic Thermometry of Ocean Climate Project:

GENERAL COMMENTS

A. Inadequate Time for Public Review and Comments. On December 2, 1994, the Advanced Research Projects Agency ("ARPA"), the National Marine Fisheries Service ("NMFS"), and the University of California, San Diego ("UCSD") submitted for public review and comment a Draft Environmental Impact Statement/Environmental Impact Report ("DEIS/EIR") for the California component of the Acoustic Thermometry of Ocean Climate Project ("ATOC"). This document, including well-over 300 pages of text and tables, was produced after over eight months of intense effort by Scripps Institute of Oceanography ("Scripps"), ARPA, NMFS, and the other cooperating agencies. Despite repeated requests for an extension of the public comment period up to and including March 2, 1995, these requests were refused in clear violation of the

1 I-14a

National Environmental Policy Act, 42 U.S.C. § 4371 et seq. ("NEPA") and the California Environmental Quality Act, Cal. Pub. Resources Code § 21000 et seq. ("CEQA"). "Public participation is an essential part of the CEQA process." CEQA Guidelines ("Guidelines") § 15201. "Comments are an integral part of the EIR." Sutter Sensible Planning Inc. v. Board of Supervisors, 122 Cal. App.3d 813, 820, 176 Cal. Rptr. 342 (3d Dist. 1981); see also 40 C.F.R. § 1506.6 (regarding EIS). In accordance with the mandate of NEPA and CEQA, such an extension would have contributed to a greater level of public understanding of the ATOC project -- a project that has generated an almost unprecedented level of public concern.

Instead, the January 31, 1995 deadline offered just sixty-one days in which to review this highly technical and complex document which purports to cover federal NEPA requirements, state CEQA requirements, federal Endangered Species Act and Marine Mammal Protection Act permit requirements and various additional state and local permitting requirements. It is clearly unreasonable to expect the public to review, digest, evaluate and comment on such a multi-facetted scientific document in such a short period of time, especially where a significant portion of that period included the year-end holiday season.

Given the extraordinary public interest in the ATOC project and the significant scientific controversy that surrounds it, the small extension of the public comment period to January 31, 1995, was simply insufficient. Therefore, we submit these comments without having had sufficient time to thoroughly and comprehensively review and comment on the DEIS/EIR.

B. Inadequate Project Description. The project description is confusing and misleading. As such, the alternatives analysis is skewed to favor the proposed project. If correctly evaluated, most of the alternatives clearly demonstrate reduced adverse impacts as well as the ability to achieve the project goals as they should be indicated.

C. Disorganization. The DEIS/EIR is disorganized and intentionally confusing. The admitted and expressly stated negative impacts of the proposed project are scattered throughout the DEIS/EIR rather than clearly stated and cumulatively evaluated.

2 D. Inadequate Evaluation of Cumulative Impacts. The treatment of cumulative impacts is inadequate. I-12c

E. Inadequate Alternatives Analysis. The alternatives analysis is subjective and unsupported by data or evidence in he record.

F. Inadequate Impacts Analysis. The document fails to identify and adequately address the very real concerns regarding the effectiveness and prudence of conducting such a complex and highly speculative scientific research project, especially given its potential impact on the most protected and sacred marine resources in the world -- the Monterey Bay National Marine Sanctuary.

G. Permitting. ATOC is not "scientific research on marine mammals" as defined in the Marine Mammal Protection Act, 16 U.S.C. § 1361 et seq. ("MMPA"), and the Endangered Species Act, 16 U.S.C. § 1531 et seq. ("ESA"), but rather a proposed study on global climate changes. DEIS/EIR at 1-3. Therefore, under the MMPA, this project should be permitted, if at all, under the incidental take permit requirements.

3 TC

H. The DEIS/EIR Is Not An Objective and Neutral Evaluation of the Proposed Project. The DEIS/EIR must be a neutral explanation of the project and its potential impacts. 40 C.F.R. § 1502.1. Furthermore, NEPA procedures must ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken." 40 C.F.R. § 1500.1(b)(emphasis added). In contrast, the DEIS/EIR is skewed in favor of the proposed project. For example, under the guise of offering "clarification and explanation," a substantial portion of the Executive Summary is devoted to summarily discounting the very real concerns regarding the potential harm to the marine environment -- as a true adversarial piece. This argumentative section is entirely inappropriate for this document and therefore should be taken out. See DEIS/EIR at ES-5.

4 TC

Moreover, in violation of the NEPA process, it appears that the certain phases of the project have already begun. See 40 C.F.R. § 1602.2(f),(g) (Agencies shall not commit resources prejudicing selection of alternatives before making a final decision.; EIS's shall serve as the means of assessing the environmental impact proposed agency actions, rather than justify actions already made). For example, a section of the sea cable has already been laid, a permit was issued for the vertical line array installation, and Phase I of the MMRP Pilot Study has begun.

I. Ill-Defined and Inadequate Mitigation Measures. Each proposed mitigation measure must be shown to be feasible and effective. The reason for adopting mitigation measures is to "substantially lessen or avoid" significant adverse environmental impacts. Cal. Pub. Res. Code § 21002. The agency must also adopt a "reporting or monitoring program" designed to "ensure [mitigation] compliance during project implementation." Cal. Pub. Res. Code § 21081.6(a)(1).

5 TC

C-160

Measures derived from the current project description (as submitted in the revised permit application) are not properly determined "mitigation" measures. In the alternatives section, the agencies shall "[i]nclude mitigation measures not already included in the proposed action or alternatives. 40 C.F.R. § 1502.14(f). Therefore, nearly every "mitigation measure" proposed in the DEIS/EIR is not properly labelled such. For example, Mitigation Measures A-1 through A-5 are already included in the proposed action. See DEIS/EIR at ES-15-18. Similarly, other so-called "mitigation measures" cited throughout the DEIS/EIR are nothing more than elements of the project description itself. See, e.g., DEIS/EIR at 2-41.

When properly evaluated, the DEIS/EIR proposes only five mitigation measures and not a single mitigation monitoring plan, as required under the law. The failure to include mitigation measure monitoring plans leaves unanswered questions regarding the implementation of such measures. For example, with regard to Mitigation Measure 2-2, how will the MMRP be coordinated with other oceanographic and acoustic research efforts? What other activities, including U.S. Navy activities, will be conducted? Are other activities currently permitted? Specifically how will scheduling and operational conflicts be avoided? There is a long list of ongoing research and education projects set forth at pages 3-72 and 73, how will the potential interference or conflicts with these ongoing activities be avoided?

SPECIFIC COMMENTS

Executive Summary

The executive summary must include each significant effect with proposed mitigation measures and alternatives that would reduce or avoid that effect. Guidelines § 15123. This section fails to fulfill CEQA's clear requirement by only stating that there are "twenty potential impacts." Even assuming this number is correct, these 20 impacts must be listed and each proposed mitigation measure must include an explanation of how it will mitigate the potential impact. The Executive Summary fails to adequately fulfill this requirement.

6 TC

No comments regarding information in the text, summarized in the executive summary, will be raised here. All such comments will be addressed under each individual section, unless already fully discussed under general comments.

ES-4: The Areas of Concern must be more clearly and thoroughly addressed. This section lists only three concerns generated by this proposed project, and fails to adequately address them. First, the impact of the ATOC sound on marine animals, including mammals and sea turtles, is not addressed by reducing the

7 TC

transmission time if, as admitted, there is "insufficient" knowledge as to the impact of the ATOC sound on these animals. This concern is not alleviated by adding the MMRP, as that program is unlikely to generate statistically useful data. In any event, there is no indication that the results of the MMRP will be used to determine whether ATOC should go forward. Similarly, concerns regarding the use of alternative technologies and preservation of the Monterey Bay National Marine Sanctuary ("the Sanctuary") are inadequately evaluated here and throughout the DEIS/EIR. See, infra at 10-13, 18-20. This section should be more fully developed to adequately address these concerns.

8 ES-6-10: Why is such a large part of this "summary" devoted to the ATOC sound impact comparisons when, in fact, the ultimate conclusion of this DEIS/EIR is that the impacts are "unknown"? What is the basis for comparing sounds produced under water with sounds produced in air?

TC
I-7d

9 ES-8: How was the estimate one whale will be exposed to ATOC "less than once every hundred years" statistically derived? What purpose will be served by conducting the blue whale tagging experiment and passive acoustic data collection efforts as part of the MMRP?

TC
App. C

1 - Introduction, Purpose and Need for Action

The project description must be accurate and consistent throughout an EIR. "An accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR." County of Inyo v. City of Los Angeles, 71 Cal. App. 3d 185, 193, 139 Cal. Rptr. 396 (3d Dist. 1977); see also Guidelines § 15124 (Discussion). "Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefits against its environmental costs, consider mitigation measures, assess the advantage of terminating the proposal (i.e. the "no project" alternative) and weigh other alternatives in the balance." County of Inyo, supra, 71 Cal. App. 3d at 192-93. As discussed below, the inaccurate and unstable project description in the DEIS/EIR is legally inadequate.

1.1 The ATOC Project

Scope of Project. NMFS and ARPA have already received numerous letters emphasizing the need to prepare a comprehensive programmatic environmental impact statement evaluating the cumulative environmental impacts of the ATOC Program as a whole. In particular, these letters have emphasized that the ATOC project lawfully cannot be parcelled into separate projects for purposes of evaluating the environmental impacts of each of these related projects in isolation. (See e.g. June 15,

10

I-2
TC

1994 letter from Heller, Ehrman, White & McAuliffe; April 14, April 29, May, 6, May 14, November 4, and November 7, 1994 letters from Sierra Club Legal Defense Club, Inc.; March 17 and March 21, 1994 letters from Natural Resources Defense Council).

Under the law, NMFS and ARPA must prepare a comprehensive programmatic EIS that evaluates the cumulative impacts of the ATOC Program before any significant aspect of the program is implemented, and before resources are irrevocably committed. The DEIS/EIR, as currently drafted, does not satisfy this requirement.

In their efforts to avoid evaluating the environmental impacts of the ATOC Program as a whole, the entire DEIS/EIR is limited to only a six-month Marine Mammal Research Program ("MMRP"), designed to test the impact of the ATOC Low Frequency Sound ("LFS") on marine animals, and a two-year, California-based "proof-of-concept" study of the ATOC program. The numerous other locations which have been proposed for ATOC-related projects, including Hawaii and New Zealand, cannot lawfully be excluded from the DEIS/EIR. Moreover, the full extent of the proposed ATOC project cannot be ignored. The DEIS/EIR itself states, "If successful, a ten-year follow-on global ATOC program would be proposed. . ." DEIS/EIR at Abstract. The goal of ATOC is "proving the acoustic thermometry concept for future global ocean climate monitoring programs." DEIS/EIR at ES-3. Three new hydrophone receiver arrays will be installed -- near New Zealand, near Pt. Sur and south of Adak, Alaska, combined with 10 drifting receivers that will be deployed along selected transmission paths. DEIS/EIR at ES-2. "This initial phase should demonstrate that it is possible to construct and operate an international network capable of detecting and characterizing ocean climate change." DEIS/EIR at 1-20.

Therefore, this ten year project, the possible international/global system, as well as the ATOC-related projects proposed in other locations, are clearly part of the ATOC program as a whole and, as such, are foreseeable, potential environmental impacts of the "proof-of-concept" study. Accordingly, the potential environmental impacts of the entire ATOC project must be evaluated in a single programmatic EIS/EIR. For example, no consideration of the New Zealand and Alaska hydrophone arrays exists in this document, let alone the cumulative impacts of these projects. Moreover, what criteria will be used to determine the location of the 10 drifting receivers? Are there any possible environmental impacts of choosing such a location, and any mitigating factors that should be applied?

Until and unless the project is properly defined and a proper environmental impacts evaluation is drafted, the implementation of any aspect of the ATOC project will be in violation of both NEPA and CEQA.

This obligation cannot be avoided by alleging that a programmatic EIS may be "too speculative" or subject to "several key uncertainties." DEIS/EIR at 1-20, 1-21, ES-3. If speculative and baseless, why was the full 10-year ATOC experiment part of Scripps' initial permit application submitted to NMFS? See Research Permit P557A at 25. Only when faced with drafting an EIS/EIR did Scripps reduced this project to a two-year California-only phase. The agencies' attempt to avoid its statutory and regulatory duties by misrepresenting the full scope of the proposed project is unseemly and patently unlawful.

Moreover, each of the smaller ATOC-related projects, including the recent Acoustic Engineering Test, which have improperly been proposed and conducted outside of the NEPA/CEQA process is a component of the proposed ATOC project. As such, each of these projects will have cumulative impacts when viewed with the other parts of the ATOC Program. See 40 C.F.R. § 1508.25(a)(2). Cumulative impacts, as closely related, "connected" actions, must be evaluated in a single EIS. Id. Therefore, the impacts of the entire ATOC Program must be fully considered, and alternatives to that program fully explored, in a complete EIS before any components of the ATOC Program are conducted.

Such a requirement ensures that before the ATOC program or any of its related projects can be implemented, a determination will be made whether measuring ocean temperature is the most prudent, practicable and feasible method to evaluate global warming and, if so, whether there are less intrusive means than the ATOC project to obtain those measurements. It is just this determination that ARPA, NMFS, UCSD and Scripps apparently seek to avoid. As currently drafted, the DEIS/EIR fails to analyze the proper scope of the ATOC project, and therefore, does not meet the legal requirements for such a document.

Military Purpose. The DEIS/EIR fails to disclose the military purpose allegedly associated with the ATOC project. What are the military uses associated with the ATOC project? All potential environmental impacts of these military uses must be evaluated as well as any alternatives to this project which will fulfill such military purposes. Is this funding provided by Department of Defense ("DoD") a dual use or non-military use of DoD's funds?

11 I-1

Global Warming. The DEIS/EIR alleges that ATOC "is necessary to validate global climate computer models being used and developed to answer the question whether our earth is warming as a result of the 'greenhouse' effect." DIES/EIR at ES-1, 1-3. The document fails to explain how or why the ATOC data is "necessary," and how such measurements would "validate" other climate models. Without the supporting evidence and explanations, these bare representations fail to

12 I-3 b, c, d

inform the public and assist agencies in decision making. Therefore, a full explanation of the "global climate models" should be included in the EIS/EIR, as well as an appendix which includes the models themselves. See 40 C.F.R. § 1502.24 ("Agencies shall insure that professional integrity, including scientific integrity, of the discussions and analyses in EISs. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement.") As currently written, the DEIS/EIR does not explain how the information generated by the ATOC experiment on the deep sea temperature will validate those models.

Moreover, the DEIS/EIR proposes that certain computer models of global climate change "have been criticized as inaccurate and oversimplified. Therefore, they have had very little impact on governmental decisions to take action to curb emissions of greenhouse gases." DEIS/EIR at 1-4. It is further proposed that ATOC will fulfill the need for large-scale observations of ocean temperatures so that the models may serve as a persuasive basis for policy formulation. DEIS/EIR at 1-4, 2-46, 2-47. Such baseless statements fail to explain how the results of the ATOC project, even if considered accurate and precise, will result in governmental policy actions to curb greenhouse gas emissions. Moreover, if global warming policy changes is a purpose of the ATOC project, then alternatives which will effect such a policy changing result must be included in the EIS/EIR. For example, a very effective means to attain that goal is to direct the millions of dollars devoted to the ATOC design and implementation towards demonstrating that it is economically feasible and scientifically prudent to take action now to abate the global warming problems -- without any further proof of the problems existence.

1.1.2 The Marine Mammal Research Program

Determining deep sea ocean temperature, providing information for future global ocean climate monitoring programs, confirming computer models of global climate change, and allegedly affecting government policy determinations regarding the reduction of greenhouse gas emissions are wholly unrelated to marine animals or the effects of noise on marine animals. Yet, "the ATOC program recognizes a need to evaluate the potential effects of the proposed source transmissions on marine animals, in particular marine mammals and sea turtles." DEIS/EIR at 1-4. Accordingly, the MMRP was designed for a single purpose -- to evaluate the effects of the ATOC source sound on marine animals.

Inexplicably, however, the DEIS/EIR alleges that the MMRP itself will govern the location of the ATOC project -- going so far as to claim that the presence of marine animals is a necessary element of the ATOC project. DEIS/EIR at 1-21. Clearly,

13 I-42, b

to achieve its stated goal of global warming evaluation and governmental policy impact, the ATOC project need not involve the presence of marine animals. Obviously, if located in an area nearly free of marine animals, particularly marine mammals and sea turtles, the possible impacts of the source noise emissions on marine animals would be greatly reduced, if not eliminated. It is the location of the ATOC source which should dictate the parameters (and location) of the MMRP, not visa versa.

However, the DEIS/EIR continues to misstate the purpose and goals of the ATOC project. "A goal of these experiments is to evaluate the potential impacts of low frequency sound on marine animals." DEIS/EIR at ES-12. The MMRP was neither a goal nor even a part of the ATOC project prior to the significant public outcry and pressure mandating that ARPA, NMFS and Scripps obey the law and comply with NEPA and CEQA requirements. As admitted in the DEIS/EIR, the MMRP is a last-minute addition to the proposed project, added "in response to the question of potential effects" of low frequency sound on marine animals. DEIS/EIR at 1-4. It is entirely disingenuous to now claim that marine animal research is a part of ATOC. The MMRP is properly labelled a mitigation measure, intended to determine and monitor any adverse impacts of the ATOC source sound on marine animals. See DEIS/EIR at ES-15.

The unclear and confusing stated goals of the ATOC project as presented in the DEIS/EIR render the document inadequate and unlawfully insufficient. As presently drafted, the entire alternatives evaluation is fundamentally flawed as it evaluates, as a necessary element of this project, the presence of an abundance of marine animals. Properly analyzed, the alternative site analysis would likely result in very different conclusions. Specifically, siting the ATOC project in the center of the Sanctuary would clearly be unnecessary.

14 I-3a

1.1.3 The Acoustic Thermometry Program

ES-3, 1-5: In what way will the results of ATOC "support" all facets of future global climate change research planning, and "provide important information for studying global climate questions"?

15 I-3a, d, f

1-4: How will the ATOC project obtain any data on temporal variation in "large scale observations of ocean temperatures" useful for "comparing with and verifying the predictions of existing climate models"? The ATOC data is limited to the deep sound channel axis only where there is a several year delay in responding to changes in surface temperature. How will this data apply to existing climate models? Can statistically significant data be obtain over a two-year program? If not, then this

16 I-3d

document must evaluate the ten year program necessary to obtain this information, including all the environmental impacts and alternatives available for such a project.

17 Table 1.1.3-1: This table is misleading and inaccurate; it fails to explain the basis for the sound comparisons, thereby leaving the reader with no understanding of its validity or accuracy. TC

2.0 Alternatives

"This section is the heart of the EIS." 40 C.F.R. § 1502.14.; see also Grazing Fields Farm v. Goldshmidt, 626 F.2d 1068, 1072 (1st Cir. 1980)(NEPA's "primary procedural mechanism" is the requirement to discuss alternatives in the EIS). An EIS must "[d]evote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits." 40 C.F.R. § 1502.14(d). Under CEQA, alternatives must be discussed in "meaningful detail." Laurel Heights Imp. Ass'n v. Un. of Cal., 47 Cal. 3d 376, 406, 253 Cal. Rptr. 426 (1988). Based on Affected Environment and Environmental Consequences sections, this section should present impacts of the proposal and the alternatives in comparative form. Alternatives analysis is crucial to CEQA's mandate that avoidable significant environmental damage be substantially lessened or avoided where feasible. Pub. Res. Code §§ 21100(b)(4), 21002; Guidelines §§ 15002(a)(3); 15021(a)(2), 15126(d).

When a project and its objectives are defined too narrowly, an EIR's treatment of alternatives may also be inadequate. In City of Santee v. County of San Diego, 214 Cal. App. 3d 1438, 1455, 263 Cal. Rptr. 340 (4th Dist. 1989), the Court of Appeal determined that based on the administrative record, the proposed project would remain in existence substantially longer than the "temporary" period alleged on the record. The Court determined that construction and operation of the "interim" facility was really the first component of a larger plan to expand the project, and that the agency, therefore, had impermissibly "peicemealed" that larger project. The inadequacy of the project description resulted in inadequate, unduly narrow project alternatives.

Similarly here, the California ATOC proposed project is actually the first component of the world-wide ATOC project plan. As such, the project description and the alternatives analysis, among other sections of the DEIS/EIR, are unduly narrow and inadequate. See supra at pp. 6-7 (discussing scope of project). Additionally, the DEIS/EIR incorrectly determines that the MMRP criteria, rather than the ATOC project criteria, will govern the site selection. As a result, every alternative site -- using both stationary source and the moored autonomous source -- is dismissed based on a lack of criteria required for the MMRP. As already discussed, such criteria are

unnecessarily imposed and therefore artificially skew the entire DEIS/EIR Alternatives analysis.

Proposed Project:

18 2-3: Where is the discussion of the impacts of these activities? TC App. C

19 2-4: What affect will the results of the MMRP have on whether the ATOC project will proceed? TC

20 2-14: Why are two sources (and presumably more pathways) necessary? Why are those two sources necessary for the initial two-year, "proof of concept" experiment? TC

2-15: The MMRP Site Survey Criteria, as discussed above, are wholly irrelevant to the goals of the ATOC project. These criteria are included as a post-hoc justification for a previously chosen site -- the Sanctuary.

21 2-16: It is inappropriate to allege that aspects of the project are mitigation measures. In any event, the explanation of the variable source numbers and pathways is ill-defined and confusing, especially with regard to how these variables will mitigation impacts. TC

Dismissed Alternatives. "If the agency finds certain alternatives to be infeasible, its analysis must explain in meaningful detail the reasons and facts supporting that conclusion." Marin Municipal Water District v. KG Land Corporation California, 235 Cal. App. 3d 1652, 1664, 1 Cal. Rptr.2d 767 (1st Dist. 1991). A project delay and a lack of development funding is not a valid basis for dismissing an alternative as infeasible or inadequate. Rather, the alternatives discussion must focus on alternatives capable of either eliminating any significant adverse environmental effects or reducing them to a level of insignificance, even if such alternatives would be more costly or would impede to some degree the project's objectives. Guidelines § 15126(d)(3).

22 ATOC is fully funded by the Department of Defense. To allege that delays and "uncertain" funding sources may arise is plainly disingenuous and invalid as permitting decisions and environmental impact determinations are not limited by or based on the funding sources. TC

ES-13-14; 2-17; Table 2.4-1: While we do not currently support location of the ATOC project at the Sur Slope site, that alternative was improperly deemed infeasible because it requires different technology and technology which has not been

C-160

applied to this type of project. If further testing must be done to properly design a moored autonomous source, then the agency must conduct this further research.

23 Table 2.4-1 and Related Text: The entire alternatives analysis biased toward the preferred alternative. Conveniently, the text and table artificially separate each component, avoiding a cumulative picture to properly analyze each proposed alternative as a whole. Moreover, the ranking system in the DEIS/DEIR uses a mathematical formula that is not explained and skews the outcome of the ranking. How were the percentages of "relative response criteria" determined? TC

24 2-41: The evaluation of restricted source transmission times is inadequate. There is no evaluation of the possible advantages of terminating all sound emissions upon detection (visually or acoustically) of suspected sensitive animals (grey whales, blue whales). I-6g

2-43: Every "alternative" deemed to be part of the project, it is not an alternative at all. As such, each of these "alternatives" should be fully evaluated as part of the "Project Description" as well as all of the potential impacts and alternatives thereto. See DEIS/EIR at 2-46 to 2-50 (including computer models, satellite sensors, other sensors).

25 2-43: How and what studies indicate that the frequency proposed is "anticipated to have minimal adverse impacts"? What evidence is there, if any, that such an overlap of frequencies used by whales will not have impact, or that higher or lower frequencies would be better or worse? TC

Additional Alternatives Not Considered. The alternative of conducting the MMRP and ATOC at different sites was not considered. Failure to consider this alternative evidences the project proponents' attempt to ensure that the ATOC experiment is located in the Sanctuary. The full ATOC experiment could be designed and conducted at a suitable location, away from the presence of marine animals. The MMRP could be conducted using low-level portable sources in the present of marine animals, to the extent necessary. The project proponents blatantly avoid this obvious alternative to avoid the indication that the ATOC source need not be located in the Sanctuary. I-4b I-6e

26

3 Affected Environment

The DEIR must discuss any inconsistencies between the proposed project and existing general plans and regional plans. Guidelines §15125(b). Therefore, this section must discuss inconsistencies of this project and the Sanctuary, as governed by the

Marine Protection, Research and Sanctuaries Act, 40 U.S.C. § 1531 et seq., the state refuges and reserves, including the Pt. Lobos and Carmel Bay Ecological Reserves, the California Sea Otter Game Refuge, state parks and reserves including Pulia Pfeiffer Burns State Park, Big Creek Ecological Reserve, and the entire Big Sur coastline. Any and all inconsistencies with the purpose and design of the above must be disclosed.

4 Environmental Consequences/Impacts

4.1 Introduction - General Comments

This section fails to adequately consider cumulative impacts, as required under NEPA and CEQA. "The requirement for a cumulative impact analysis must be interpreted so as to afford the fullest possible protection of the environment within the reasonable scope of the statutory and regulatory language." Citizens to Preserve Ojai v. 27 Board of Supervisors, 176 Cal. App. 3d 421, 431-32, 222 Cal. Rptr. 247 (2d Dist. 1985). I-12c The DEIS/EIR fails to list present, past, and anticipated future projects, including those inside and outside the agencies control, or to summarize the expected environmental effects of those projects. See Guidelines § 15130(b).

Examples of cumulative impacts which have not properly been considered here include: the potential to further reduce the severely depleted population of the endangered species proposed to be harassed; the effects of other present or future projects planned for the Marine Sanctuary combined with the ATOC project; the potential impact on marine environment over the tens of thousands of miles that this sound is supposed to travel. These and other cumulative impacts must be fully disclosed and analyzed in this section.

4-131: The cursory consideration of the California and Hawaii ATOC projects cumulative impacts is insufficient. What is the basis for each and every statement of fact on page 4-131? For example, how will the MMRP determine the cumulative impact on the species as a whole? How will the currently proposed mitigation measures reduce that potential impact?

Table 4.1-1: Even where one alternative is clearly and expressly stated to have less impact, the table fails to reflect that fact. For example, the moored autonomous source (Alternative 4) has a very low potential impact on the physical 28 environment as it does not involve cable installation and would have a small sea floor TC "footprint." DEIS/EIR at 4-9. Nevertheless, the preferred alternative, which includes both cable installation and maintenance and a much larger "footprint" is given the same impact level as Alternative 4.

C-160

These inconsistencies reflected in Table 4.1-1 render the comparison skewed and inaccurate. This table should be remodelled to reflect the impacts, in comparative format, of each alternative.

4.2 Potential Effects on the Physical Environment

4-9: The potential significant impact from construction of the facilities on the physical environment is not fully explained. For example, how will trenching and 29 pipe installation, especially within the surf zone, avoid a threat to the physical environment? Summary statements allegedly dismissing threat of impacts are not sufficient. See 5.4.1

4-9, 4-10: How will "proper design of the ATOC facilities . . . minimize 30 the potential for impacts from bluff erosion"? What is the design as currently proposed? How will the design minimize impacts? TC

4-10: How will removal of ATOC facilities mitigate the impacts of 31 installation? What is the current plan for removal? When is removal anticipated? What will define "economically and practicably feasible"? I-19

4-10: Why is a long term average of ATOC used to determine significance of the noise? Why is that "considered the most appropriate"? DEIS/EIR at ES-8, 4-10. High ambient noise levels expected in the study area are not expected to occur during all 32 hours of the day and night. Therefore, any evaluation of the noise significance must consider that the ambient noise levels will vary. Accordingly, the potential disturbance of marine environment will vary. TC

4-11: Average ambient noise levels are not an indication of potential impact on marine environment at any given time. If the ATOC source is "turned on" during a period of very low ambient noise, what will the potential impact be and what 33 mitigation measures will be applied to reduce that impact? A single sentence is devoted to the MMRP vessels and aircraft impact on ambient noise levels. This is inadequate. What vessels and aircraft will be used during the ATOC and MMRP programs? What amount of noise will these vessels add to the ocean environment? What impacts will these vessels have? TC

4.3 Potential Effects on the Biological Environment

The bulk of the comments on this section will be submitted by scientists familiar with the studies and research purportedly relied upon in this section. The following general comments are presented below:

34 What is the support for the alleged CEQA Standard of Significance, defined at ES-11 and 4-14? The text indicates that the standard is "commonly accepted." What is the support for that allegation? I-6K

2 The cumulative effects analysis in this section is inadequate and understated. By breaking the analysis of the cumulative effects by species, the DEIS/EIR fails to properly evaluate the cumulative effects on the entire biological environment, including all species potentially effected and all effects cumulatively impacting those species. What are the full cumulative effects on the entire biological environment? I-12c

35 4-12: The lack of information regarding the effects of noise on marine animals requires the agency to investigate this unknown, as it is both practicable and economically feasible to do so. NEPA requires agencies to satisfy certain detailed requirements when they confront incomplete or unavailable information. First, the agencies must acknowledge that relevant scientific information is lacking. Second, they must obtain such information, with original research if necessary. 40 C.F.R. § 1502.22. I-6n

Each acknowledged "unknown" impact is improperly translated into "no impact." See e.g. CEQA Impacts at 4-10. Despite a long list of studies which strongly indicate a potential for significant impacts, the DEIS/EIR concludes that the impact is "less than significant." What is the basis for those assumptions? If the impact is truly unknown, the assumption should be that it is a significant impact. How will each of the unknown impacts be mitigated or eliminated?

Mysticetes: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

35 4-24: Mitigation Measure 3-1[1]: This measure merely proposes to determine the "likely exposure" of mysticetes to the ATOC sound source. Assuming they are exposed (because they are present), what relevance is their population distribution to the impacts of the ATOC sound? I-6n

35 4-28: Mitigation Measure 4-1[2]: How will reduction in duty cycle and power levels necessarily mitigate potential impacts? How can all the "unknowns" for all I-6n

[1] This comment equally applies to Mitigation Measures A-1, 4-2, and 5-2 as they are the same.

[2] This comment equally applies to Mitigation Measures A-3, A-5, 2-1, 4-1, and 5-1 as they are the same.

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the species considered lead to the conclusion that this "mitigation measure" will be effective? This statement is obviously conclusory and invalid.

Odontocetes: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

Pinnipeds and Fissipeds: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

Sea Turtles: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

Fish: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

Invertebrates: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

Plankton: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

Seabirds: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts.

Threatened, Endangered and Special Status Species: The impacts are inadequately stated, confusing, and ill-defined. The proposed mitigation measures fail to address the potential impacts. The evaluation of these impacts are artificially separated out from the general consideration of impacts on these species, thereby artificially reducing the actual anticipated impacts on these very depleted species.

36 Marine Sanctuaries and Special Resource Areas: The DEIR must discuss any inconsistencies between the proposed project and existing general plans and regional plans. Guidelines § 15125(b). Therefore, this section must discuss the inconsistencies between this project and the MBNMS, as governed by the Marine Protection, Research and Sanctuaries Act, 40 U.S.C. § 1531 et seq., the state refuges and reserves, including the Pt. Lobos and Carmel Bay Ecological Reserves, the California Sea Otter Game Refuge, state parks and reserves including Pulia Pfeiffer Burns State Park, Big Creek Ecological Reserve, and the entire Big Sur coastline. Any and all inconsistencies with the purpose and design of the above must be disclosed. See 5.1.4 5.4.3

37 4-111: The DEIS/EIR, by limiting this evaluation to biological resources, fails to consider the impact of the project construction and other physical impacts of the ATOC project (including the proposed MMPA). The statement that the potential for direct, indirect, or cumulative effects on marine sanctuary resources is anticipated to be minimal is unsupported.

38 4-31: The Sanctuary is a sensitive habitat for many species of marine animals. To state otherwise, without any support, is clearly incorrect. Therefore, all evaluations of potential impact on habitat in the area must be considered significant.

5.0 Consistency with Federal, State, and Local Requirements, Plans and Policies

The relevant permitting agencies must consider ATOC's numerous permit applications after completion of the ongoing NEPA and CEQA process. During the official application periods which will occur, if at all, after approval of the EIS/EIR, we will address in greater detail our comments on each of the permits for the ATOC project. Therefore, only our preliminary comments are set forth below.

5.1 Federal Regulatory Programs

3 ESA and MMPA: The proposed ATOC project is not "scientific research on marine mammals" as defined in the MMPA and the ESA, but rather a proposed study on global climate changes. Therefore, under the MMPA, this project should be permitted, if at all, under the incidental take permit requirements.

The Sanctuary: Monterey Bay was designated a marine sanctuary based on, among other things, the area's natural resources and ecological qualities, including its contribution to productivity and maintenance of threatened and endangered species and their habitat. See 16 U.S.C. § 1433(b). Creation of the Monterey Bay National Marine Sanctuary ("the Sanctuary") secured federal protection and management of the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the area. See 15 C.F.R. § 944.1. In order to preserve such an area of national significance, all activities proposed to be conducted within the boundaries of a Marine Sanctuary are severely restricted and highly regulated. See 16 U.S.C. § 1431 et seq.

In stark contrast to the goals and objectives of the Sanctuary, ARPA and Scripps propose to conduct their ATOC project in the Sanctuary's pristine marine environment. The ATOC program, wholly unrelated to marine resource protection, is a study proposed to measure long-term ocean climate changes using acoustic sound paths

in the deep sea by constructing a sound source within the Sanctuary which would transmit sounds across the entire North Pacific ocean basin. If successful, ARPA and Scripps intend to conduct a ten-year follow-on global ATOC program that would allegedly help determine the potential for global climate changes. See DEIS/EIR at Abstract and ES-1-3.

Contrary to the allegations of ARPA and Scripps, the ATOC program clearly is not consistent with the goals and objectives of the Sanctuary Management Plan, and will not actively contribute to the research and education goals contained therein. In fact, the proposed ATOC project fails to fulfill any of the programs in the Sanctuary Management Plan.

According to the DEIS/EIR, the research goals of the Sanctuary include baseline studies, monitoring, and predictive studies of the marine area, including the marine animals living within and migrating through the Sanctuary. The ATOC program, an experiment intended contribute to a predictive model of global climate changes, is entirely unrelated to research on the marine resources within the Sanctuary and, therefore, is unrelated to the goals of the Sanctuary. Admittedly, the MMRP -- a short-term marine mammal research program designed only to determine the potential impact of the ATOC low-frequency sound on marine mammals -- may comport with the research and education goals of the Sanctuary. However, the MMRP is neither necessary nor even related to the purpose and needs of the ATOC program. Most importantly, this last-minute addition to the ATOC program, representing only a small fraction of the entire project, cannot possibly justify allowing the full ATOC experiment to be conducted within the Sanctuary.

In fact, the ATOC program potentially involves a number of expressly prohibited activities within the Sanctuary, including: constructing or placing any structure on the seabed of the Sanctuary; taking of marine mammals, sea turtles, seabirds in or above the Sanctuary; flying motorized aircraft at less than 1000 feet above the Sanctuary; and operating motorized personal water craft within the Sanctuary. See 15 C.F.R. § 944.5(a). It is these very activities that subject the ATOC program to the National Marine Sanctuary permit requirements. The DEIS/EIR fails to alleviate the very real concern about protecting our scarce marine resources and offers absolutely no justification for conducting the ATOC program within the Sanctuary.

Therefore, the ATOC project cannot be conducted within the boundaries of the Monterey Bay National Marine Sanctuary.

Clayton H. Spikes
Advanced Research Projects Agency
January 30, 1995

Marine Mammal Research Program - Appendix C.

General Comments: The Marine Mammal Research Program, as currently proposed, will fail to achieve statistically significant data. As such, the MMRP results will be unable to show any statistically significant difference in marine animal behavior when ATOC source is on or off. The ATOC project and its associated MMRP has far-reaching potential to harm a large number of marine species and their habitats. The impacts of this project have not been adequately discussed or mitigated and the MMRP, as currently designed, will not adequately serve this purpose. Therefore, the MMRP should not be implemented, nor accepted by the agencies as an effective proposal for monitoring the impact of ATOC generated noise on marine animals. See 40 C.F.R. § 1502.24 ("Agencies shall insure that professional integrity, including scientific integrity, of the discussions and analyses in EISs.")

Moreover, under the stringent standards set forth by NMFS for considering and issuing scientific research permits under the ESA and MMPA, the MMRP cannot be permitted. NMFS has established and enforced very strict monitoring programs for projects involving the production of ocean noise. NMFS must subject the ATOC project to the same strict protocols. If the ATOC project is subject to a "lesser standard" of marine animal impact monitoring, the DEIS/EIR must fully set forth the basis for the reduced efforts to protect marine animals as well as include, in its entirety, the two standards applied to monitoring projects -- one for ATOC and the other for all other projects.

Specifically, NMFS has imposed very strict scientific protocols to protect marine animals from the potential impact of oil drilling in the Arctic. Some of these very studies are cited in the DEIS/EIR at 4-24. The ATOC project should be subject to the same strict scrutiny as the oil drilling projects because the ATOC project will emit similar sounds into the ocean, at a similar frequency and noise levels. Instead, NMFS has apparently abandoned its strict scientific standards and accepted, for purposes of the ATOC project, a low standard of scientific protocol.

As a cooperating/responsible agency with special expertise, NMFS is required to review the DEIS/EIR and offer comments with respect to its expertise. Marine mammal research and its concomitant permit requirements fall squarely within
39 the purview and expertise of NMFS. When a lead agency completes an EIR that identifies one or more significant effects, a responsible agency must make findings concerning the avoidance or mitigation of these effects. Guidelines § 15096(d). Therefore, it is NMFS duty to stringently review the MMRP and comment on its adequacy. As part of this mandatory duty, we request that NMFS call on its qualified scientific statisticians located in Seattle, Washington to review the MMRP and confirm, I-6i

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Clayton H. Spikes
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January 30, 1995

as we suspect they will, that the MMRP cannot produce statistically significant data and falls well below the stringent standards required by NMFS in other projects affecting marine animals.

Specific Comments:

40 C-1: Outside of the permitting office, are any NMFS employees receiving research funds or equipment from any of the project proponents including, but not limited to, ARPA and/or Scripps? No

41 C-1: What role did Robert De Long and Sharon Melin play as "co-investigators" regarding the MMRP? App. C (CA Sea Lions)

42 C-4: How is a six-month project characterized as a "broad-based" research program? App. C (Prop. limits)

43 C-6: The "workshop" designed to present and discuss the results of the proposed Pilot Study should be scheduled at least 30 days after publication of the "results" in order to ensure meaningful public participation. TC

44 C-6: How will the six-month Pilot Study detect "major changes" in behaviors specifically caused by the ATOC sound transmission? What behaviors will be considered "acute or chronic responses"? What about subtle changes? How will subtle changes be detected? What number of observations of what type of each data is proposed for the MMRP? What is the statistical basis for that number? TC Table C-1

45 C-7: Even assuming that the data produced by the MMRP Pilot Study is statistically valid, how will the results be used? How will the data be statistically extrapolated? What statistical significance will be required before a determination of "long-term" changes or "unacceptable long-term effects" be made? How will subtle behavior changes be detected? I-12a

46 C-8: How will the MMRP differentiate the effects of introduced noise from the ATOC source from noise produced by ships and seismic exploration? TC

47 C-8: What projects are proposed to assess the effects of ATOC signals on harbor seals and California sea lions? These experiments should be fully evaluated in this DEIS/EIR as related projects, producing potentially cumulative impacts. I-12c

C-10: The null hypothesis should assume that the ATOC sound emissions will produce an adverse effect. The project should be designed to determine whether behavioral change is caused by ATOC or another factor.

48 C-11: How will the effect of the observer, specifically the survey aircraft, be statistically eliminated? TC

49 C-11-13: How will the effect of the observer, specifically the observation boat, be statistically eliminated? TC

C-13-14: What will be accomplished using acoustic surveys? How are these objectives different from other projects, such as oil drilling, for which NMFS expressly denied any use of acoustical data because of its unreliability and lack of
50 statistical significance? How will acoustic detection of marine mammal vocalizing statistically function as any indication of perceived danger? Is there any baseline data to be used for comparison? Is the acoustic testing planned to be conducted at different times of the day and night in order to ensure that data is taken at different levels of ambient noise. TC Table C-1

C-16: The Kolmogorov-Smirnov test is not sensitive enough to detect
51 "slight changes." How, specifically, will this test show slight changes? What number of each type of data sample will be used? TC

52 C-23: How will the effects of the El Nino, tanker traffic, seismic exploration, weather, and earthquakes be statistically eliminated? TC

C-25: If the blue whale research is "under development" and the results
53 are unknown, why is this aspect included in the MMRP? These are endangered species whose populations need not be unduly harassed to conduct an experiment which, in any event, will likely have no influence on the ATOC project. TC

C-26-27: The proposed capture and tagging of the leatherback sea turtles is an unnecessary and statistically insignificant proposal. These ancient marine animals, which have existed on earth long before the presence of human beings, are now critically
54 endangered and federally protected. A single page is devoted to describing the proposal to harass and monitor these marine reptiles. This is a patently deficient and ill-defined plan. What possible justification is there for such a proposal? What findings will cause any effect on the ATOC project? TC App. C

55 C-34: Does each of the "authorizing" permits expressly indicate that the activity/research to be conducted is to further the ATOC project? Does each of the TC

"authorizing" permits expressly permit an ATOC-sponsored individual to conduct the activity permitted? If not, on what basis may the "authorizing" permits be interpreted to allow ATOC-related activities?

1-5: Without explanation, the DEIS/EIR states that the "ATOC climate-related transmissions will begin only if the system is determined to be safe for marine
56 animals, particularly marine mammals and sea turtles." What will define "safe"? What extent of harm, if any, will be acceptable to continue with the project? Who will review and analyze the results? TC

ES-3-4 : "This Pilot Study will determine how best to continue the
57 project." This paragraph should explain how the study will determine that. For example, may the project be cancelled or moved as a result of the Pilot Study. If so, under what circumstances? How will this threshold be determined? TC Sec 1.12

ES-8 and 3-5: Why is a long term average of ATOC used to determine significance of the noise? Why is that "considered the most appropriate"? High ambient noise levels expected in the study area are not expected to occur during all
32 hours of the day and night. Therefore, any evaluation of the noise significance should take into consideration the fact that the ambient noise levels will vary and, accordingly, so will the potential disturbance of the marine environment. Given the ambient noise description at 3-5, how does the MMRP proposed to eliminate statistically the ambient noise influence on the behavior of the studied animals? TC

ES-10: The seal, whale and turtle will be focus of MMRP "to the extent that they are amendable to available research techniques." Is this qualifying phrase
58 meant to infer that, if not amenable, the research with respect to one or more of these animals will be "skipped" and the ATOC project will go forward as planned? What does that statement mean? TC

CONCLUSION

The foregoing comments are submitted in a sincere effort to identify the many deficiencies in the Draft EIS/EIR for the California ATOC Project. We hope that each comment will be given serious review and consideration, resulting in a final document which fully comports with the strict requirements of both NEPA and CEQA.

Respectfully submitted,

HELLER, EHRMAN, WHITE & McAULIFFE

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January 30, 1995

Mr. Clayton H. Spikes
Advanced Research Projects Agency
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Arlington, Virginia 22202

Dear Mr. Spike:

The Department of Fish and Game has reviewed the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the Acoustic Thermometry of Ocean Climate (ATOC) project proposed to be located off Point Sur, California. The primary objective of the Department's review of environmental documents is to be able to provide recommendations for minimizing negative impacts on fish and wildlife resources, their use and users. In meeting this objective, the Department's attention usually is focused on potential habitat damage or losses, and potential use conflicts, including restriction in public access, navigation, and commercial or recreational fisheries opportunities.

The ATOC project provides an opportunity to test synoptic techniques using sound transmission over a large area of the Pacific Ocean to test the hypothesis that global warming is affecting ocean temperatures. The hypothesis of the proposed ATOC project is that these sound transmission techniques can detect changes in the deep ocean temperatures. Integral temperature changes in the ocean deep water may be inferred from measurements of sound travel time over broad areas.

The DEIS/EIR proposes three areas of sound effects: the zone of potential temporary threshold shift (ZOI) (150 dB), a zone of influence (ZOI) (120 dB), and a zone of no scientific documented effects (less than 110 dB). The Department concurs with the evaluation that the potential for physically harmful effects to aquatic organisms is not significant and not likely to occur. However, it does appear that adequate data are provided to support a finding that aquatic organisms would be exposed to sound levels that have previously elicited avoidance behavioral responses. The ZOI is modeled to extend from the sound source to the water's surface and extend 25 kilometers shoreward and 12 kilometers (km) seaward.

In the scoping hearing on May 16, 1994, the Department presented testimony which included information on commercial fishing activities in the ATOC vicinity. The DEIS/EIR
1 does not provide information as to potential effects to commercial fisheries especially those that trawl along approximately the 100-150 fathom contour between Yankee Point and Point Sur. The FEIS/EIR should address the potential for gear entanglement with the seafloor cable, sound source, and listening arrays. In addition, the FEIS/EIR should address if there

I-5e

will be any restriction of fishing activities in a zone that encompasses the ATOC sea equipment and cable route. If restrictions to fishing activities are necessary to protect the research equipment, an appropriate mitigation measure should be developed. The Department is available to provide data as to current fishing activity zones.

To mitigate for potential effects to fish from the produced sound levels, mitigation measure 10-1 and 11-1 were developed which state that the Marine Mammal Research Program (MMRP) will assess effects to fish. However, the research protocols for the MMRP (Appendix C) does not have a section to address how potential effects to fish would be monitored. The Department recommends that the MMRP be revised to include fish monitoring protocols. The use of remote operating vehicle (ROV) could be an effective method to video fish usage of the project area. Data collected should compare fish usage of the area prior to start of the sound transmissions, during sound transmissions, and after sound transmission ended. If possible, the ROV video tapes could be compared to the data previously collected by the Monterey Bay Aquarium Research Institute (MBARI).

2 I-62

Available oceanographic and marine biological data, provided in the DEIS/EIR, suggest that the potential effects of the acoustic levels to marine mammals and other marine life will not be significant (page ES-11). The project includes the MMRP to monitor potential effects to targeted species and provide a mechanism to take action to terminate the sound transmission if and when effects are detected (Phase II of the MMRP). In addition, this project will provide much information on the distribution, abundance, and behavior of marine mammals as detailed in the MMRP. The ATOC-source-induced changes in distribution and behavioral responses can be studied in detail during early, controlled sound transmissions that provide a unique opportunity to assess the effects of sound on these marine mammal species.

The MMRP states that the National Marine Fisheries Service and the Marine Mammal Commission would be consulted to evaluate the biological significance of observed responses as a condition of project modification or termination. The MMRP should be expanded to include what type and extent of behavior modification that would be considered an appropriate criteria to immediately halt sound transmission (shutdown protocols). This criteria list would help differentiate between behaviors that could be considered minor (e.g., temporary deflection of direction of movement away from the sound source) and major (e.g., sea turtle floundering on the surface during sound transmittance) as they pertain to potential modifications in the sound transmittance duty cycle. The criteria list should contain factors that would help define potential chronic effects to various species.

3 I-6g

To help clarify when sound is being transmitted and which programs are ongoing, Table 1.1.2-1 could be revised. Confusion arises between the transmissions described in the text of the document and those described in the MMRP. For clarification purposes, an

4 TC

additional column should be included describing how many days the sound would be on and off and what power level would be used for each of the six activities. As an example, Number 2 - the MMRP Pilot Study period would broadcast for four consecutive days (6 times per day) then be off for seven consecutive days; Number 6 - the feasibility study would broadcast every day for two months (8 percent duty cycle).

Much of the potential for (or lack of) effects has been determined based on the hearing threshold of the targeted species. Throughout the document it states that if little information is known about potential effects, the effects are not expected to be significant. The assumption of not significant effects should not categorically be applied to species that do not vocalize with the same frequency (Hz level) as produced by the sound source. Even though a particular species does not use (or has not been measured to produce) the sound source frequency, this does not eliminate the potential for it being affected by the sound source. The DEIS/EIR states that Atlantic bottlenose dolphins and sea turtles receive sound through other body receptors and not solely with ear structures (page 4-44, 4-73). Therefore, even if a species has not been documented to have low frequency hearing, it should not be dismissed as not being affected by the sound. The MMRP should have protocols to characterize potential effects to all species observed in the sound source vicinity not just those with low frequency hearing.

5 I-6k App. C

Section four describes potential effects on the biological environment. In regard to marine mammals, it states that during the five-minute ramp-up period, marine mammals will be able to swim outside the ZOI (Table 4.1-1). The blue whale is one of the fastest swimmers (top speeds of 48 km per hour) and would only travel four km during the ramp up period. This would not allow the whale to exit the ZOI within five minutes. All other marine mammals (and sea turtles) are slower swimmers than the blue whale. The Department concurs with the assumption that if the area sound levels are annoying to animals, they most likely will not remain in that area. To provide extra time for marine mammals to exit the ZOI, it is recommended that the ramp up period be increased from five minutes to at least 10-15 minutes.

6 I-6m

There is no information presented in the DEIS/EIR calculating the sound levels that would be received in air by animals that would be at the surface (e.g., resting sea lions, pelicans). Sea lions and seals have hearing developed for detecting underwater and air borne sounds. Sea otters also would be in this category but are highly unlikely to be in the ZOI. Although it is possible that the water surface may reflect all sound produced by ATOC, a section providing information as to sound levels in air should be included in the FEIS/EIR.

7 TC

Dr. Dan Costa presented preliminary data results from the baseline study at the January 6, 1995 public hearing. These data indicate that humpback whales and harbor seals are present in the ATOC vicinity. The MMRP and Section four should be revised in the

8 Attach. C-6

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Mr. Clayton H. Spikes
January 30, 1995
Page Four

FEIS/EIR to incorporate these data. Based on these data, it may be appropriate to switch tagging studies on blue to humpback whales. It also should be evaluated if harbor seals may be more a more appropriate species to study than the proposed lactating California sea lions.

The Department believes that the DEIS/EIR provides enough data to support a finding that an area surrounding the ATOC source will be ensonified to levels that have elicited avoidance responses in whales. It also suggests that there is a potential to mask and/or interfere with long-distance communication or echolocation by whales should communication coincide with periods of sound transmission (page 4-32, 4-52). The MMRP will not be conducted long enough to analyze the potential to determine the impact of these effects on a marine mammal's well being with only a two-year study (e.g., increase stress on individuals or populations, disruption of cow-calf communication, etc.). These chronic, long-term effects on a species' well being may not be determined even by an extensive lengthy study. However, the MMRP will be an important first step towards providing answers to these questions.

Thank you for the opportunity to comment on the DEIS/EIR for the ATOC project. Page specific comments are attached separately. Questions should be addressed to Ms. Deborah Johnston, Environmental Specialist, Department of Fish and Game, 20 Lower Ragsdale Drive, Suite 100, Monterey, California 93940, (408) 649-7141.

Sincerely,

A. Petrovich, Jr.
Deputy Director

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January 30, 1995

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Arlington, Virginia 22202

RE: Draft EIS/EIR for the CALIFORNIA ATOC PROJECT and associated MARINE MAMMAL RESEARCH PROGRAM
(Scientific Research Permit Application P557B)

Dear Mr. Spikes:

The Animal Protection Institute of America represents a national membership of 150,000. We appreciate this opportunity to submit our comments to the draft EIS/EIR on the California ATOC project and its associated Marine Mammal Research Program (MMRP).

JUSTIFICATION FOR THE PROPOSED ACTION

In our response to the EIS Scoping process on ATOC and the Pilot Study Project, we questioned the need of oceanic temperatures in determining proof of global warming. Additionally we asked the ATOC proponents to consider the BEST method of measuring ocean temperatures without disturbing or impacting protected marine life.

According to the draft California EIS/EIR there is an important need for the computer model predictions to be tested against observations as a persuasive basis for governmental decisions to take action to curb emissions of greenhouse gasses. The EIS listed seven alternative methods of measuring ocean temperatures, but only considered two, the proposed acoustic thermometry and moored autonomous sound sources. The moored autonomous sound source alternative has the same potential negative impact on marine life so should have been disqualified as an alternative method of measuring ocean temperatures.

Two others of the seven alternatives, global climate models and

continued . . .

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polar hydrophones, are included in the proposed action so were not analyzed as alternative in themselves.

The method of directly measuring ocean temperatures with oceanographic point sensors was discounted because of reported limited usefulness due to the relatively small number of measurements.

The draft EIS states that the final two methods, satellite sensors for sea surface temperature measurements and satellite sensors for sea level measurements, do not meet the project objectives.

In our opinion the National Environmental Policy Act mandate to evaluate valid alternatives as well as the proposed action was not carried out. No valid alternatives were selected to consider in detail. Instead, the additional listed "alternatives" were variations of the proposed action. Alternate project sites should not have been included with the list of alternatives (they are not a different method of measuring the ocean), but evaluated only as a part of the MMRP.

NO ACTION

The "No Action" Alternative did not address the consequence of the ATOC program being canceled. Will no temperature readings be taken or will the experimenters choose a different temperature measuring methodology? I-5a

1

PROPOSED ACTION

The Executive Summary of the Draft EIS/EIR states, "Yet, whether the ATOC technique will provide useful climatic information depends on surmounting a number of technical and other potential barriers. For example, ocean movements from tides, currents, internal waves, eddies, and other oceanographic features also affect acoustic transmissions. While traveling long distances, sounds could be scattered, distorted or otherwise rendered unusable." At the conclusion of the 1991 Heard Island Feasibility Test were these potential barriers to acoustic thermometry kept in mind? The discussion of the Proposed Action Alternative in the draft EIS/EIR does not address the results of this feasibility test or the potential barriers mentioned above. I-3d

2

The likely effects of the ATOC program on marine life appear to be mitigated by the Marine Mammal Research Program Pilot Study. ATOC will evaluate the effects before proceeding with the demonstration period. But can the long term and cumulative effects of the ATOC program be calculated during this four-month period? The effect of the low frequency sound blasts on marine life can continue to be monitored but what guarantee is there that harm will not have already occurred. I-12a, c

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continued . . .

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January 30, 1995

As noted in our written testimony to the California and Hawaiian ATOC hearings, the Animal Protection Institute has consistently opposed marine mammal "takings" (that includes harassing) throughout the past twenty years. We urge the National Marine Fisheries Service to reject the application for a research permit. We reject the alternatives listed in the California draft EIS/EIR and urge a comprehensive "no action" option.

FOR THE ANIMAL PROTECTION INSTITUTE

Alan H. Berger
Executive Director

January 31, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

TRANSMITTED BY FACSIMILE: 703/418-1042

Dear Mr. Spikes:

On behalf of the more than two million members and constituents of The Humane Society of the United States (HSUS) and Earth Island Institute (EII), I would like to offer the following comments on the draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) prepared for the California Acoustic Thermometry of Ocean Climate Project (ATOC) and its associated Marine Mammal Research Program (MMRP). Both The HSUS and EII are also members of the coalition that is submitting comments through the Sierra Club Legal Defense Fund. Some of the comments offered herein are also included in the coalition comments.

The HSUS and EII have several major concerns with the draft EIS/EIR that we wish to emphasize in these separate comments. The first is that the EIS/EIR is clearly a biased document. An environmental impact statement is meant to be an objective discussion of impacts and alternatives to the proposed project. It is to be used by permitting agencies and others during the decision-making process, before resources have been irrevocably committed to a project, and under certain circumstances may provide sufficient information to indicate that a project should not proceed as proposed due to unacceptable environmental impacts.

The draft EIS/EIR for ATOC, however, presumes throughout that the project will proceed and assumes that impacts to marine life will be minimal. It is clearly meant as a justification of an anticipated decision by the governmental agencies in question to issue the requested permits. Objective language is lacking throughout the text

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of the document. It appears that resources were committed irrevocably to ATOC even prior to the publication of the EIS/EIR, in many senses making this review of the EIS/EIR an empty exercise. A lack of sincere effort to explore alternatives to the proposed action is lamentably apparent in every section, particularly Section 2. One type of alternative that is never even mentioned is any type that uses entirely different ways of measuring global climate changes and does not rely (or at least does not solely rely) on measuring ocean temperature at all, thus avoiding the problem of impacts on marine mammals altogether.

Our second concern is that the MMRP objectives are overly ambitious. It is possible that the methods presented in Appendix C, given an adequate time frame in which to implement them, would be sufficient to measure changes or the lack thereof in the various biological parameters to be examined. The MMRP clearly intends to use all the technologies and techniques available to marine mammal field scientists.
1 However, it is extremely unlikely that the time frame proposed will be in any way adequate to acquire the necessary data to reject or accept the stated null hypotheses. Studying cetaceans and pinnipeds (let alone sea turtles) at sea is fraught with difficulties, even with a decent budget and using the latest technologies. Very little is known about many of the species that might be affected by ATOC and most assuredly a 10-month base-line study, to be followed by a six-month pilot study, will not increase the knowledge base sufficiently to determine if deviations from the "norm" are being observed during ATOC transmissions. The HSUS and EII consider the researchers' expectations that they will be able to detect such deviations to be unrealistic. I-6b

From the beginning, The HSUS has asked that a sufficient period of time be given over to establishing base-line data on free-ranging marine mammals in the Monterey Bay area; our original suggestion was that at the least the proposed two-year period for which the ATOC permit was being requested should be devoted solely to the MMRP. Given the stated objectives, a time frame of three to four years seems more appropriate, but 24 months, as opposed to the stated 16, seems a minimal requirement. The researchers in charge of the MMRP have good intentions, but they will almost certainly not be able to achieve their goals within the time frame proposed.

A third concern is that there are three potential outcomes to the MMRP, only one of which, the outcome wherein no significant impact to marine mammals is
2 observed, is adequately discussed. The EIS/EIR shows a biased expectation of achieving this outcome. The insistent and awkward iteration of the null hypotheses in Appendix C seems a subtle manifestation of this inappropriate bias; however, in several places the EIS/EIR states in so many words the expectation of accepting the I-6k

null hypotheses (see e.g. Table 4.3.1.1.3-1). The other two potential outcomes, wherein MMRP results are inconclusive or all or some of the null hypotheses are rejected, are not adequately addressed in the EIS/EIR at all. In fact, it is not clear how the null hypotheses could be rejected, as "biologically significant effect" is left unsatisfactorily ill-defined in the text. Most importantly, it is never made clear what the consequences to ATOC will be if the results of the MMRP prove inconclusive and it is never made clear that ATOC will not proceed if its transmissions are found to harm marine mammals and cannot be mitigated. The consequences of all potential outcomes of the MMRP must be thoroughly addressed in the EIS/EIR.

A fourth concern is that the MMRP site seems inextricably and inappropriately linked to the ATOC site. That is, in several places, the EIS/EIR expresses the need to locate the ATOC site in an area that has a sufficiently large marine mammal population to provide adequate data for meaningful statistics for the MMRP (see e.g. Table 2.2.3.2-1). However, it is the understanding of The HSUS and EII that the goal of ATOC alone should be to avoid even the potential for harassment or
3 injury to marine mammals, making a site with a low density of marine mammals preferable. The goal of the MMRP alone is to determine if ATOC transmissions have a negative impact on marine mammals, making a site with a high density of marine mammals preferable. Therefore, clearly the MMRP and ATOC have conflicting goals; utilizing two different sites seems to be indicated. For instance, if two sites are used, the Pioneer Seamount site becomes a better alternative site for ATOC, while the Sur Ridge site continues to be an acceptable site for the MMRP (see Table 2.4-1 and Figure 3.2.1-1). As every indication in the EIS/EIR is that the installation and removal of the ATOC acoustic source is relatively straight-forward, this does not seem an unreasonable solution, if in fact the intention of ATOC is to minimize impact on marine life to the fullest extent possible.

I-46

The HSUS has at no time opposed ATOC on any other basis than that the MMRP was inappropriately designed and that the environmental impact of the project was not appropriately analyzed as required by law (see previous comments submitted by The HSUS). The first objection has been addressed in the draft EIS/EIR, but not to
4 complete satisfaction. The second objection continues to be of deep concern. There has been an unseemly lack of initiative on the part of the ATOC and MMRP researchers to expose ATOC to the bright light of public scrutiny. There now seems to be an unseemly desire for haste to proceed with the project, but had appropriate steps been taken from the beginning to comply with the National Environmental Policy Act (NEPA), this haste would be unnecessary. There has been some indication that funding for this project is subject to a deadline, but that is not the concern of the public, whose only concern need be the protection of public resources

TC

I-14d

(i.e. protected marine life) that may be impacted by ATOC. If ATOC fails to proceed on the proposed time schedule (or at all) because the project is finally compelled to follow NEPA procedures properly, the draft EIS/EIR does not convince The HSUS or EII that a vital research opportunity to examine global warming will have been missed.

In conclusion, the draft EIS/EIR does not fulfill the requirements of an environmental impact statement as required by NEPA. It must be revised to adequately and *objectively* discuss alternatives to the proposed action, the MMRP protocol needs to be revised to include an adequate time frame for base-line data collection, an adequate discussion of *all* contingencies and consequences of the MMRP results needs to be undertaken, and the MMRP and ATOC sites need to be de-linked. Finally, the governmental agencies responsible for issuing permits for this project need to have adequate time to consider the final EIS/EIR in their decision-making processes. The MMRP and ATOC must not be allowed to proceed until informed and reasoned decisions can be made.

Thank you for the opportunity to comment on this important matter.

Sincerely,

Naomi A. Rose, Ph.D.
Marine Mammal Scientist
Wildlife and Habitat Protection

cc: Mark Berman, Earth Island Institute
Michael Sherwood, Sierra Club Legal Defense Fund

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January 30, 1995

Mr. Clayton H. Spikes
Advanced Research Projects Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes:

As Educational Director of Long Marine Laboratory, the marine research support facility for the University of California, Santa Cruz Institute of Marine Sciences, I will comment on the research and education interface potential of this project. I am also a member of the Sanctuary Advisory Council and the chair of the Sanctuary Education Panel for the Monterey Bay National Marine Sanctuary. Comments from these bodies have already been forwarded to you via SAC chair, Karin Strasser-Kauffman. This letter, however, is written independently of my sanctuary advisory role. It is written from my perspective as an educational administrator for Long Marine Laboratory.

This draft EIR/EIS states that
"The project proponents recognize that they are ultimately accountable for providing accurate information so that the public and government agencies can make informed decisions. An important function of this document is to provide clarification and explanation of these questions to facilitate fair evaluation."

I have read over the EIR from the standpoint of a marine research educator and find it sufficiently thorough and comprehensive in most realms. I also find that it is written in a format that should be comprehensible to a layperson. My main concern is for the lack of substance and content directed to potential educational components of the proposed research in this document. The creation of this document has been a valuable process in presenting scientific information to the public. The potential use of this document for sheer education purposes is significant - it provides information on

C-164

local biological resources in a format that has previously been unavailable.

I commend the project Is for their significant improvements to the program, most notably the addition of the Principal Investigators, pilot study, the use of a minimum duty cycle and power level with a minimum impact frequency and the control of the sound source by marine mammal scientists initially and the accompanying precautionary methods incorporated.

I see remarkable potential for the marine mammal research component of this project, both from the biological and the educational standpoint. We have here the opportunity to use this project as a model for the integration and collaboration of scientists, educators, the community, students and agency policy makers.

The one positive suggestion I have is the following:
1 *I strongly recommend the incorporation of a strong and clear educational component into this program. A clear commitment to public education is needed in this research protocol to fully accomplish sanctuary goals of education, research and conservation integration.* TC Sec4.5.1.1

By making real and current data on our local marine mammals available to teachers, students and the public through educational facilities, the positive potential for this project increases exponentially.

We are on the cutting edge of a new wave in science education in the Monterey Bay Region. Institutions, facilities and schools are joining forces to make science real for students and create future environmental stewards for our sanctuary. In the immediate future many local schools will be connected to research facilities via a high speed telecommunications network, via the Destination Tomorrow and Pacific Bell's Calren Grant. Already a sanctuary education electronic bulletin board is in place in local schools. What these programs need are scientists to provide access to their data for students to explore the process of science with. What better and more intriguing data than the data being generated from this MMRP?

I suggest that a formal research education component be incorporated into the project. This would require an allocation of funds to support at minimum a part-time educational facilitator to act as a bridge between the scientific data collection and regional marine science educators. Through this type of effort we can further sanctuary goals of research, education and informed management.

To conclude, I agree with the EIR/EIS conclusions that there is a lack of conflict with the Monterey Bay National Marine Sanctuary Management Plan, that research and education in this field will be stimulated through this project and that the potential for any effect on educational efforts in the region will only be positive in nature.

Sincerely,

Dorris Welch-Burman

Dorris Welch-Burman
Educational Director
Long Marine Laboratory

THE FUND FOR ANIMALS INC.

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RECEIVED 2-8-95

31 January 1995

Advanced Resources Projects Agency
Clayton Spikes, Marine Acoustics, Inc.
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Dear Mr Spike,

Please consider these comments from The Fund for Animals as a supplement to those submitted on our behalf by the Sierra Club Legal Defense Fund.

Feasibility of Project:

Among the concerns expressed at the scoping hearing were that of our Scientific Advisor, Dr. Norman Seaton, and others, concerning the feasibility of ATOC being able to contribute to information on global warming. That concern is ignored in this document yet lies at the very core of the question as to whether ATOC should proceed. The EIS does not even acknowledge that is an issue. Dr. Seaton, a highly respected doctor of physics and holder of seven scientific patents, has closely examined the validity of ATOC, and will address these issues in his separate comments. The Fund for Animals is very fortunate in having his expertise. Other animal welfare and environmental groups do not have this advantage. If they did, I believe that ATOC would be challenged more vigorously as a faulty premise. If the purported goal of ATOC is impossible to achieve, then all other considerations are debates over the arranging of chairs on the Titanic. It is a voyage that should not be undertaken.

1 I-3d

Purpose of ATOC:

Is the primary purpose of ATOC really to study global warming? The EIS acknowledges other interests, but treats them as simply coincidences. Existing US Navy seabed receivers were installed during the cold war at a cost of $20 billion. The military has a huge interest in not only maintaining these receivers but expanding them. ATOC gives them this opportunity while complying with Congress' mandate to expend portions of its budget on environmentally-related issues (Page 1-23). The Strategic Environmental Research and Development Program's "goal is to use some its resources from downsizing of defense." ATOC is not a downsizing but an expansion of the military's interest in communication and detection in the deep sound channel. "Special receiving equipment will be installed at US Navy facilities." (Page 1-7) These facilities will be removed after ATOC is done only to the "extent economically and practicably feasible." The Dept of

2 I-1

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Defense will "convert some of its assets for dual, or non-military uses." We believe the dual purpose is very much military, which explains why some of its information is classified. At a press conference Scripps put on at the Geophysical Union conference they said that the "signal will be a rich as a humpback whale's song." It is our fear that that is the real goal of the military's support of ATOC - to emit and receive coded signals through the sound channel that to others will sound like whales. Unfortunately, no one knows what devastating disturbance such sounds will have on the whales who depend on the sound channel for their very lives.

General Overview:

The Sierra Legal Defense Fund expresses our oppositon to the segmentation of ATOC projects. In addition to those listed by them, I would like to add my dismay at the presentation given at the January 6 hearing by UC Santa Cruz. With many photos and
3 graphs under the heading Marine Mammal Research Project, Dr. Costa told of the numerous activities undertaken on behalf of ATOC, a project for which no permit has been issued. Animals have been harrassed, tagged, moved, etc. These activities are very much unwarranted and abusive to animals for a project that has not yet been approved. Using other permits is indicative of their efforts to segment the project. I-2, I-12a

ATOC's reluctance and refusal to discuss long term intentions are due less to their uncertainty of future plans, but are merely a continuation of their current, and successful, efforts to segmentize a project that is overwhelming in scope when seen in its entirety.

Environmental Consequences:

Nowhere in the document did I read any mention of the word "stress". Stress is cumulative. By the time changes may be documented the damage is irreversible. While
4 the EIS prefers to concentrate on animals around the sound source, the effects on animals in the sound channel receives much less attention even though those animals will be even more profoundly damaged. I-12b

Throughout the document ATOC is given the benefit of any doubt. This is not only illegal but illogical. The burden of proof must not be on the animals but on ATOC. But that is a burden ATOC is not willing or able to carry.

Thank you for your consideration of these comments.

Virginia Handley
California Coordinator

RECEIVED 2-6-95

Surfrider Foundation
San Francisco Chapter

January 31, 1995

To: Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 90
2345 Crystal Drive
Arlington, Virginia 22202

From: Surfrider Foundation - San Francisco Chapter
750 La Playa, Suite 620
San Francisco, California 94121
Peter B. Reich, Environmental Committee Chairman

Re: Public comment on the Acoustic Thermometry of Ocean Climate Draft EIS/EIR

Dear Mr. Spikes,

Thank you for the opportunity to comment on the Draft Environmental Impact Statement/Environmental Impact Report (EIS\EIR) for the Acoustic Thermometry of Ocean Climate (ATOC) project and the associated Marine Mammal Research Program.

The Surfrider Foundation (SF) is a Non-Profit Environmental Organization dedicated to the preservation and enhancement of the worlds waves, waters, oceans, coastal and beach environments, and the inhabitants thereof. SF is committed to research, protection, conservation, and education focussing on these important issues.

In San Francisco, the SF is represented by the SF - San Francisco Chapter (SFSFC), and we focus on coastal and ocean issues that affect this region. SFSFC has serious reservations about the placement of a low frequency noise generator in the Monterey Bay Marine Sanctuary, as well as off the coast of Kauai. It is our understanding from reviewing the EIS/EIR that the noise emitted will be of a non-harmonic tone, that is or may be disturbing to the local marine mammal populations that exist in the areas where these noises will be emitted or in the noise pathway to the receiving station.

We at SFSFC are not experts at marine biology or the habits of marine mammals, but the information presented appears to leave gaps as to the exact effects these noises may have on the local inhabitants. This being the case, SFSFC feels
1 strongly that further studies be continued to ensure that there be no negative impacts on the marine life in these areas. I would also like to point out that with the abundance of technology available in satellite imagery, could not an alternative method to measure potential sea level rise be implemented? SFSFC is very concerned by the Department of Defense (DOD) motives for this project. Is this project truly concerned with global warming, or is it a cover up by the DOD to further pro-war research? I-1, I-5a

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There should be serious consideration and research given to finding alternative techniques to address global warming and sea level rise. Humans are not the only species of life on this planet, and the problems of global warming are a direct result of our existence. Must we further burden the species that share our planet by blasting them out of the water?

Unfortunately, SFSFC is unable to provide comments on a more technical basis, however, we request that our questions, which are more theoretical, be answered and a basis for implementing such a marine disturbance be provided. If humans lived in the areas where these sounds are to be emitted, there is no way this project would get to the first blast. Give the marine mammal and undersea populations the same consideration we give to ourselves, and make sure the project will not have any negative impacts. Please also provide detailed information on the alternatives identified.

SFSFC appreciates your consideration on this matter. We are willing to provide support where possible to address the many issues at hand, and are anxious to see the best and most environmentally sensitive methods to gain the information sought selected. If we can be of further assistance, please don't hesitate to call. Thank you again.

Sincerely,

SURFRIDER FOUNDATION SAN FRANCISCO CHAPTER

Peter B. Reich, Environmental Committee Chairman

IDA
IN DEFENSE OF ANIMALS

RECEIVED 2-22-95

January 30, 1995

Advanced Research Projects Agency
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RE: Comments on the Draft EIS\EIR for the California Acoustic Thermometry of Ocean Climate Project (ATOC) and the Marine Mammal Research Program (MMRP), Scientific Research Permit Application P557B

Dear Mr. Spikes:

In Defense of Animals is a national, nonprofit animal advocacy organization with approximately 65,000 members nationwide. In Defense of Animals' (IDA) is dedicated to defending the rights, welfare and habitat of all animals. We welcome the opportunity to comment on the Draft EIS\EIR for the California Acoustic Thermometry (ATOC) project and the associated Marine Mammal Research Program (MMRP), and although we do not directly address the Kauai Acoustic Thermometry Project here, many of our comments can be applied to that portion of the proposed research, as well. It should, however, be noted that concerned organizations and members of the public were given a completely insufficient amount of time to formulate our comments on such a lengthy and technical body of material as the Draft EIS/EIR for CA. ATOC and the MMRP, hence our comments are not *nearly* as specific nor as comprehensive as we would have preferred.

After reviewing the Draft EIS\EIR for the CA. ATOC project, it is our understanding that ATOC would consist of an initial 2-year study in which a 260 watt acoustic transmissions will be activated for 4-7 days on a 2-8% duty cycle, with a respite of 7-10 days of non-transmission, in order to measure changes in deep sea ocean temperatures, and that the data collected may yield information on the possible indications of global warming. We further understand that a 6-12 month Pilot Marine Mammal Research Program (MMRP) is scheduled for the proposed ATOC sites (namely Point Sur, which is located well within the Monterey Bay National Marine Sanctuary of the coast of Santa Cruz, CA., and the North Shore area off the coast of Kauai, HI.) in order to ascertain what effects these 195 db subsea sound blasts will have on the marine life in these densely-populated areas.

I. MARINE MAMMAL RESEARCH PROGRAM (MMRP)

While IDA acknowledges the need for research into the behavior and habitat of marine life for the purposes of protection, preservation, and advancing our understanding, we have grave reservations about the MMRP due to the incorporation of invasive techniques (ie: sound

blasts) to measure behavioral changes in marine life within the affected areas. After reviewing the Draft EIS\EIR regarding the MMRP, our general concerns are as follows:

A. **Compounding the harassment of marine animals.** As the DEIS states, "available information on subsea noise and its biological impact ranges from incomplete to nonexistent." DEIS, p. 4-15. Given this statement, there seems to be great question as to whether more noise (ie: acoustic signals generated by ATOC sources) should be introduced at all, and the Draft EIS and EIR fail to sufficiently address this issue.

B. **MMRP is biased for approval of ATOC.** While the DEIS/EIR states the objectives for the MMRP are to "1) detect and evaluate potential effects of ATOC source sound transmissions on marine mammals,..;" 2) Identify mitigation measures to avoid the potential disruptions of behavioral patterns of local marine animals,..; 3) Use the acoustic capabilities of the ATOC system to explore the potential effects of other sources of low-frequency noise on local marine animals,..." DEIS, p. 1-21, we were struck by the statement that "This Pilot Study will determine *how best to continue* this project", not *whether or not to do so.* DEIS, p. ES-3. [emphasis, ours]. This statement seems to illustrate the apparent bias of the MMRP Pilot Study not only to support the commencement of the ATOC project, but indeed to be the *initial phase of ATOC.* Based on the information contained in the DEIS, it seems reasonable to conclude the MMRP will be incapable of obtaining truly objective and independent results.

C. **MMRP schedule: Too little, too late.** If the MMRP was truly to be an independent assessment of the adverse effects of low-level sound on marine animals, should it not follow a completely *separate schedule preceding the commencement of ATOC, not running parallel to it?* Furthermore, if gathering information on the effects of low-level undersea noise on marine animals is truly one of the main objectives, would it not be prudent to monitor the effect of existing sources of man-made noise? According to the statements contained in the DEIS, very little is known about the effects of commercial or recreation-generated undersea noise on marine animals, and this would appear to be an ideal opportunity to research the effects of pre-existing undersea noise levels on *specific species of marine animals,* (particularly as the DEIS has equated the noise generated by a container ship, for example, to a db level of 198--just 3 db's above the proposed 195 db for ATOC). DEIS, p. 1-10.

D. **Criteria for determining negative impact on marine animals is inadequate.** The Draft EIS/EIR sites CEQA *Standard of Significance* as the basis for determining significant adverse impacts on biological resources. These standards acknowledge 3 categories for determination as those actions which: "1) Substantially affects a rare or endangered species of animal or plant or the habitat of the species; 2) Interferes substantially with the movement of any resident or migratory fish or wildlife species; or 3) substantially

diminishes habitat for fish, wildlife or plants." While these stipulations may provide decent general guidelines, they appear to be very subjective (despite the fact that "substantial impact" is given a general definition). Furthermore, the standards fail to consider short and long-term effects of *stress* on the behavior and overall health of the marine animals who will be subjected to the provisions of the ATOC project. Therefore, we remain unconvinced that the criteria used in the DEIS/EIR to determine what constitutes a negative impact is neither sensitive enough nor comprehensive enough to present an accurate assessment of the effects of low-level subsea sound blasts on marine life.

II. THE CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE (ATOC):

While our main focus is the possible affects of the MMRP and the ATOC project on the abundant species of marine animals, In Defense of Animals also has some general concerns about the projects themselves as outlined in the Draft DEIS/EIR for the ATOC Program. Our general concerns are as follows:

A. **The lack of an objective and impartial evaluation of ATOC:** It has become apparent in reviewing the DEIS/EIR that it was *written with the assumption that ATOC,* as proposed, would take place, with minor adjustments as necessary, per the findings of the Pilot Study MMRP. This is clearly evident by the statement that portions of the study have already begun, including aerial and shipboard surveys, preliminary pinniped audiometrics, and a preliminary tagging of a limited number of marine mammal species. DEIS, p. 1-6. Most notably, the premature laying of source cable for an ATOC transmitter in the Point Sur area clearly presupposes the official site for ATOC, California. All of the measures mentioned above were carried out prematurely, as the DEIS/EIR for the ATOC and MMRP projects have not, as of yet, been officially approved.

B. **Consideration of alternatives to ATOC, including the No Action Alternative:** One criteria used for determining ideal test sites for ATOC and the MMRP was choosing a location with a high concentration of species of marine animals. This criteria was apparently one of the strong deciding factors involved in the choice of the Point Sur Site, disturbingly located right in the midst of a national wildlife sanctuary, and the North Shore of Kauai, known to be a very popular breeding site for cetaceans. While having access to an abundance of research subjects would be preferable from a scientific point of view, it would seem to be in direct contradiction to environmental and ecological principles and considerations, as the potential for negative impacts would be at the highest possible level. The DEIS/DEIR has clearly discounted the feasibility of several alternative sites, partially on the basis of *lower concentrations of potentially affected marine animals.* Furthermore, it seems quite clear that any real arguments against the overall feasibility and effectiveness of the proposed ATOC projects, both in California and Hawaii, have been minimized or completely discounted--despite the very real possibility of severe biological, ecological and

environmental consequences.

III. CONCLUSION:

Based on our review of the Draft EIS/EIR, we assert that neither the possible consequences nor the alternatives to the proposed MMRP, California ATOC, or the Hawaii ATOC projects have been adequately explored, and that there are far too many possible areas of negative impact. As represented in the Draft EIS/EIR, IDA opposes the proposed ATOC project on the grounds that the provisions of the project represent undue and unnecessary harassment of
6 marine life. Furthermore, we feel that conducting such tests in a marine wildlife sanctuary is I-42
totally inappropriate and runs contrary to the purpose of a sanctuary. IDA asserts that the Draft EIS/EIR for both the ATOC and MMRP projects has not satisfactorily demonstrated that the invasive techniques proposed for collecting data would not negatively impact the abundant marine life now inhabiting the chosen test sites, nor are we satisfied that the provisions for mitigation are sufficient, considering the numerous areas which are vulnerable to the possibility of experiencing a negative impact.

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January 30, 1995

Advanced research Projects Agency
c/o Dr. Clayton R. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Re: Draft EIS/EIR for California ATOC Project

Dear Dr. Spikes:

The DEIS/DEIR issued in November 1994 does at first glance appear to provide a very thorough and complete discussion of the scientific and legal issues involved in advancing the ATOC project. However, on closer examination, there is quite obviously much dissembling in both of these issues, and collusion between agencies that should be separate. (Indeed a question that immediately comes to mind is why is public commentary to be forwarded to an officer of a commercial company, Marine Acoustics, Inc., with obvious business interests in ATOC.)

Both NEPA and CEQA require that a comprehensive DEIS be prepared
1 on the entire environmental affects of ATOC as a whole before any part of the project can go forward, and before funds are irrevocably committed. Any attempt to create smaller projects is unlawful, an issue that the current DEIS conveniently overlooks. I-2

Further, both NEPA and CEQA require that an EIS must discuss all reasonable alternatives to a proposed action that would achieve the same goals, and must discuss and evaluate the environmental impacts
2 in comparison to those of the proposed action, and give reasons why I-5a
they are not given serious consideration. It is in this matter that I consider the comments of the present DEIS to be most inadequate if not a downright insult to the intelligence of anyone who has given an ounce of unbiased rational thought to the subject.

As described in the executive summary (ES-1) the overall ATOC project is an international research effort to determine long term ocean climate changes on global scales by using acoustic sound paths in the sea's deep "sound channel" to precisely measure average ocean temperatures. What is in question is not that some kind of an average temperature cannot be determined over a given sound ray path, but whether or not meaningful temperature differences can be ascertained, and in a meaningful time frame, despite gyre scale fluctuation phenomena outlined for example in the November 1989 issue of the Journal of Physical Oceanography by Munk & Forbes and entitled "Global Ocean Warming: An Acoustic Measure?"

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A change in temperature requires that there be some means to transfer heat from a source to the point in question and the standard methods for this are conduction, convection and radiation, yet the foregoing article by Munk and Forbes dicusses none of these as a potential explanation for a possible temperature change at the depth of the deep sound channel. As a physicist I find that omission incomprehensible. In a seven page article (dated June 4) I addressed to Mr. Gene Nitta of the National Marine Fishery Service and Dr. Ralph Alewine at ARPA, I pointed out that that the propagation of heat through water in the absence of convection is one of the slowest for any material, (even less than burned cork!) and further gave calculations showing that even for a 10°C rise in surface temperature one could expect a 1/10,000 °C rise at the deep sound channel only after 2,600 years! Heat radiation is rapidly attenuated in the upper layers of the ocean long before one gets to the deep sound channel depth and so that leaves convection as the sole possible means of heat transfer into the deep sound channel.

While convection obviously becomes a factor around underwater volcanoes and vents there are very few other driving forces, since warm water floats over cold, to bring about vertical convection. If there were, the great cold of the ocean depths that is responsible for the deep sound channel would long ago been dissapated over at least the thousands of millenia that it has been adapted for communication by the great whales. What currents there are in the ocean depths are very slow, of the order of 1 cm/sec. (220 m./yr.) and travel in a mostly horizontal plane. Whether the great cold of the ocean depths is a residual leftover from the last ice age, as I conjectured in my June 4th commentary, or whether it results from the cold of the polar seas sliding and dissapating towards the equatorial depths, there is no reason to believe that the temperature of the deep sound channel will change beyond the expected gyre scale variations in the next10-20 years.

My conclusion today is the same as it was on June 4, that there is not even the remotest possibility of using any measurement in the deep sound channel to indicate global warming. Indeed of all the proposals and research performed by other scientists on the subject of global warming, the ATOC project at great expence would seem to offer the least significant result coupled with the most environmental damage, at least as far as it impacts on whales and other marine life.

3 I-3d

In assessing the impact of the ATOC sound on marine life, the ATOC proponents consistently compare the intensity of their sound to that of a supertanker. But that is simply not a justifiable comparison, for the supertanker is not in the deep sound channel. At the top of the page in ES-2 it is stated that 'The net effect is that the sound channel very efficiently sounds over long distances. This effect also tends to limit sounds that are trapped in the deep sound channel from being detectable at depths outside of the channel." Two quite accurate sentences, but to which the converse should also have been appended. For in dealing with acoustic pressure waves, wave patterns are completely reversible. This means that sounds generated outside the deep sound channel (i.e. a supertanker) will not enter and stay in the deep sound channel, i.e. there is no comparison between the environmental stress to the marine environment by a tanker or ATOC in the deep sound channel and a tanker on the surface.

Yours sincerely,
LABORATORY FOR SCIENCE
Norman T. Seaton
Norman T. Seaton, PhD.

C-168

LABORATORY FOR SCIENCE
2821 9th Street
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June 4, 1994

To: Mr. Gene Nitta
National Marine Fisheries Service

Re: Marine Mammal Permit Application for ATOC

Forewords:
Within the brief time allotted for public commentary at the May.16 Santa Cruz meeting, it was possible to only give the briefest synopsis of my complete testimony. This is now given below.

Commentary on ATOC
by
Norman T. Seaton, PhD.
(Science adviser to The Fund for Animals)

Introduction:

The purported purpose of the proposed experiment on Acoustical Thermometry of the Ocean Climate is to evaluate the possibility of using measurements of the velocity of sound over great ocean distances and changes in this velocity to determine global warming, or the lack of it. The assumption of the experiment is that the velocity of sound can be measured with sufficient accuracy to make such a determination within a reasonable time, say 10 years. That brings up two problems: the immediate problem of obtaining accurate baseline data to which later sound velocity measurements can be compared to indicate the presence or absence of global warming. A second and more important problem however relates to the assumption itself. A significant portion of this commentary is devoted to demonstrating the invalidity of this assumption.

As a physicist, if I were asked how I would determine the presence or absence of global warming, I would say look to rainfall measurements throughout the world. It is well known from high school physics and chemistry that the vapor pressure of water increases from less than 5 mm of Hg at 0°C to 760 mm at 100°C. The condensation of such vapors leads to rainfall on both land and sea, so that rainfall becomes a very sensitive indicator of water vapor pressure and ocean surface temperature. The use of rainfall data has the great advantage that accurate data has already been collected for many decades. Thus accurate baseline data is already available for reference purposes. Furthermore the physical apparatus for making future measurements is already in place and will be used for local purposes, even if not summed up to indicate global warming. And of course the gathering and summing up such data poses no hazard to man, whales, fish, or any other part of the ocean environment.

Fig. 1 The Thermocline Curve

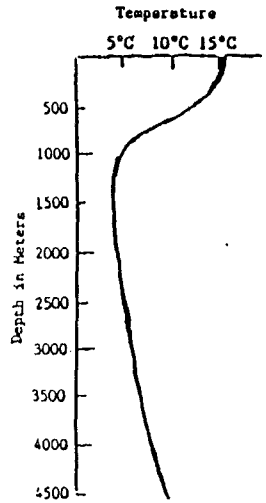


Fig. 2 - Sound Velocity Curve

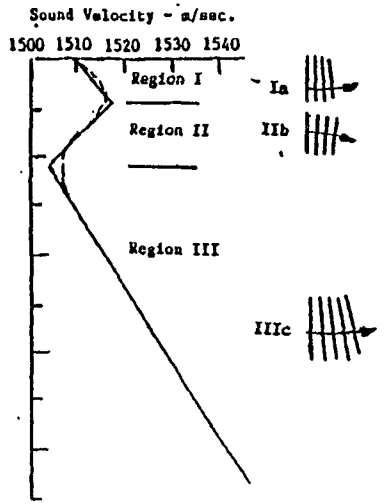


Fig. 3 - Sound Ray Paths

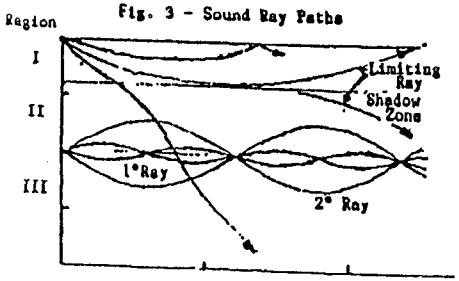
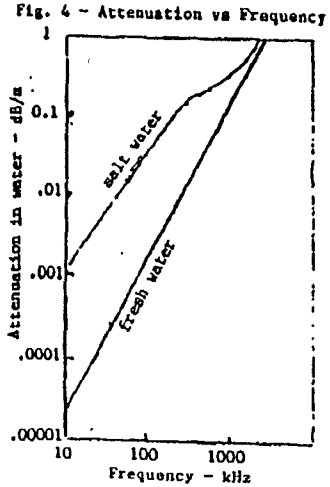


Fig. 4 - Attenuation vs Frequency



ATOC, Physics, and the Deep Sound Channel:

The premise of ATOC is that sound velocity varies with the temperature of the sea water, and indeed it does, changing by about 1 part in 500 at sea level for every degree centigrade change. The velocity of sound also increases with salinity, and in an almost linear fashion, with depth. The empirical formula often used is:

$$c = 1410 + 4.21t - .037t^2 + 1.14S + .018d$$

where c is the velocity of sound in meters/second, t is the temperature in degrees C, S is the salinity in parts per thousand (typ. 32), and d is the depth in meters. From the above formula it is evident that the dominant factors determining the velocity of sound are temperature and depth. Changes in salinity essentially play only a minor part except near the mouth of rivers. Changes in sound velocity with temperature and depth determine how a sound beam is refracted or bent. It is particularly instructive to look at the variation of temperature with depth, the thermocline, in the great oceans and to look at a typical sound velocity profile resulting from the thermocline curve and the increase in velocity that accompanies increasing depth. These curves are shown in Figs. 1 & 2. You will note that as a function of depth the ocean temperature first exhibits an essentially isothermal region near the surface followed by a rather rapid decline to about 4°C after which it slowly increases as the ocean floor is approached.

The accompanying depth velocity profile, Fig. 2, has for convenience of discussion been broken up into three regions approximated by the straight lines shown. Regions I & III have essentially the same slope as determined by the depth factor because temperatures there are nearly constant; in region II however the slope is reversed because of the overwhelming effect of the temperature decrease in that region. A sound wave launched horizontally in region III will slowly be deflected upward because at lower depths the speed of sound is higher so that the separation between wavefronts becomes larger. This depicted in drawing IIIc. This situation also applies to region I as depicted in drawing Ia. In region II a horizontally directed beam will be refracted downward as shown in drawing IIb. Such a wave will cross the division between regions II & III and then start to curve upward and the cycle is repeated again and again with very little attenuation other than in principle the 1/distance factor. In Fig. 3 we have shown the path of sound waves initiated on the surface and in the deep sound channel centered on the division line between regions II & III, i.e. where the sound velocity has its minimum value. It is of interest to note that the time taken for the longer paths can be as much as 10 seconds less than that for the direct path over a distance of 3,000 km (a garbled signal rumbles in and ends abruptly). In Fig. 4 we have shown the attenuation as a function of frequency for both fresh and salt water, the deviation of the latter being attributed to the relaxation effects of the dissolved magnesium sulfate in sea water. The efficiency with which sound power can be transmitted even in sea water is truly remarkable and all the more so at low frequencies. ATOC's desire to use low frequency emission in the middle of the deep sound channel is therefore understandable if one disregards all the needs of the other deep sea animals, essentially blind except for their remarkable abilities with underwater sound.

The Thermocline - Origins and Implications:

The thermocline, the variation of temperature with depth, is a very significant feature of the earth's great oceans. The shape of the thermocline obviously becomes altered in the oceans near the polar regions, but in general the thermocline curve is as shown in Fig. 1. It is a significant feature because of what it tells us about the past history of the earth, and because it is essential to the formation of a deep sound channel and the animals that have evolved over hundreds of millenia to take advantage of this long distance sound channel. Here we have great bodies of water where the surface temperature is about 17°C, where the ocean floor temperature is 5-10°C or more, and yet between 1,000 to 2,000 meters the temperature is only 4-5°C. The great oceans represent a quantity of "cold" that rivals that in the polar ice caps, and the question naturally arises: how did it originate and why is it still there?

The Pleistocene Epoch* started about 3 million years ago, and during this period, glaciers formed four times over Europe and North America finally retreating there about 10,000 years ago. Is it possible that the ocean "cold" of the deep oceans is a remnant from the last ice age perhaps replenished by deep ocean currents fed by the melting at the fringes of the of the polar ice caps? I think the answer is yes, and for two reasons that go a long way in explaining the temperature stratification that has been observed in the great oceans.

Consider first two of the many remarkable properties of water: its temperature dependent density and its thermal diffusivity. Fresh water has its maximum density at 4°C and the temperature at which salt water will attain its maximum density will not be far different (3.2% salinity means 1 salt molecule for every 100 water molecules). This means that warm water "floats" over cold, and unless mechanically mixed, it will lose heat to the cold by diffusion at a rate so low that it boggles the imagination. Since wave action tends to mix up (isothermalize) the top 200 meters of the ocean, let us suppose we could raise the top 250 meters by 10°C, then ask at what depth we could expect to find that the temperature had increased by 1/10,000th °C at the end of a 10 year period? As shown in the Appendix, the answer is 290 meters! If we could keep the top layer of the ocean at this 10°C increase, the law of times would indicate that it would require 2,600** years before one could detect even a temperature change of just 1/10,000th °C at a depth of 900 meters! Even with grossly exaggerated and unrealistic starting assumptions, heat diffusion is a very slow process indeed!

While water density gradients evidently do result in deep ocean currents, these currents stay in more or less horizontal plane, and have a very long recirculation time (thousands of years in the Pacific Ocean and hundreds in the Atlantic) and obviously have not significantly mixed up the stratification of ocean temperatures. They certainly cannot in any meaningful time frame affect either the depth of the deep sound channel or its temperature.

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* Fossil remains of whales first appeared during the Eocene Epoch over 40 million years earlier.

** It is interesting to note that geologists have been able to estimate the end of the last ice age from a knowledge of the thermocline in rock, with the help of a heat diffusion factor that is seven times that for water. The estimated time was 25,000 years.

In conclusion, it should be clear from the foregoing discussion that changes in the deep sound channel temperature can only occur over very long periods of geologic time.

There is not even the remotest possibility of using any measurement of sound velocity in the deep sound channel to indicate global warming, and to imply otherwise with a name, such as Acoustic Thermometry of the Ocean Climate, is an affront to responsible science and the public pocketbook.

Sound Levels and Biological Effects:

Proponents of ATOC like to point out that the sea is a very noisy place and that the sound levels of 195 dB they plan to use are the same as that generated by a supertanker, but that argument is disingenuous on two scores. Firstly the supertanker is not in the deep sound channel, and secondly, most of the frequency spectrum of the racket generated by the supertanker will not be in the range of frequencies used by most marine mammals.

As can be inferred from Fig. 3, most sounds generated on the surface get launched at an angle so shallow that they get refracted back up to the surface to be scattered by waves, or the launching angle is so steep that they pass right through the deep sound channel and get scattered from the ocean floor. Sounds on the surface must be launched within a very narrow range of angles if they are to get into the deep sound channel and stay in it. The power of the ATOC signal will undoubtedly be phased by their vertical line array so that most of it stays in the deep sound channel. While the ATOC sound may be greatly attenuated by the time it gets to the receivers, there will be vast volumes of the ocean where it will not be all that weak in comparison to whale vocalizations.

The other problem with the ATOC emission relates the frequencies which they propose to use and the problem of masking. Masking raises the threshold of hearing for a particular sound when another unwanted one of a frequency close to that of the particular sound of interest is added into the mix. The masking effect is always much worse when the masking sound has the same or a somewhat lower frequency than the ones of interest. The effect is much less when the unwanted frequency is an octave or more higher than those of interest. The ATOC sound could thus be particularly stressful and perhaps even fatal to the existence of the larger deep diving whales that have low frequency vocalizations and use the deep sound channel for communication.

Final Conclusion:

I believe the permit to conduct marine mammal research should be denied to ATOC. It is particularly odious that ATOC proposes to do this research in a marine sanctuary like that in Monterey Bay and in a known whale breeding ground like that off Kauai. Enough public monies have already been wasted on this project, and the balance of whatever funding remains should be used for some really useful purpose.

The ocean world of whales, dolphins and fish does not need more study, it needs to be cleaned up and left alone, and not become the cesspool of man's schemes, carelessness and disregard.

In our land world of exploding population, ever diminishing resources and ever increasing pollution, scientists should direct all their attention to solving the problems they and the greed of man have already generated. To do otherwise is to write man's final epitaph on a world wasteland of his own making.

References:

Applied Underwater Acoustics, Tucker & Gazey, Pergamon Press

Fundamentals of Acoustics, Kinsler & Frey, John Wiley & Sons

Mathematical Theory of Heat Conduction, Ingersoll & Zobel, McGraw-Hill

Appendix

The theory of heat diffusion in materials has long been a subject of interest to mathematicians and physicists alike starting with Fourier, Laplace, Lord Kelvin and others. The basic differential equation for heat diffusion throughout a body can be expressed by the equation:

$$\frac{\partial T}{\partial t} = \alpha \Delta T$$

Where T is the temperature at any point, t=time, and Δ=the Laplacian operator. The diffusivity constant $\alpha = k/c\rho$ where k=heat conductivity, c=specific heat, ρ=density is function of the particular material considered (and for water α is especially small).

For the rather simple example we wish to consider the above partial differential equation reduces to an ordinary differential equation:

$$\frac{\partial T}{\partial t} = \alpha \frac{\partial^2 T}{\partial z^2}$$ where again t=time, z=distance down

Many different kinds of solutions to this simple one dimensional heat flow equation, corresponding to different boundary conditions, are worked out in the text "The Mathematical Theory of Heat Conduction" by Ingersoll and Zobel. Sections 7.14 & 7.15 are pertinent to the type of situation we wish to consider, i.e. a large expanse of water where at least below a given depth there is no convective mixing up* of whatever temperature stratification exists there. Consider a column of water that is thermally isolated so no heat comes into the column through its sides but only in the z direction from the top down. We will further assume that we can raise and keep raised the top 250 meters by 10°C, and we ask the question: in 10 years at what depth will the temperature rise by 1/10,000th °C because the temperature of the top 250 meters has been raised by this 10°C. The solution to the differential equation is that given by 7.14(b)

$T=T_s[1-\Phi(nz)]$ where $\Phi=\frac{2}{\sqrt{\pi}}\int_0^{nz} e^{-\beta^2}d\beta$ is the probability integral

Here $n=1/2\sqrt{\alpha t}$ and T_s is the amount the temperature was raised down to the 250 meter level and z is the distance down from that level. Putting in $T=10^{-4}$°C and $T_s=10$°C we have $[1-\Phi(nz)]=10^{-5}$, corresponding $nz=3.12$ (see probability integral tables). Since $\alpha=1.31\times10^{-3}$ for water, and taking $t=3.1536 \times 10^8$ seconds (10 yrs), we find $n=7.78 \times 10^{-4}$ cm^{-1}, whence z=4010.7 cms or 40.1 meters, and the distance from the top will be 290.1 meters. To find the time for the same rise to occur at 900 meters, we will have t=10 yrs x $(650/40.1)^2$=2627 years from the law of times (7.15). If we were to raise just the very top surface of the ocean by 10°C, the time required for that temperature rise to diffuse down to 900 meters and give a 1/10,000th °C increase would be 5,000 years!**

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* The Heard Island experiment was done at a depth of 175 meters, where according to Fig. 4.4 of Tucker & Gazey, diurnal variations can still show up (perhaps explaining whatever results were obtained there).

** An intriguing question is: can the time of the last ice age be predicted from the upper section I of the thermocline curve (Fig. 1) in view of its close resemblance to the probability integral curve (taking 4°C as a baseline).

NRDC

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Natural Resources Defense Council

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VIA FACSIMILE

RECEIVED 2-7-95

January 31, 1995

Clayton H. Spikes
Advanced Research Projects Agency
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Arlington, VA 22202

Dear Mr. Spikes:

This letter summarizes the views of the Natural Resources Defense Council (NRDC), a private non profit national environmental organization, regarding the draft Environmental Impact Statement (DEIS) for the California Acoustic Thermometry of Ocean Climate Project (ATOC) and its associated Marine Mammal Research Program (MMRP). In addition, NRDC has signed on to coalition comments representing the concerns of over twenty interest groups prepared by the Sierra Club Legal Defense Fund as well as those prepared on our behalf by Heller Ehrman White and McAuliffe. These two sets of comments identify the fundamental deficiencies of the DEIS in detail as is appropriate for this stage of the process. They are incorporated herein by reference.

As evidenced by our early and frequent communications[1] with the National Marine Fisheries Service (NMFS) and ATOC proponents throughout 1994, NRDC is very concerned about the potential threat this project poses to the rich marine resources of the Monterey Bay National Marine Sanctuary. We also presented oral

[1] Correspondence submitted by NRDC and incorporated here by reference include those addressed to Rolland A. Schmitten at NMFS dated March 3, 1994; March 8, 1994; March 17, 1994; March 21, 1994 and November 23, 1994 from Joel Reynolds and Ann Notthoff as well as those submitted on our behalf by Heller Ehrman White and McAuliffe on April 8, 1994; April 29, 1994 and August 11, 1994.

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testimony at both public hearings held in Santa Cruz, California on May 16, 1994 and January 6, 1995.[2]

While NRDC has been an outspoken critic of the ATOC project as originally proposed, we have also made a serious effort to discuss our concerns in a constructive manner with project sponsors and the permitting agencies. In collaboration with former chief NOAA scientist Dr. Sylvia Earle,[3] NRDC facilitated two meetings in San Francisco on May 13, 1994 and July 19, 1994 to bring together and air the viewpoints of the full range of participants and interests in this debate. Although the intricacies and uncertainties associated with this project are substantial, NRDC remains hopeful that some legally supportable and mutually agreeable resolution is possible.

As the record clearly indicates, NRDC considers global warming to be a very serious matter and has devoted considerable resources to promoting effective policies to retard and reverse the pattern of climate change currently threatening the globe. Yet, as we have articulated in various forums,[4] "in seeking new information we must not trample the innocent residents of the very environment we are trying to understand." The ATOC project with its associated MMRP as described in the DEIS persists in its dismissal of legitimate and technical criticisms of the proposed project.

NRDC was an early supporter of the drive to establish the Monterey Bay National Marine Sanctuary. We coordinated the technical comments of scientific experts on the proposed Management Plan. We welcome preparation of the DEIS which attempts to illuminate the choices confronting the permitting agencies. Unfortunately, given largely to the prejudicial tenor of its language, the DEIS

[2] NRDC hearing testimony is also incorporated herein by reference.

[3] Dr. Earle was elected to NRDC's governing Board of Trustees in the fall of 1994.

[4] See, e.g., editorial by Ann Notthoff which appeared in Alolkoy, The Publication of the Channel Islands National Marine Sanctuary, Fall 1994, vol. 7, no. 3. (exhibit 1 hereto).

fails to provide clarification on a number of key issues. Our concerns focus on three areas:

(1) the analysis of alternatives to this project;
(2) the site selection analysis; and
(3) the permit process -- specifically the relationship of the Marine Mammal Research Program to the rest of the ATOC experiment.

First, the analysis of alternatives gives little attention to alternatives that would avoid or drastically minimize impacts to marine mammals. Given the admittedly uncertain value of the information hoped to be gleaned from ATOC, more serious consideration of avoidance alternatives should be given.

1 I-52

Second, as Table 2.4-1 on page 2-54 reveals, from an acoustic thermometry point of view, all three alternate sites rank comparably high. It is only when the marine mammal criteria are factored in that the Sur Ridge site emerges as preferable. But that is not what ATOC, as currently proposed, is about. The MMRP should not be used to justify a site that is otherwise unremarkable, particularly when the MMRP will be less statistically powerful precisely because of the constraints of a fixed source at this proposed site. This choice is fundamental. To quote from Dr. Hal Whitehead's remarks, "a basic decision as to whether it is desirable to put the source in a biologically rich area (so you can study its effects) or a biologically poor area (so it harms as little as possible) must be made. You can't have it both ways." NRDC recommends avoidance of harm as the best policy.

2 I-46

Third, the information produced by a properly constructed MMRP must be used to <u>inform</u> decision makers regarding the ATOC proposal. As presented in the DEIS, there is not a clear decision making point after the MMRP that asks decision makers to use new information to decide about ATOC. There are numerous blurs in the sequence of events described in the document that cause us concern (for example pp. 2-4 and ES-3 describe the MMRP as valuable in informing project designers <u>how</u> rather than <u>whether</u> to proceed with the ATOC phase). To correct this lack of a clear decision point between the two research projects, NRDC recommends that NMFS consider issuing a permit for a legitimate MMRP first, and only then upon its satisfactory completion, deciding whether a permit should be issued for ATOC. We also question the adequacy of a

3 TC I-17

scientific research permit rather than an incidental take permit. There is a strong argument that the latter is required. The simplistic discussion of this point on p. 1-1 is insufficient.

Finally, we believe the DEIS fundamentally fails to demonstrate why the acoustic thermometry experiment should be allowed to be conducted within the boundaries of a National Marine Sanctuary. While well-designed, non intrusive research that begins to answer some of the mysteries surrounding the effects of low frequency sound on marine mammals[5] may, under some circumstances, require a rich marine environment, no such circumstances have been demonstrated for acoustic thermometry.

4 I-42

Thank you for your careful consideration of our views. Please keep us informed of any and all decision documents concerning the ATOC project.

Sincerely,

Ann Notthoff
Senior Planner

Joel R. Reynolds
Senior Attorney

[5] The depth of our ignorance about these effects was exhaustively examined in the National Research Council report on <u>Low-Frequency Sound and Marine Mammals: Current Knowledge and Research Needs</u>, National Academy Press, April 1994.

STATE OF CALIFORNIA—THE RESOURCES AGENCY

PETE WILSON, Governor

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2-3-95

January 31, 1995

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Arlington, VA 22202

Re: California Acoustic Thermometry of Ocean Climate Project (ATOC) and its associated Marine Mammal Research Program (MMRP), Scripps Institution of Oceanography (Scripps)

Dear Mr. Spikes:

Please accept the following comments on the November 1994 Draft EIS/R for the above-referenced project. This cover letter addresses our general concerns, with more specific technical comments attached:

We applaud Scripps' redesign of the ATOC program, which now contains a Marine Mammal Research Program (MMRP) in advance of commencing the longer term ATOC implementation. Hopefully information gained through the MMRP will help alleviate many of the concerns raised by the fact that there is still a dearth of reliable scientific information regarding the effects of intense low frequency sounds on marine organisms.

Several concerns nevertheless remain. It is possible that many or all of these may be resolved through the ongoing monitoring and evaluation of the MMRP and ATOC, if these efforts are properly structured. At this point in the
1 process is it difficult to foresee whether such resolution will occur. For I-6c
example, we question whether Scripps has built in a sufficient time period separating the conclusion of the initial 6 month MMRP and the commencement of ATOC to enable adequate scientific debate over the lessons learned and their implications, including any necessary changes to the project.

We recommend that Mitigation Measure 2-1 (p. 4-11 and p. ES-16) be amplified
2 as follows, to incorporate the commitment made elsewhere in the document: TC
"The ATOC source will be shut down if the acute responses listed in Table C-1 are observed in relation to source transmissions."

Even with this commitment, we are uncomfortable with the severity of an impact that would need to occur and be documented before Scripps would agree to shut down the project (i.e., those impacts listed as "Acute/Chronic Responses" in

Table C-1, Item 6, of the DEIS/R). For example, less-than-acute/chronic marine mammal responses (i.e., Table C-1, Items 1-5) and long-term displacement (Table C-1, Item 7(b)) should be enough to trigger requirements for sound source modifications (e.g., those in CEQA Mitigation Measure 2-1). In other words, the less extreme (than acute/chronic) marine animal responses
3 would be correlated with less drastic (than shut-down) ATOC modifications. We I-6g
are very interested in learning whether the agencies on which Scripps is relying for peer review agree with the thresholds for shut-down in Table C-1 (including the National Marine Fisheries Service (NMFS), the Marine Mammal Commission, the Monterey Bay National Marine Sanctuary (MBNMS), as well as the Sanctuary's Advisory Council). We commend Scripps for including these entities in the ongoing monitoring and oversight of the program. However we would like to see more details on the particular roles and responsibilities of these peer review agencies.

It appears from reviewing the Draft EIS/R that Scripps does intend to be flexible in developing adverse impact thresholds and will probably put off such definitions until after the review of the 6 month MMRP, when more will presumably be known about the response of marine organisms to sounds. (For example, EIS/R page C-7 [Research Protocol] states: "... the study results ... will be used to help design a long-term program to determine if the operational ATOC program has unacceptable long-term effects.") Since it will likely take completion of the MMRP before the threshold question of what constitutes an adverse impact to potentially affected species can be defined, it would appear reasonable to infer that the reviewing agencies, including the Coastal Commission, will also need that information before they can provide useful feedback and/or make informed regulatory decisions on the longer-term program.

At this point we can only state that the "acute/chronic" impacts referred to in the Draft EIS/R, as impacts that might trigger the need for project modifications, need to be better defined, or, alternatively, if Scripps intends this definition to be an iterative process, then the process needs to be clear to all concerned.

Another question we have relates to the type of sound proposed for use. Common sense tells us that marine mammals are already adapted or acclimated to a wide variety of noises in their environment. Perhaps Scripps should consider (or experiment with) the use of differing sound signatures (i.e., including harmonics) that may be more familiar (and therefore less threatening) to marine mammals. The MMRP should consider experimenting with alternative sounds to determine whether a difference in impact can be determined. Historically the Navy's listening arrays at Point Sur have been able to effectively detect and differentiate sounds with differing harmonics and other characteristics, and we expect that Scripps' listening arrays will
4 have equivalent or better detection/differentiation capabilities. We CEQA Mit. Mea 2 A-4
recommend, therefore, adding another sentence to Mitigation Measure 2-1, which would provide that other modifications to the sound source (i.e., not just limited to intensity or duty cycle) will be made if they would reduce adverse impacts.

Another question arises with respect to the analysis of alternative locations. Five of the six Pacific Coast alternative sites analyzed correspond to the East Pacific NAVFAC sites. However, another Pacific Coast
5 site, NAVFAC Centerville Beach (near Ferndale in Humboldt County), is not I-4c
mentioned. The Navy used this site, in part, for its desirable subsea acoustic characteristics. Accordingly, this site should either be evaluated on par with the others, or its omission should be accounted for in the text.

Thank you for the opportunity to comment. Please consider the attached, more specific comments as well. If you have any questions regarding the comments in this cover letter, please contact me at (415) 904-5289.

Sincerely,

Mark Delaplaine

Mark Delaplaine
Federal Consistency Supervisor

Attachment

cc: Central Coast Area Office
OCRM
HBNMS
NMFS
Scripps

January 25, 1995

Coastal Commission Staff Review of the Draft EIS/EIR for the California Acoustic Thermometry of Ocean Climate Project and its associated Marine Mammal Research Program

Although this Draft EIS/EIR demonstrates an extensive research effort, a comprehensive approach, and a commitment to fully evaluating potential adverse impacts, there are a few issues which deserve further attention.

The presumed lack of significant environmental impacts is a major assumption stated throughout the Draft EIS/EIR. In particular, the ATOC Feasibility Demonstration initially presumes the lack of any significant environmental impact despite the admittedly limited amount of information available. For example, in the first paragraph of the Scientific Uncertainty Section (page 4-15) it is stated that "[a]s stressed in this EIS/EIR, available information on subsea noise and its biological impact ranges from incomplete to nonexistent, depending on the species being considered." This suggests that the available data are of limited value in determining the type or extent of project related impacts. However, in the second paragraph of the same section it is stated that "[a]s set forth
6 below, the ATOC project and MMRP are not anticipated, in some cases, to result in adverse effects on biological resources. This conclusion is based on available information regarding the species potentially affected." These seemingly contradictory statements give rise to issues that should be more fully explored. The lack of relevant information is mentioned throughout the document, but this does not justify the assumption of a "less than significant impact." Commission staff are not suggesting alteration of the demonstration project; to the contrary we generally support the approach described in the Draft EIS/EIR. We suggest, however, that the document should be expanded to include a more frank discussion of the assumptions used to arrive at a determination of "less than significant impacts."

TC
I-6K

Determinations of risk for the various marine mammals are made on the basis of their distribution and abundance in the project area. However, Table 3.3.1-1 (pages 3-17, 3-18) raises some questions regarding the sources and accuracy of the data used. In particular, notes 8-12, which presumably describe the data sources, are missing.
7 Secondly, the determination of risk based on the distribution of marine animals in the project area does not address the potential effects of an El Nino event. There is some evidence of altered behavior, distribution, and migration routes during such events. Thus, an El Nino could affect the distribution and occurrence of marine animals in the project area, and some discussion of this seems warranted.

TC

The potential for behavioral disruption is discussed for each taxonomic group of mammals. Although natural forms of disturbance have been described, human-induced disturbance is the more relevant issue in this case. Research on human-induced

disturbance has demonstrated adverse impacts to marine mammals including site abandonment, altered behavior, and other indications of stress. Of particular concern is the possibility of separation or abandonment of young. Although these issues are going to be addressed in the Marine Mammals Research Project, the Commission staff questions how "significant impacts" will be evaluated. For example, on page 1-5 it is
8 stated that "ATOC climate-related transmissions will begin only if the system is determined to be safe for marine animals..." However, "safe" is not defined. Commission staff suggest the Draft EIS/EIR be expanded to include a discussion of acceptable risk and definitions for terms like "minimal impacts" and "safe." TC

Commission staff appreciate the opportunity to comment on this Draft EIS/EIR. Please contact the Commission's staff biologist, Zachary Hymanson at (415) 904-5253 if you wish to discuss these comments further.

SIERRA CLUB NATIONAL MARINE COMMITTEE

January 30, 1995

Advanced Research Projects Agency
National Marine Fisheries Service
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Re: Comments on Draft Environmental Impact Statement /Environmental Impact Report for California Acoustic Thermometry of Ocean Climate Project

We appreciate this opportunity to submit comments on behalf of the Sierra Club (its Marine Committee and Ventana Chapter in particular) regarding the DEIS for the California Acoustic Thermometry of Ocean Climate (and Marine Mammal Research) Project.

1) Marine Mammal Impact Terminology

The DEIS uses CEQA terms of "significant, and less than significant" but fails to
1 offer bridging definitions to relate to federal MMPA terms of "negligible, non-negligible". To fulfill environmental impact requirements for both California and NEPA, definitions that bridge this gap must be provided in the joint FEIS. TC I-6k

The FEIS should provide definitions, which DEIS lacks, to *consistently* use terms for effects on marine mammals that are clearly defined in the document. For example: "significant, less than significant effect", "minimal effect", "adverse, unacceptable effect" (pages C-7, 5-3, 4-14) illustrate at least some of the variety in undefined terms. Given this term variability, it is of concern how marine mammal observation data collected will be recorded, analyzed, and provided to both designated reviewers and to the public. Use fewer terms for effects, and define them precisely.

2) Review Stage for Pilot Study Results of MMRP

There is information (DEIS 2-3) of the entities to be provided with preliminary
2 results for review. However essential items are missing:
a) The Pacific Regional Scientific Review Group, newly established under MMPA-95, must be added to the review bodies to be provided with Pilot Study results in addition to the list on DEIS 2-3. Part of their charge under federal law is to advise the Secretary (of Commerce) on "actual, expected, or potential impacts of TC

habitat destruction—— and for strategic stocks, appropriate conservation or management measures to alleviate any such impacts (MMPA sec.)117(d).

b) The FEIS must address what is to occur in case information does *not* confirm the project expectation of "negligible effect" (i.e. either as reported to the Review Bodies by MMRP research team, or because Review Bodies judge the results "non-negligible". Clarification, for either situation, of who acts and how is vital to be addressed. 3 TC

c) For credibil review by all bodies of Pilot Study results, and to expedite work of all concerned, we strongly recommend that criteria for evaluating Pilot study results be agreed upon and listed in the FEIS. 4 TC

3) MMRP Pilot Study- length, and following months.
We strongly support continuing the Pilot Study for 10 months, because for adequate data, six months is really short. 5 I-66

DEIS should set out more clearly what research will be continued throughout the ATOC project, rather than indicating most activities as "to be decided". We urge that to fill important information gaps in knowledge of sound effects marine mammal (as reported by National Academy of Sciences), it is essential to continue full blown research and data collection for entire two years. 6 TC

4) Cumulative Sound Potential
DEIS discussion (4-12) is unacceptable, in *failing* to relate the degree to which *ATOC sound would so markedly increase* the total sound impacting marine mammals, who are already affected by very loud container ship traffic. 7 I-12c

5) ATOC Shut-Down Protocol
DEIS mentions in several places possible need to discontinue the sound, and refers to "protocol" elsewhere in document—but in fact the *protocol for actual decision-making to shut-down is not described*. We recommend that FEIS include shut-down plan similar to that included in the Hawaii DEIS document. 8 I-69

6) Reporting by ATOC during 2-Year Project.
Quarterly reports at very least, are essential, especially given the degree of public controversy over ATOC in 1994. We strongly recommend that FEIS include a Public Information Plan, this plan to made public, which clarifies ongoing source of information for press and public (the Sanctuary designee we presume), dates at which to expect update reports, status of Pilot Project and Project Reviews. ATOC 9 TC Table 2.2.1.1-1

must not allow random information sources and unsubstantiated " information" to misinform the public. We presume that through the Sanctuary ATOC can access an excellent science reporter, interested and willing to translate difficult informatio into understandable media material.

I appreciate this opportunity to provide comments.

Sincerely,

Shirley Taylor

Shirley Taylor, Sierra Club Marine Committee chair
1414 Hilltop Drive, Tallahassee FL 32303
904-385-7862

Maxine McCloskey

Maxine McCloskey, Sierra Club Marine Committee vice-chair
5101 Westbard Ave., Bethesda MD 20816
301-229-4987
FAX: 301-229-2923

C-172

To Clayton H. Spikes:

RECEIVED 2-3-95

I am writing to express my opposition to the ATOC. The DEIS is inadequate to allow the ATOC project to proceed.

I think the research benefits are stated in the DEIS as uncertain. You cannot estimate the effects of low-frequency sound on marine mammals, such as loss of hearing and damage to reproductive and immune systems.

I think before this project is to proceed, further analysis must occur.

Sincerely,
Laura Nie

LAURA NIE
609 S. O'Leary #1
Flagstaff, AZ 86001

C-173

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT
Silver Spring, Maryland 20910

January 31, 1995

RECEIVED 2-3-95

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

NOAA's Office of Ocean and Coastal Resource Management (OCRM), which administers both the National Marine Sanctuary Program (NMSP) and the Coastal Zone Management Program (CZMP), has prepared formal comments on the DEIS for the California component of the ATOC project. As Dr. Charles Wahle, of the Sanctuaries and Reserves Division, explained earlier today to Mr. Ed Craig, our comments are undergoing internal NOAA review and should be available for submission by COB, Thursday, Feb. 2, 1995. The primary purpose of this internal review is to ensure maximum coordination and consistency of the various programmatic components within the agency. Mr. Craig assured Dr. Wahle that these comments would be included in the formal public record, if received by ARPA by COB, Friday, Feb. 3, 1995.

The OCRM comments are limited primarily to issues of direct programmatic concern. Our comments focus on 4 distinct areas:

1) Federal Consistency Authority with the California Coastal Commission (CCC). The Coastal Programs Division of OCRM has prepared detailed comments clarifying the various aspects of this federally funded and permitted project which would or may allow the CCC to exercise its authority to review this activity for consistency with its coastal zone management program.

2) ATOC Sound Source Location. Based on a thorough review of the ATOC DEIS, the NMSP recommends that ARPA and Scripps choose either of the two alternative central California sites (Sur Slope or Pioneer Sea Mount) which lie outside the boundaries of the Monterey Bay NMS. I-42

1

3) Marine Mammal Research Program. The NMSP proposes a number of relatively minor modifications to the protocols and schedule of the MMRP, aimed at increasing its ability to assess and monitor potential adverse impacts of ATOC transmissions on marine protected species.

4) Detailed Programmatic Comments. The NMSP has prepared a number of relatively straightforward corrections or clarifications to aspects of the DEIS dealing with issues of programmatic concern.

We appreciate your consideration of OCRM's comments, and look forward to working with ARPA, Scripps and NMFS to facilitate this project. Please feel free to contact Dr. Wahle at 301-713-3145x156, if you need further clarification of our intent or timeline.

Sincerely,

for Jeffrey R. Benoit
Director

cc: SWilson, DEvans, NOS
JBenoit, OCRM
JLawless, CWahle, DMalek, OCRM/SRD
CLewsey, DKaiser, JKing, OCRM/CPD
MJackson, MWeiss, GCOS
DWieting, WArchambault, OPSP
ATerbush, JDrevenak, NMFS/OPR

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

RECEIVED 2-7-95

January 31, 1995

Clayton H. Spikes
Advanced Research Projects Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the project entitled California Acoustic Thermometry of Ocean Climate Project (ATOC), Monterey County, CA. Our review is provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The ATOC is proposed as a two year proof-of-concept study funded by the Strategic Environmental Research and Development Program (SERDP) to measure long-term ocean climate changes using acoustic sound paths in the deep sea as means of precise synoptic temperature data collection. If successful, a ten-year follow-on global ATOC program would be proposed. Two sound sources are currently proposed. One located offshore of central California near Pt. Sur, within the Monterey Bay National Marine Sanctuary, and the other located off the north shore of Kauai, HI. This EIS evaluates the California sound source, while a companion EIS will evaluate the Kauai sound source. The proposed Pt. Sur facilities would include a 260 watt output acoustic sound source to be located approximately 40 km (21.5 nm) offshore at a depth of about 850 m (close to 3000 ft).

There is limited research and information on the potential effects of low frequency sound on marine animals. ATOC feasibility operations will be preceded by a six-month Marine Mammal Research Program (MMRP), which will allow marine biologists to utilize the sound source strictly for research studies into the potential effects of low frequency sound on marine animals. Baseline marine animal population and behavioral data collection efforts have already been ongoing in central California offshore area since mid-1994.

We commend the project sponsors for the modifications made to the project to address public concern regarding the lack of information on potential impacts. Reducing the proposed transmission schedule and placing the MMRP up front may help

reduce potential impacts and increase the margin of safety. We believe the MMRP is critical for verifying assumptions and providing essential baseline data. In fact, we recommend project sponsors consider extending the MMRP to ensure adequate evaluation of potential impacts prior to initiation of the ATOC feasibility study. I-6b

1

The research protocol for the MMRP states that a two-day workshop will be convened to present and discuss findings of the study. We support this commitment. Given the public and scientific controversy regarding potential impacts of the ATOC, we urge that there be a complete and open reevaluation of the ATOC in light of MMRP results. TC

2

If the ATOC proof-of-concept study is successful, a ten-year follow-on global ATOC program would be proposed. It is therefore critical that the process of evaluating subsequent actions be clearly explained in the FEIS. We recommend that a broad programmatic EIS be developed for the 10-year ATOC program, should it occur, with tiered NEPA documents for each new sound source. I-2

3

It is clear that essential information for determining potential impacts is lacking. Furthermore, EPA is concerned with the purpose and need for the project, potential cumulative impacts, and the lack of consensus within the scientific community regarding potential impacts. Based upon our review, the above concerns, and the potential precedence of the proposed project, EPA has classified this DEIS as category EC-2, Environmental Concerns - Insufficient Information (see attached "Summary of the EPA Rating System"). Our detailed comments are enclosed.

We appreciate the opportunity to review this DEIS. Please send two copies of the FEIS to this office at the same time it is officially filed with our Washington, D.C. office. If you have any questions, please call me at (415) 744-1584, or Laura Fujii, of my staff, at (415) 744-1579.

Sincerely,

David J. Farrel, Acting Chief
Office of Federal Activities

Enclosures: 4 pages

94-453
MI002151
filename: CAATOC.dei

cc: Jeannie Drevenak, NMFS, Silver Spring
Terry Jackson, MBNMS, Monterey
Tami Grove, CCC, Santa Cruz

C-174

DETAILED COMMENTS

Purpose and Need

The DEIS states that the ATOC project and associated MMRP is an effort to determine long-term ocean climate changes on global scales and to evaluate potential effects of low frequency sound transmissions on marine animals (pg. 1-7). However, there are many existing climate change technologies (e.g., paleoclimate modeling intercomparison, satellite studies) and marine animal research projects which could address the same purpose and need at probable lower risk to the marine environment.

4

We understand that many of the existing climate change technologies have been incorporated into the ATOC project. However, the FEIS should clearly state what unique information would be provided by ATOC and the level of confidence for successfully obtaining this information at minimum risk to the environment. Given the lack of information on potential impacts, the FEIS should persuasively demonstrate that the trade off between potential impacts and information gained is justified. I3d, f

Cumulative Impacts

EPA recommended, in our scoping comments, that project sponsors consider preparing a programmatic EIS to address the alternatives and impacts of the ATOC program. Such an approach would have provided a forum for evaluating potential cumulative impacts. Since this approach has not been followed, it is essential that the EIS include a comprehensive examination of potential cumulative impacts that may be reasonably expected from the California, Hawaii, and future sound source locations.

The DEIS appears to evaluate only the cumulative impacts of other potential noise sources (e.g., pg. 4-95). Cumulative impact is defined in NEPA as the impact which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions (40 CFR 1508.7). Therefore, pursuant to NEPA, actions other then noise generating activities should be considered when evaluating cumulative impacts. The FEIS should include an expanded cumulative impact analysis which evaluates the potential ripple effect caused by the loss or reduction of prey species and the affect of other activities such as commercial fisheries, recreation, commercial shipping, and general harassment. I-12c

5

Existing Environment

The DEIS clearly demonstrates that there is a lack of adequate information regarding baseline conditions at the preferred sound source site. Baseline information for many species is not available and much of the information which is provided is inferred from general studies of the California coast. There is a critical need for sampling and monitoring to verify assumptions, especially given the known biological richness of the area. The FEIS should clearly address this
6 information gap and describe existing and proposed sampling, monitoring and survey activities which will be implemented to ensure adequate baseline data is obtained prior to commencement of the ATOC feasibility study. TC App.C

We recommend that the information on biological activity for the selected and alternative sites be described by site. As currently described, it is difficult to compare the sites or to gain a clear picture of each site's biological activity.

Given the lack of baseline information on existing conditions and lack of knowledge of the effects of low frequency sound on marine animals, it may be wise to consider a more moderate research approach which would allow for the development of additional information and technologies. For instance, we encourage a shift in focus from verification of the ATOC
7 technology to evaluation of potential impacts and the development of technology which would provide more siting flexibility (e.g., moored autonomous source). Once supporting technologies are developed and there is adequate information to evaluate program impacts, further evaluation of ATOC technologies can be pursued. I-52

General Comments

1. The FEIS should clearly describe future plans if the feasibility study confirms that ATOC technology is <u>not</u> feasible
8 or if the MMRP demonstrates that there are significant adverse effects even at the reduced 2% transmission level. For instance, describe the process for determining whether to continue with the 2 month 8% transmission cycle. TC

2. As stated in the DEIS, there are numerous marine research and education facilities located within the study area (pg. 3-72). Although the proposed ATOC may provide beneficial educational opportunities, there may also be potential conflicts between ATOC effects and other research goals. For instance, if
9 ATOC does have a chronic effect on marine mammals resulting in reduced populations in the area, this effect could directly influence the outcome of ongoing population and behavioral research. The FEIS should thoroughly examine this issue and TC

C-174

EPA COMMENTS, ARP, DEIS CA ATOC, MONTEREY, CA, JAN 1995

evaluate the potential for research conflicts.

3. For clarity, we recommend the location of the preferred and
10 alternative ATOC sound source sites be shown on Figure 3.3.8-1, Federal and state designated biological resources areas near Pt. Sur (pg. 3-61). TC

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

The Resources Agency

Pete Wilson
Governor

RECEIVED
2-7-95

Douglas P. Wheeler
Secretary

of California

California Conservation Corps • Department of Boating & Waterways • Department of Conservation
Department of Fish & Game • Department of Forestry & Fire Protection • Department of Parks & Recreation • Department of Water Resources

January 31, 1995

Ms. Marilyn E. Cox, Assistant Director
Physical Planning
Campus Planning Office
University of California, San Diego
La Jolla, California 92093-0006

Dear Ms. Cox:

Thank you for your letter of November 28 announcing the release of the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the California Acoustic Thermometry of Ocean Climate (ATOC) project and its associated Marine Mammal Research Program (MMRP). The Resources Agency is providing general policy comments, while more specific comments will be provided by our constituent departments. We offer the following comments:

1. We are pleased with the Scripps Institution of Oceanography (Scripps) decision to redesign the ATOC program to include a preliminary study (the MMRP) for addressing the question of whether long-term underwater low frequency acoustic transmissions are safe for marine animals. Given the lack of reliable scientific data in this area and general concern for marine animal well-being, we believe this to be a prudent and necessary step prior to initiating the complete ATOC project.

2. The report states that, during the Pilot Study, the National Marine Fisheries Service and Marine Mammal Commission will "be consulted to help evaluate the biological significance of any observations of acute or chronic response, and to determine whether the experiment should be modified or terminated." (p. C-7) Furthermore, at the conclusion of the 6-month Pilot Study, "the results will be evaluated to determine how best to continue the project" and that the evaluation will be reviewed by the Advanced Research Projects Agency, NMFS, MMC, the National Marine Mammal Laboratory, and the MBNMS SAC (p. 1-4). In addition, the report states that the Monterey Bay National Marine Sanctuary - Sanctuary Advisory Council (MBNMS SAC) will "review this research protocol and the results of this research effort [the MMRP] on a quarterly or biannual basis. . . and would review any modifications of the experimental protocol. . ." (p. C-31)

The Resources Building Sacramento, CA 95814 (916) 653-5656 FAX (916) 653-8102

California Coastal Commission • California Tahoe Conservancy • Colorado River Board of California
Energy Resources, Conservation & Development Commission • San Francisco Bay Conservation & Development Commission
State Coastal Conservancy • State Lands Commission • State Reclamation Board

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C-175

How exactly will the "consultation" and "reviews" be taken into consideration? Will there be an opportunity for independent reviews of the Pilot Study results, and not just a review of the evaluation? We recommend that the EIS/EIR clarify the roles and responsibilities of these agencies regarding termination, modification, and review of the MMRP, especially if there is disagreement between the participants. 1 I-6a TC

3. We are concerned that there may not be adequate time between completing the Pilot Study and beginning the ATOC feasibility operations to allow scientific review and debate of the Pilot Study results, and to incorporate any necessary changes into the ATOC project. In addition, it is not clear how the Pilot Study findings will be presented and discussed by the relevant organizations. 2 I-6c

4. Most importantly, a lack of "significant" environmental impacts (which is not clearly defined) is subtly presumed throughout much of the EIS/EIR, creating what appears to be an internal contradiction. For example, the document first states that ". . .very little is known about the effects of low frequency noise on marine mammals," and then, in the very next paragraph, states that the "Pilot Study will determine how best to continue the project" (p. ES-3). This is of concern, for if the impacts to marine mammals are unclear, it would be appropriate to evaluate and review the Pilot Study results before determining whether to continue the project. 3 I-6k

Thank you again for the opportunity to comment on the Draft Environmental Impact Statement/Environmental Impact Report for the ATOC project and its associated MMRP. Any questions you may have should be directed to Brian Baird of my staff at (916) 657-0198.

Sincerely,

Douglas P. Wheeler
Secretary for Resources

cc: Advanced Research Projects Agency, c/o Marine Acoustics, Inc.
National Marine Fisheries Service, National Oceanic and Atmospheric Agency
Scripps Institution of Oceanography, University of California, San Diego
Sanctuary Advisory Council, Monterey Bay National Marine Sanctuary

C-176

RECEIVED

SAVE OUR SHORES

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

January 31, 1995

Dear Mr. Spikes

Save Our Shores is a marine conservation group dedicated to protecting the Monterey Bay National Marine Sanctuary (MBNMS). More than 2500 people around Monterey Bay and northern California support our efforts to promote research, conservation, and education programs that further the mission of the Sanctuary. We appreciate the opportunity to comment on the Draft Environmental Impact Statement/Environmental Report (DEIS/EIR) for the California Acoustic Thermometry of Ocean Climate (ATOC) Project.

Save Our Shores does not support ATOC in the Sanctuary because its potential impacts are inconsistent with the Sanctuary's conservation standards, it is inconsistent with the Sanctuary's mission and research goals; the potential benefits are unclear and have been poorly explained to the public; and there are alternative locations outside the Sanctuary where this research would be more appropriate. We do, however, support further research that would address the impacts of low frequency sound on marine life, especially marine mammals. We would reconsider supporting ATOC outside of the Sanctuary boundaries after the research from the marine mammal pilot project have been analyzed and made available for scientific and public review. 1 I-4b

The potential impacts of ATOC are inconsistent with MBNMS conservation standards

ATOC may impact marine life in the MBNMS in a manner that is inconsistent with MBNMS goals. The MBNMS Management Plan is clearly focused on resource protection:

> The highest priority management goal for the Sanctuary is the protection of its marine environment, resources, and qualities as well as reducing the threats to Sanctuary resources and qualities. (Section II. B. p. V-6 & V7)

Post Office Box 1560
Santa Cruz, California 95061
Phone 408-462-5660 • Fax 408-462-6070
Sanctuary Watch Hotline 800-9-SHORES

RECYCLED PAPER

The ATOC DEIS states that

> Disruption of marine mammals as a result of human-made noise can be expected to result in interruption (at least briefly) of normal behavioral and social interactions with other animals of their species, an increase in energy cost (whether or not feeding was disrupted), and displacement to a habitat that may be less suitable. (Section 4.3.1.1.1, p. 4-26)

> Habituation can be detrimental, however, if it leads to a lack of response to hazardous situations. For example, habituation to low frequency sounds, including sounds from large vessels and the ATOC source, could lead to decreased avoidance of vessels and increased injury or death from collisions. (Section 4.3.1.1.1, p. 4-29)

> In summary, the potential for adverse impacts from long-term exposures to the ATOC sound fields is unknown. (Section 4.3.1.1.1 p. 4-30)

In these instances, the DEIS clearly identifies the potential for serious environmental impacts to a rich habitat unique to this region. Because of its significant, potential long-term impacts, ATOC is inconsistent with the goals of Sanctuary protection.

2 In other cases, however, the logic of the DEIS is flawed and circular. Repeatedly throughout the Environmental Consequences section, the conclusion is reached that, if no evidence for a significant impact exists, the impact must not exist. Clearly this is false. TC I-6K

ATOC is inconsistent with the mission of the National Marine Sanctuary Program

> The goals of the National Marine Sanctuary Program are to provide enhanced resource protection through conservation and management of the Sanctuaries that complements existing regulatory authorities; to support, promote, and coordinate scientific research on, and monitoring of, the site-specific marine resources of the Sanctuaries; to enhance public awareness, understanding appreciation, and wise use of the marine environment; and to facilitate, to the extent compatible with the primary objective of resource protection, multiple uses of the National Marine Sanctuaries.

ATOC is an international research effort to determine long-term ocean climate changes on global scales. This does not follow the mission of supporting, promoting, and coordinating research on site-specific marine resources within the Sanctuary.

C-176

ATOC is inconsistent with criteria for MBNMS research

> The purpose of Sanctuary research activities is to improve understanding of the Monterey Bay environment, resources and qualities, to resolve specific management problems, and to coordinate and facilitate information flow between the various research institutions, agencies and organizations.

As the DEIS states, the rationale for ATOC is to gather deep ocean temperature data because time scales and the specific global consequences on climate predicted by these models have been criticized as inaccurate and oversimplified. Therefore, they have had little impact on governmental decisions regarding greenhouse gas emissions.

3 Reliance on global temperature computer models to make decisions is a highly dubious proposition and may be a dangerous management strategy. Responding to inadequacies in computer models is not an adequate justification for placing a powerful long-term low-frequency sound source within a marine sanctuary. I-3C

The benefits of ATOC are unclear and have been poorly explained to the public

Many of the areas residents are unconvinced that the ATOC project will benefit the Sanctuary. At both public hearings in Santa Cruz, the majority of speakers opposed the project because they were not convinced that the potential benefits of ATOC outweighed the potential for damage.

Decision makers and representatives of the public including the Santa Cruz City Council and the Board of Supervisors opposed ATOC. Specifically, the Santa Cruz County Board of Supervisors who represent over 230,000 people passed a resolution recommending the No Action alternative. They based this on their analysis that the ATOC DEIS fails to adequately address indirect economic impacts and may adversely affect tourism and recreational commercial fishing industries. The County contends that it would be fiscally imprudent to proceed with the ATOC Project because of the large number of uncertainties and the possibility that no measurable benefits may be gained.

There are alternative locations outside the Sanctuary where ATOC could be conducted

The DEIS considers eleven alternatives representing a range of options. This list was further narrowed to five alternatives - the proposed action, no action, Sur Slope source site, Pioneer Seamount source site and the use of the moored autonomous sources.

Clearly, because of the important biotic values located within the preferred site, two alternatives exist so that the ATOC sound source does not have to be implemented within Sanctuary boundaries. I-4a

4

Marine Mammal Research Project

The current Marine Mammal Research Project (MMRP), as proposed, is designed to study direct impacts to marine mammals by assessing their level of disturbance through evaluating their behaviors, or changes of behavior, and will address whether long-term underwater low frequency sounds are safe for marine mammals. SOS strongly supports a MMRP, however, some modifications will have to be implemented in order for SOS to support the MMRP associated with ATOC.

As is stated in the DEIS, at the conclusion of the six month MMRP pilot project, a two-day workshop would be convened to present and discuss the project findings. This is inadequate. There are no protocols or criteria for changing the ATOC project operations should impacts be detected. With no specific criteria, the results of the pilot project are open to interpretation. In addition, details and a timeline are missing which address how much time will be devoted to statistical analyses of the pilot study results, peer and oversight review of those results, and plans for modifications of the MMRP. TC I-6c

5

We recommend that the MMRP pilot project be conducted within the MBNMS and extended to two years (minimum of one). With the extensive marine mammal populations that inhabit the Sanctuary, an adequate MMRP ties in well with the Sanctuary Research goals of resolving specific management problems. We encourage resolution of our concerns outlined above and strongly support the development of a technically qualified group, independent of the project, to evaluate the pilot project data. Once the data has been assessed, it should be released for public and peer review. I-6b

6

We encourage the permitting divisions of NOAA, specifically the National Marine Fisheries Service and the Office of Ocean and Coastal Resource Management to view the MMRP pilot study and ATOC as two separate projects with two separate permits. The ATOC project should not be given a permit until the MMRP pilot study results are in, analyzed, peer reviewed and the results are conclusive that no significant adverse affects will occur within the marine environment. Only at that point should ATOC be considered to proceed, outside of Sanctuary boundaries. I-17

7

Sincerely,

Vicki Nichols

Vicki Nichols
Executive Director

FRIENDS OF THE SEA OTTER

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31 January 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes,

Friends of the Sea Otter is submitting their comments on the draft EIS/EIR for the California Acoustic Thermometry of Ocean Climate (ATOC) project and its associated Marine Mammal Research Program (MMRP). Most of our expertise, and therefore comments, center on the MMRP. We do, however, have comments related to other sections of the document as well.

In the final EIS/EIR we would like to see:

1. A discussion of the site used in November for the Acoustic Engineering Test as an alternative site for ATOC. I-4c

1

2. Accurate reporting of site selection criteria. In early ATOC discussions and papers, it was revealed that probable sites for the sound source were evaluated using acoustic, logistical, and economical considerations relative to the needs of the ATOC climate project. Site selection initially was <u>not</u> based on whether or not enough marine mammals were present to support baseline data collection relative to the MMRP. Curiously, the draft EIS/EIR makes it appear as though presence of marine mammals at the proposed Monterey Bay National Marine Sanctuary site (Sur Ridge site) was a driving consideration in site selection. This was not the case, and should not be presented in the draft EIS/EIR as an *a posteriori* criterion or rationale in site selection. I-4b

2

3. A letter of agreement from the U.S. Fish and Wildlife Service that exempts the project from the Endangered Species Act Section 7 consultation process for southern sea otters, <u>if</u> the Service agress the evidence in the draft EIS/EIR supports that conclusion. As it stands now in the draft, there is a *presumption* on the part of the project proponents that sea otters are exempt, but no consultations or letters supporting that presumption are documented within the draft EIS/EIR. TC

3

FRIENDS OF THE SEA OTTER

Specific to the MMRP, we have the following comments:

1. We would like to see an outline of the program to be used to document the collection, necropsy, and cause of death analyses for marine animals -- mammals, birds, fish, turtles -- found dead or moribund, on water or on shore, during the course of the Pilot MMRP and during the ATOC climate phase. This would need to include much more extensive planning, networking, and follow-up than the Marine Mammal Stranding Network (noted in the draft EIS/EIR as the sole sourch of this information and assistance) is able to provide. TC 4

2. We also request a very specific timeline for implementation at the conclusion of the Pilot MMRP, that shows how much time will be devoted to statistical analyses, peer and oversight review of results, to discussion of probable modifications to the MMRP long-term monitoring program, and for assurance that those modifications will be made before the start of the ATOC climate-phase research. We expect that analyses and peer and public reviews of information from the Pilot MMRP, and strategizing for any program modification, would take at least two months, and perhaps longer. This could culminate in the two-day public workshop proposed in the draft EIS/EIR. However, the two-day workshop is not sufficient in and of itself. If the Pilot MMRP is "Phase II" of the ATOC project, and the climate-directed phase of the project is "Phase III", then we need a clearly delineated "Phase IIA" in between to evaluate Phase II results before entering Phase III. Phase IIA is also critical to charting the public-buy-in pathway. Many in the public will not become supportive of the MMRP or ATOC simply as a result of adding a substantial review period, but it will go a long way to documenting scientific review and public information effort on the part of ATOC proponents, and will help scientists outside the MMRP help the MMPR biologists in developing Phase III monitoring protocols. TC 5 I-6C

3. Most important, we encourage the development of a small oversight group that is structured differently from the Citizen's Advisory Board function referred to in the draft EIS/EIR. We would like to see an oversight group composed of at least two members from each of the following disciplines: ocean acoustics specialists, marine mammal experts, and conservation scientists. It is imperative that the people nominated to and selected for inclusion on the oversight team be extremely knowledgable in their fields, not already associated with the ATOC or MMRP projects, and work side-by-side with the ATOC and MMRP scientists as the data are collected, interpreted, and TC 6

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FRIENDS OF THE SEA OTTER

C-177

analyzed. It could also be expected that this oversight group may be asked to offer their separate or collective opinions of MMRP and ATOC progress and decisions to such groups and the Sanctuary Advisory Council for the Monterey Bay National Marine Sanctuary. Although we do not have the names of potential ocean acoustics specialists to put forward in nomination, we can offer some suggestions for the marine mammal experts (Dr. Gregory Silber of the Marine Mammal Commission, Dr. Peter Tyack, and/or Dr. Katy Payne), and for conservation scientists from environmental groups (Dr. Rod Fujita of the Environmental Defense Fund, Ms. Anne Notthoff from the Natural Resources Defense Council, Ms. Rachel Saunders from the Center for Marine Conservation, Ms. Ellen Faurot-Daniels from Friends of the Sea Otter) or universities (Dr. Michael Soule from the University of California at Santa Cruz). We feel very strongly that the project proponents should pay for the time and expenses of these oversight team members. Though a departure form requirements made of most research projects, the storm of public and scientific controversy generated by the ATOC and MMRP projects requires incorporation of measures to assure the objectivity and integrity that the public perceives as missing from the project so far.

We thank you for the opportunity to comment on this draft EIS/EIR, and look forward to the final EIS/EIR and its ability to integrate solutions to the gaps and inconsistencies still remaining, particularly in the areas of research oversight and long-term monitoring.

Sincerely,

Ellen Faurot-Daniels

Ellen Faurot-Daniels
Science and Education Director

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C-178

PO Box 25886
Mud's Park, AZ 86017

RECEIVED 2-1-95

January 26, 1995

Dear Clayton Spikes,

The ATOC project is really an experiment that no one knows the repercussions of.

Marine mammals are in grave enough danger as it is with toxins in their environment, Spare them anymore stress & possible damage.

If the intent is to study global warming -- there are hundreds of better ways to spend money on energy efficient technology, renewable resources & clean energy.

I object to this project.

Marilyn A. LaRosa

Marilyn A. LaRosa

C-179

To: ARPA, Clayton Spikes re:ATOC From: 1-31-95 11:34am p. 1 of 7

January 31 1995

Regarding: ATOC Sound Blasts from Big Sur

To whom it may concern:
All of the below are significant comments
(Although I haven't had time to arrange them please accept my apologies.)

There are two parts to the experiment.

1. Marine Mammal Studies related to the 195 db sound.
2. 195 db Sound generation & Temperature Calculations

Both experiments have such large basic flaws, I recommend neither be funded.

1. The Marine Mammal experiment is INTENDED to bother marine life. This is indescribably inappropriate for a Marine SANCTUARY.

2. The Global Warming/Temperature experiment, at best, will produce such questionable data that conclusions could not be relied upon.

General EIS comments:

A. Include an Index. (NEPA Section 1502.10j)
B. "Write in Plain Language" (NEPA Section 1502.8)
C. The DEIS has a superficial glossary. Create a complete one.
- Check it with one of the computer programs that identify uncommon words. Words like "mysticetes" and "ordontocetes" are not in common use and fail NEPA's "Write in Plain Language" dictate.

Specific Comments:

1. Marine Mammal Studies related to the 195 db sound.

Hearing damage is NOT the worst case possible.

Other physical damage, including death, to marine life is entirely possible.

I strongly object to the marine mammal portion of the experiment because of the intellectually dishonest public assertions of the fellow proposed to be in charge of that part of the experiment. I have no confidence that his experiments can be free of bias.

At the May 4 presentation at the Naval Post Graduate School in Monterey Dan Costa stated "The worst case [of effects on marine life] is hearing damage."

Mr. Costa implied several times that if marine life can't hear a sound there is no possibility of physical harm to them.

To illustrate how irresponsible this assertion is consider that:

You can't see ultraviolet light, yet it gives you skin cancer.
You can't see microwave radiation yet it can cook you.
You can't smell carbon monoxide, yet it poisons you.

These are examples of undetectable biologic, temperature and chemical effects.

Mr. Costa should be well aware of the phenomena of Dolphins to stun and kill their prey (not just damage their hearing ability), simply with high volume sound.

If he is aware of this phenomena he clearly discounted it by not mentioning its possibility. In contrast several times in his spoken remarks (and possibly one of his slides) on May 4 1994 he made the assertion that "The worst case (of effects on marine life) is hearing damage."

If he is not aware of this phenomena it seems he is not capable of objective presentation, sufficiently trained, or interested in the unintended side effects of his work, to participate in the experiment.

Additionally, Mr. Costa's remarks were uncontaminated with concern for any uncomfort marine life may experience with this project.

1* Please list and examine, summarize and cite from comprehensive surveys all non-hearing sound impacts on marine life. Sec 4.3

At the May 4 presentation slides of the testing apparatus were shown attached to some of the marine animals. The sensors and transmitter bundle were insultingly inappropriate. They showed many hooked edges which could be easily snagged on kelp or other marine life.

2 * For the EIS please show photographs of the proposed sensors in place attached to the animals. Please describe in detail how sharp edges could get snagged on kelp or on other marine life. Please detail how the drag from the instruments could slow the animal down. Please detail how that slowing could harm their ability to catch food and make them more likely to be caught be predators. TC

3 * Please prepare and examine thoroughly an alternative that is originates & ends entirely *outside* the Marine Sanctuary. Sec 2.2

4 * Please explain how bilges of research vessels will be cleaned. Will the oil and debris be pumped overboard while at sea like most ocean vessels? Or is there some civil or criminal penalty if the research vessels are found doing so? Remember this is a Marine Sanctuary! By Law

5 * Please exactly what quantities, components and timing of air pollution we can expect from the vehicles involved in this research. TC

6 *Please define "thoracic" and "intrathoracic" TC

7 Page 4-123 says the possibility of divers hearing the ATOC sound is "remote". Please describe what will occur if the sound is detected by divers. Sec 4.5.1.1

8 * Please prepare an alternative that will stop or seriously reduce the sound levels if the sound is detected by divers. I-18d

2. 195 db Sound generation & Temperature Calculations:

I oppose the Sound Generation experiment at 195 decibels. It is possible I may not oppose it at 90 decibels.

This experiment is largely analagous to the early medical X-Rays.

Early X-Ray power levels were not made with any regard to tissue damage. Power levels were many times higher than necessary and did cause excessive tissue damage. We have since learned that only a fraction of the X-Ray power is necessary to make perfectly satisfactory X-Ray images.

Similarly, the volume at the generator does NOT have to be 195 db. The experiment can run at 90 db (and possible as softly as 50 decibels) with identical results. At 90 db - no one would be

complaining about the Sound generation part of the experiment.

* In the EIS please list IN ONE PLACE - ALL THE VARIABLES with which the experiments will come in contact.

Then detail how each variable will be controlled and examined.

* Please include as a variable to be discussed in depth - "The contribution of local and widespread sea floor (not ocean surface) warming and cooling to the deep ocean."

* Please describe the difference between the best depth for the sound channel.

* Please describe the best depth to detect global warming.

9 * Please describe if this (best global warming) depth is constant across the scope of the experiment. I-3g

10 * Please describe variables other than water temperature that will change the speed of sound. Sec 2.2.3

11 * Please explain the "Magellan" project mentioned by Mr. Munk, why it failed and why ATOC wouldn't fail for the same reasons. Sec 1.1.3

Page 1-4 "The oceans are the Earth's major reservoir of heat" This is ludicrous and shows the extreme tunnel vision of the experimenters. The earth's major reservoir of heat is the earth itself. By comparison, the oceans are but an onion skin on the surface of a basketball.

Worldwide the sea floor is not a constant temperature at a given spot nor uniform across its surface. In volcanic areas there may be large temperature increases in a small area. Other places may have small temperature increases over a large area. Yet other areas may experience cooling.

The expected measurement warming increase of the water over the course of 10 years is on the order of .1 (one tenth of a degree) Celsius. If the temperature of the sea floor slowly rises (or falls) over the course of the experiment AND IS NOT INDEPENDENTLY MEASURED IT COULD EASILY THROW ANY CONCLUSIONS IN DOUBT.

* Please have the EIS identify how the magnitude and locations of sea floor temperature increase and decrease will be monitored.

12 * Please detail how ocean currents (vertical as well as horizontal) in the experiment area will be monitored. TC

The 195 db sound is said to be needed to travel for the longest traverse which is Big Sur to New Zealand. It is important to note - as that sound passes (is received or detected) in Hawaii, the Big Sur 195 db will be reduced to about 50-55 db.

That same signal will continue on to New Zealand which is more than twice as far away as Hawaii. Since the sound is only 50 db as it passes Hawaii, only a 50 db generator is necessary to send a signal from Hawaii to New Zealand. That distance is farther than Big Sur to Hawaii.

* I request that an alternative be prepared that eliminates the longest distance, such as the Big Sur/New Zealand traverse, by starting with the minimum starting volume possible. The volume to be evaluated as an alternative should be as low as 50 db.

LOCAL vs DISTANT TEMPERATURES

The experiment can't discern local vs distant temperature changes. The

experiment can not measure the difference in temperatures in its path. It can only tell the average temperature across the whole path.

Nearby temperature could go up enormously, while over a great distance the temperature could go down. If the sound signal takes the same amount of time to make traverse the distance this would show identical data with no way to know this.

Please make it clear in the EIS that ONLY THIN CROSS SECTIONS OF THE Pacific Ocean will be measured by this technique. (Actually this experiment can not even measure slices (or cross sections) of ocean. It can only measure a line similar to a bullet path. Worse yet there is no possible method to insure the same path is measured throughout the experiment.)

* Please make it clear in the executive summary of the EIS that this experiment will not generate a world wide temperature map.

12 Small temperature increases over a large area could contribute to currents. Please detail how these currents will be taken into account since only a narrow cross section of ocean will be measured. TC

13 * Please make it clear in the executive summary of the EIS that in order to evaluate the value of this experiment related to global warming it must be a worldwide (or oceanwide) experiment. I-3d

* Please make it clear in the executive summary of the EIS that 99.9% of the ocean depth temperatures will remain unknown even with the best possible results from ATOC.

* Please make it clear in the in the executive summary of the EIS that data from this experiment can not be used to generate a 3-D map of deep ocean temperature.

14 * Please include in the EIS all international literature references to experiments in the past 40 years dealing with the effects of high volume noise on animal (including human) life. I remember reading about a French Crowd-control device in the 1970's that operated in the range of 130 db and 70 hertz. Scientific American (April 1994) mentioned recent experiments of "low frequency "infrasound" generators powerful enough to generate nausea or diarrhea'. App A

15 The expected measurement warming increase over the course of 10 years is on the order of .1 (one tenth of a degree) Celsius. Please explain in detail how other scientists and politicians will be persuaded that this tiny temperature change is significant. I-3b

16 *Please explain re: table ES-1 at what megahertz and sound frequency these comparisons use. TC

* Also in table ES-1 - what contributes to the sound level of "Sea sounds during storm?

17 Is it wind on water, crashing waves, a combination or something else? TC
What were the conditions for this citation?
Wind speed? Open ocean? depth below surface?

* Please cite experiments that quantify the difference between sound quality at a given sound volume.
For example the difference between 100 decibel sounds of:
a. violin or cello
b. chain saw.

* In the executive summary please line of the alternatives in a table or list fashion. It is too difficult to understand them when buried in a paragraph as on page ES-12.

18 * Please list project costs in Executive Summary TC Sec1.3.2

19 * For table on page 1-10 please include "depth" and "hertz" in columns. TC

20 * For table on page 1-10 please explain what "energy integrated over 50 hz bandwidth" means. TC

21 * On page 1-11 please explain "relative impedance of air and water" Sec1.14

* On page 1-11 please explain why the 2 factors are added to reach 61.5 dB, as opposed to subtracted or some other function.

22 * On page 1-11 please explain "broad-spectrum values". TC

* On page 1-11 please explain how the temperature measurements (in the 24 degree latitude experiment) do not all go up - some went down.

23 * Please describe how the time lag is determined between global air temperature change and deep sea temperature change. Is it 1 year, is it 5 years, is it 500 years? How do you know? I-3c

"A quieter sonar blast" alternative could be supported but is not genuinely addressed. Alternative 6 pretends to do so but does not spell anything out. I could perhaps support a reduced sound level experiment that emits 50 db, but it isn't seriously analyzed.

* Please prepare an alternative that operates at 50 db.

* Since water based sound levels are "61.5 decibels higher than air based sound levels", please explain what the equivalent air sound level of a water based 60 decibel sound. Is it a negative number? Does that indicate negative sound?

23 This experiment proposes to determine air temperature change because global air temperature change can't be measured directly. How do you link any temperature change detected in the ocean back to the unmeasureable atmosphere without using circular reasoning? I-3d

24 Sound Signals sent at the same time will arrive at different time at the detectors. Sec 1.1.3
* Please describe how - when signals come in you know which one is the correct one? Is it the first to arrive, the average, the last one or something else?

25 Page 2-48 last paragraph: Define "long" in "long time scales". TC

Page 2-49 2nd paragraph: change "accuracy of a few centimeters" to "accuracy better than a millimeter"

26 * Please explain thoroughly which climate models this data is intended for. I-3c Sec 4.

27 * Please estimate the number of species within the 120db range.

* Please estimate the number of UNknown species within the 120db range.

28 * Please estimate the number of square miles the 120dB sound level will encompass. TC

*Please define "Sanctuary" and explain whether it means "A place to go to have experiments performed on you", or , as Webster's describes, "A place of refuge".

---

a) Is this EIS a credible balanced review of the important issues?

No. This document gives all indication of "Choose the answer you want first, then select your facts to prove it." Ignore science, ignore comment from the public, ignore NEPA and go do what you wanted anyway.

To illustrate: the EIS ignores every one of my comments for the scoping process is missing an Index (NEPA Section 1502.10j), and has a superficial glossary where a comprehensive glossary is highly necessary because the document does not fulfill NEPA Section 1500.4d "Writing environmental impact statements in plain language."

b) Which option do you recommend ?

1) Alt 9: Sea Level Height (SLH) measurements.
This alternative has significant new data revealed this week (Science News Dec 10 page 388) that completely eclipses the potential results from the ATOC experiment in every significant aspect AND is passive measurement - unlike ATOC. This alternative is rejected by the EIS entirely and only by circular (well, perhaps a little figure 8) reasoning. In reality the observation that sea level height rises due to global warming is on far more solid ground (sorry - pun unintended) than the ATOC experiment.

Response time of cause and effect (ATOC indirectly measures atmospheric warming and has an unknown multi-year temperature rise time lag - Sea Level Height (SLH) has a time lag measured in days),

Data richness (ATOC gives at most 2 dimensional data, SLH data measures at least 2 and arguably 3 more dimensions),

Comprehensivity (ATOC measures a few paths (actually "virtual points") of temperature. SLH measures the height of all the Earth's oceans - semi-hourly.

2 magnitudes less cost (SLH data is an unintended side effect of another experiment already in effect and already has 2 years of data).

Page ES-12, paragraph 4 says ""Satellite measurements of ... sea level ... do not provide information comparable to that expected from ATOC."

This is absolutely true.
ATOC's data vs Sea Level Height is like comparing a beat up Volkswagen to the Space Shuttle.

The trouble is ATOC data is the beat up Volkswagen.
Sea Level Height data is the Space Shuttle.
.pa
* Please compare ATOC to the SLH experiment in a table form in the executive summary. You may use the example table below.

Experiments:	Sea Level Height vs ATOC	
	Sea Level Height Alt.	ATOC
Data Dimensions	3	1
Data Saturation	Worldwide - millions of data points	15 data points
Start Date	1993 (2 years of data already exist)	Best case: 1995? Possibly 1996

Marine Life Harm	None	Probable
Cost	No capital cost yet.	60+ Million dollars

I insist that all comments (not just mine) be seriously addressed.

29 I insist that the ATOC and Marine Mammal experiment be separated. I can not support experiments that involve annoyance or harm to animals. I-17

Thank you for your interest,

Sincerely,

D. Dilworth
Box 1495
Carmel, CA 93921

C-180

4610 Bain Ave.
Santa Cruz, CA 95062
January 27,1995

RECEIVED 2-1-95

To whom it may concern:

I am strongly opposed to the proposed ATOC Project for the following reasons:

1 * We already have plenty of studies and data showing that there is global warming. That is a given. We do not need another experiment that proposes to tell us what we already know. What is needed is global action. I see this project as spending millions and millions of "peace dividend" dollars to re-invent the wheel. Investigate solutions and put them into practice, instead. I-3 b

2 * The project itself has a poor experimental design with far too many variables to ever accurately give the type of information hoped for. Also, with climatic changes occurring over long stretches of time, a ten year study will not yield accurate nor reliable results. I-3 f

3 * The proposed site of the sound source is within the Monterey Bay National Marine Sanctuary and the two alternate sites are adjacent to the Sanctuary. Under the laws governing the sanctuary, it is illegal to harass and /or injure marine animals, which transmitting 195dB soundwaves would surely do. Previous studies of marine mammal response to human-made noise, which were shorter term, and quieter than the proposed 195db, have shown a 50% avoidance response and a detectable change in swim direction (page C-4). I-42

* The present permit application to the Monterey Bay National Marine Sanctuary required that all installation activities be completed before July 1994. A new request to extend the installation permit should be denied due to the proposed activity harassing and harming animals in the area.

* As a teacher of deaf and hard of hearing students, I know the long term effects of exposure to very loud sounds. Becoming deafened in this way is a gradual process which would be difficult to impossible to ascertain in marine mammals until it is too late and they are permanently injured.

4 195 dB is extremely loud and would carry underwater in the ocean canyon for long distances. Many marine mammals and fish use their acute acoustic abilities to migrate, locate food and hunt, communicate, and reproduce. Their behaviors would most definitely be altered and many would move or die as a result. I-12 a

* There is sparse research regarding the effects of noise on marine mammals, but the research that the DEIS/DEIR does mention discusses the noise of super tankers. This research is not meaningful here because of the following reasons:

ATOC	Super Tanker
195 dB	120dB
Deep under water	Surface of the water
Stationary	Moving
On-going	Sporadic

Let's try to cut back on noise, not add to it!

* It appears that this study has hurriedly tried to lump studying the effects of noise on marine mammals into the study on global warming. Neither part seems well thought out.

* I attended the public hearing on January 6, 1995 in Santa Cruz. Sentiments were overwhelmingly against this study. Many articulate and knowledgeable people clearly opposed ATOC and made strong cases against it. I hope you will listen to them.

* I support Alternative #2 -NO ACTION. It does not make sense to me to damage one aspect of nature to try to determine if another has been damaged.

Debby Molina

Debby Molina

C-181

RECEIVED 2-1-95

805 Devon Place, Alexandria, VA 22314

Advanced Research Projects Agency/NMFS
c/o Clayton Spikes
Marine Acoustics Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

28 January 1995

Comments on the EIS of the Acoustic Thermometry of Ocean Climate Project (ATOC)

Sir:

I am marine mammal biologist and behavioral ecologist who is currently a Senior Scientist at the Center for Coastal Studies in Massachusetts. I hold a Ph.D. in biology from the University of Aberdeen, and have postdoctoral training from the Universities of Cambridge and Copenhagen. I have directed long-term studies of humpback, fin and northern right whales, and have been a consultant to several governments on marine mammal research and conservation. I am currently co-Principal Investigator for the Years of the North Atlantic Humpback (YONAH) project, a seven-nation study which combines the identification of individuals with molecular genetics to study humpback whales across almost their entire North Atlantic range.

I offer the following brief comments on the above EIS. Since I am short on time, and since a detailed critical analysis of the proposed work has already been forthcoming from others, I will confine my comments largely to a general impression of the document. I wish to make it clear from the outset that I am not qualified to comment on matters of bioacoustics. However, I do know something about some of the species potentially impacted by ATOC, and am certainly capable of assessing the validity of the logic which underlies both the conclusions of this EIS and the comments of critics.

My concerns about the ATOC EIS are twofold. First, it shows all the signs of a document that was put together in a hurry, with internal contradictions and sloppy mistakes. Most of these have already been illuminated by others, and I will not waste space by reiterating them here, other than to agree with others that some of these errors are serious (one example plucked at random from many: the statement that residence times of individual mysticetes are short is completely false, on either feeding or breeding grounds). This lack of rigor does not instill in me much confidence that the areas of the EIS in which I am not expert can be assumed to be sound. Furthermore, I have read many of the criticisms of colleagues and others, and am frankly staggered by the number of instances of either error or misinterpretation that they have correctly highlighted. Were I to submit an application for a marine mammal research permit which contained a

proportional number of errors, it would almost certainly be returned or denied.

My second concern stems directly from this latter point: the document is far from objective. It makes an almost *a priori* assumption that there will be no impact on marine mammals, and all cases of uncertainty are weighted towards reinforcement of this belief. The Abstract provides the first clue of what we are in for, when it carefully states that "...or the measured data are so sparse that the possible effects must be stated as uncertain." No, you don't mean *uncertain*, but *unknown*. This choice of a single word - repeated throughout the document - reflects an absolutely critical distinction of logic: the former implies sufficient knowledge on which to base a perhaps reasonable conclusion, while the latter effectively means that there is *no way* of determining the possibility of negative impact. It is the difference between permitting a project to go forward because the risks are to some extent known, and doing so on blind faith.

Sadly, this approach is typical of most EIS's. Where there is a benefit of the doubt to be given, it is almost always given to the proposers - be they commercial interests or blue-water oceanographers - and not to the species at risk. In situations characterized by complex interactions of variables and large areas of insufficient knowledge, the proposers invariably use *lack of data* as a screen from which to claim *lack of effect*. In this process, what should be the intellectually honest statement "We don't know" is somehow magically transformed into "There is no problem". This remarkable sleight-of-hand is frequently camouflaged behind carefully chosen semantics; the ATOC EIS is no exception.

Furthermore, the monitoring program proposed is seriously inadequate, and virtually assures
1 inability to detect any of the "unacceptable effects" listed, thus further reinforcing the inevitability I-6b
of a "no impact" conclusion. Can the proposers tell us how such effects could *ever* be determined under the existing regime?

It is quite possible that there will be no significant impacts of the proposed study on marine mammals or other taxa. However, given the abundant gaps in understanding of relevant variables, it is clear that any statement to this effect will be one based upon optimism rather than knowledge. Given the possibility for significant disruption of feeding and breeding activities of several endangered or threatened species, I believe that the proposed work should be either delayed until sufficient information exists, or abandoned in favor of alternative approaches. I rather doubt that this will happen; in my experience, the larger the project and the greater the uncertainty of effect, the better the chances that it will be permitted. Size and investment of effort, however, should not be the primary criteria on which such decisions are based.

Finally, I must agree with other critics of this project that the manner in which this process has been conducted has been shoddy and at times insultingly arrogant. The haste with which the EIS was put together, and the early attempts by the proposers to provide little time for scientists and
2 environmental groups to conduct an adequate review, do not speak of a good-faith effort to I-14a
submit this work to objective public scrutiny. This is regrettable, and is unlikely to leave nonpartisan observers such as myself charitably disposed towards what otherwise might be a valuable research project. Even this latter contention, however, appears open to considerable debate; while I am unqualified to judges the likelihood of ATOC's success in achieving its stated goals, I am disturbed by the number of (often self-confessed) uncertainties regarding its efficacy.

C-181

The brevity of this statement is not a reflection of inability to find detailed fault with the proposal but rather of my own lack of time at present. While I do not agree with all of the criticisms that have been voiced by others, I have reviewed many of these statements and can only agree that sufficient doubts have been raised to seriously question both the value and (in particular) the lack of impact of this large research program.

Sincerely,

Phillip J. Clapham, Ph.D.

cc: Ms. Anne Terbush/NMFS OPR

Dear Mr. Clayton H. Spikes: RECEIVED 2-1-95

I am writing to express my opposition to the ATOC project. The benefits to either military or civilian use are not great enough to warrant destruction of marine life.

Your own Draft Environmental Impact statement (DEIS) states that the impact of ATOC on marine life is uncertain. Moreover, your own DEIS states the "research benefits" as being uncertain as well. This is simply an irresponsible attitude.

I realize you and your company stand to profit greatly from this; indeed you already have profited greatly - to the tune of $35 million dollars from the DOD "to research global warming:..... "?"

1 My question is why is the DOD interested in I-1 global warming? And why would any company so interested in global warming even propose to conduct an experiment with ~~the effect~~ "uncertain" gains at the expense of "uncertain" destruction to marine life?

C-182

As a US citizen, I demand ya disclose all information regarding this project:

- any defense or military applications
- any link to SOSUS listening arrays
- any previous proposals "to study global warming" that involved same solutions such as efficiency, clean energy etc.

Sincerely,

David Wood

1-26-95

C-182

RECEIVED 2-1-95

Mr. Spikes,

I am writing you to express my strong opposition to the ATOC project.

I feel that both the unknown effects of the testing on marine life and the questionable source of funding (DOD) does not give adiqute reasoning for these test to take place. If in fact the true reason for the testing is to "research global warming dont you think there are many better and more functional ways in which the money could be spent. It seems odd that DOD is at all intersted in global warming!

The true intentions of the ATOC should be made
1 pible before any testing is done; I feel I have this right I-1
since the money being spent are my tax dollars!

Sincerely,

Jeffry C. Welch

C-182

JAN 26, 1995

RECEIVED 2-1-95

to CLAYTON H. SPIKES —

I'm WRITING to OPPOSE THE A.T.O.C. PROJECT. THIS PROJECT'S D.E.I.S. IS INADEQUATE THUS FAR, & THE BENEFITS (& DANGER TO MARINE MAMMALS) OF THIS PROJECT ARE UNCERTAIN. THERE IS NO WAY OF ESTIMATING THE EXTENT OF DEAFNESS & DAMAGE TO IMMUNE & REPRODUCTIVE SYSTEMS THIS COULD CAUSE IN DOLPHINS, WHALES & OTHER CREATURES.

ALSO, I'm CONCERNED WITH A.T.O.C.'S TRUE INTENTIONS: IF THE TRUE GOAL (AS STATED) IS PREVENTING GLOBAL WARMING, THEN WHY IS THE DOD'S $35 MILLION TO THE SCRIPPS INSTITUTE NOT BEING SPENT ON CLEAN & EFFICIENT ENERGY & LOW-IMPACT TECHNOLOGY?

IT SEEMS THE INTENTION OF A.T.O.C. MAY BE AN
1 IMPROVEMENT IN SUBMARINE DETECTMENT TECHNOLOGY I-1
RATHER THAN RESEARCHING GLOBAL WARMING.

PLEASE CONSIDER FURTHER ANALYSIS, & REVEALING A.T.O.C.'S TRUE INTENTIONS TO THE PUBLIC. PLEASE RESPOND TO THIS LETTER... THANKS.

SINCERELY,

MARK TOOLEY
307 S O'LEARY
FLAGSTAFF, AZ 86001

January 26, 1995

RECEIVED 2-1-95

To Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the "research benefits" are stated in the DEIS to be uncertain. It is impossible to estimate the irreversible effects of high decibel, low frequency sound on marine mammals, such as gradual deafness and damage to reproductive and immune systems.

Scripps institute has received 35 million dollars from the DOD to "research global warming", however, if global warming was the true priority, then the expenditure of tax dollars would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on the global climate. The "classified" nature of the ATOC project indicates that
1 ATOC has nothing to do with global warming, and suggests I-1
that ATOC is a military operation to improve submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely,

Robert E. Barber III
Robert E. Barber III
216 W. Juniper
Flagstaff, AZ, 86001

R.S.V.P.

C-182

To Mr. Spikes,

RECEIVED 2-1-95

The ATOC project sounds to me like a common hasty operation where the side-effects aren't being considered or are simply being ignored. As a level-headed individual I feel that all potential outcomes of any operations should seriously be acknowledged. In the past governmentally funded experiments have run amuck... perhaps due to negligent hollistic outcome predictions. An important alternative was pointed out; the global warming funding should go toward alternative clean energy resources; not toward any military based operations...

Please take a look at the "big picture" involved w/ this project!

Many Thanks
FREEQUELIBERTY NATIO
PUBLI PRESS

CLAYTON H. SPIKES - I am RECEIVED 2-1-95 WRITING TO EXPRESS MY OPPOSITION TO THE ATOC THE DEIS IS INADEQUATE TO ALLOW THE ATOC PROJECT TO PROCEED!!! BOTH THE ADVERSES IMPACTS TO MARINE LIFE AND THE "RESEARCH BENEFITS ARE STATED IN THE DEIS AS UNCERTAIN THE SCRIPPS INSTITUTE HAS RECEIVED 35 MILLION FROM DOD TO RESEARCH GLOBAL WARMING, HOWEVER, IF GLOBAL WARMING WAS THE PRIORITY HOW COME 1.4 MILLION HAS BEEN USED FOR
1 THE MILITARY OPERATION TO I-1
IMPROVE SUB. DETECTION! PLEASE CANCEL THE EXPERIMENT

THANK
BOB VERDERAME
920 W. COCONINO #2
FLGG. AZ. 86001

C-182

To Clayton H. Spikes 1-27-95

RECEIVED 2-1-95

I am writing in reference to the ATOC project. I oppose this project 100%. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

No inconclusive study has been done, proving that the effects of high decible, low frequency sound waves are not irreversibly damaging on marine mammals. Gradual deafness, damage to reproductive and immune systems are both possible effects.

Scripps Institute has received 35 million dollars from the DOD to "research global warming". If, however global warming was the priority, why isn't money being spent researching cleaner, renuable, sustainable energy alternatives? The ATOC is a "classified" subject. This sounds like a military opperation to me.

1 It's clear the general public doesn't have I-1
a comprehensive idea of what ATOC is about. Further analysis & public knowledge must be occur befor this project is allowed to continue.

Sincerely,

Jennifer L. Yahn

C-182

To Clayton H. Spikes: RECEIVED 2-1-95

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is inadequate to allow the ATOC project to proceed.

The adverse impacts to both marine life and the "research benefits" are stated in the DEIS as uncertain. It is impossible to estimate the irreversible effects of high decibel low-frequency sound on marine mammals, such as gradual deafness and damage to reproductive and immune systems.

Another aspect of my outrage derives from the 35 million dollars Scripps Institute from the DOD to "research global warming". How, if global warming was the true priority, then the 35 million dollars of tax dollars would be better spent on clean energy, energy efficiency, and other suicide efforts to reduce our impact on the global climate. And when there's the obvious reality that global warming is well underway from heat-trapping fossil fuels in our atmosphere. The "classified" nature of the ATOC project indicates that ATOC has nothing to do with global warming, and suggests that ATOC is a military operation to improve submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down. I-1

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely,
Laurie

C-182

To Clayton H. Spikes, RECEIVED 2-1-95 1/27/95

I am writing to express my opposition to the ATOC project for many reasons. Mainly the DEIS is totally inadequate. Even the slightest possibility of damage to marine mammals, such as gradual deafness, should halt this project immediately. If this project goes through, the damage to marine life would be irreversible, and in my opinion disgusting.

Global Warming is a reality, not something that needs to be researched. If $35 million the Scripps Institute could be much better spent researching alternative forms of energy such as wind or solar power. Knowing my tax dollars are being spent on "classified" research makes me sick. I question the entire validity of this project, especially since there is a good chance this money is actually going toward more defense research. I-1

Show some respect not only for marine mammals, but the American taxpayer as well and cancel this project immediately.

Sincerely,
Katherine Harris

C-182

RECEIVED 2-1-95

To Clayton H. Spikes,

I'm writing to voice my opposition to ATOC. Because the adverse effects on marine life and the "research benefits" that are stated in the DEIS are uncertain it is irresponsible to continue this project.

Scripps Institute has received 35 million dollars from the DOE to "research global warming" This money would be better spent on clean energy, energy efficiency, and other responsible efforts to reduce our impact on global warming rather than on a project that can potentially harm marine life.

The "classified" status of the ATOC indicates that it has little, if anything, to do with global warming. It suggests that ATOC is rather a military operation to improve submarine detection. I-1

It is clear that the real intentions and effects of ATOC have not been revealed to the public. Before the project is allowed to proceed, further analysis must occur.

Sincerely

Christy H. Polton

C-182

1/26/95

RECEIVED 2-1-95

To Clayton H. Spikes:

I am writing to you to voice my concern regarding the ATOC project. Clandestine military research is not acceptable when we do not fully understand the ramifications of this research on marine mammals and the ocean's other inhabitants.

I request that the Scripps Institute come forth with their knowledge and reveal what the real purposes of the ATOC program are. I-1

Sincerely

David Swearingen

C-182

RECEIVED 2-1-95

Clay H. Spikes:

I am writing to let you know how ridiculous the ATOC project is. The DEIS is not adequate to allow this project to continue.

This project will very probably harm marine mammals by causing deafness and damage to their immune systems.

While the intent of this project is not clear, the obvious negative effects on marine mammals should be enough to deter this project from proceeding.

I am absolutely opposed!

Sincerely,

Tonya Packard

C-182

RECEIVED 2-1-95 1/26/95

Dear Mr. Spikes:

I too am a researcher (at Northern Arizona University). I understand the temptation to always search for more information. However, I also know that carrying out a research project without looking at the harm that may come to any animal as a result of that research can cause unnecessary harm.

It is impossible to estimate the irreversible effects of high decibel, low frequency sound on marine mammals. In addition, many marine animals are endangered species which makes the ATOC project all the more risky. I understand that this project is to be research on global warming. However, if global warming were the true priority then, these tax dollars would be better spent on clean energy, energy efficiency and other responsible efforts to reduce our impact on the global climate. 1 I-1

Please reconsider this research project.

Sincerely,
George Gotto
307 S. O'Leary
Flagstaff, AZ. 86001

C-182

RECEIVED 2-1-95 1/27-95

Clayton Spikes,

I am writing to you about the ATOC project. After careful review of the Draft Environmental Impact Statement, I would like to express my opposition of the ATOC project. It seems the Impact Statement is incomplete and inadequate. Uncertainties in the report include impact to marine life as well as "research benefits". This dearth of information concerns me. For this reason I strongly urge you to stop the ATOC & and extend the public comment period.

another reason for concern — it's obvious that the proponents of ATOC are pushing their project through due to the fact that the public hearings were held only a month after the release of the DEIS on Dec 2 — and that the final EIS is scheduled to be released 30 days after the close of the public comment period.

Also — seems to me the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed. 1 I-1

Lisa Ann Kirk

C-182

RECEIVED 2.1.95

Mr. Clayton Spikes:

I am writing to urge you to oppose the ATOC project. The benefits to marine life & science are very uncertain & contradictory.

Scripps Institute received 35 million from the DOD to research "global warming" however if this was the
1 true priority the money would be spent I-1
on alternative energy - clean & green energy like solar, wind, & energy efficiency.

I'd like to hear what you have to say about this.

Sincerely,

Matt Lindstrom
406 Woodland Dr.
Flagstaff, AZ 86001

C-182

RECEIVED 2.1.95

Mr. Spikes:

I just wanted to write to let you know that the ATOC project does NOT have my approval. I want to remind you of the DEIS, this stated that the adverse impacts of marine life was uncertain - must you insist to continue?

If environmental issues are at all on your positive priority list you would be spending that 30 odd million $ on true environmento projects. - what about researching clean energy or energy efficiency? I doubt your priority is in doing any of the above - and to think my tax $ is helping to harm and further endanger our already threatened environment.

While I'm working for greenpeace I will be sure to make sure people know
1 what you're up to - or are you aware I-1
of what that is? - We insist you inform us and the public of the true nature of this project before you are allowed to proceed

for the environment now & forever

Crystal Maderic

C-182

Jan 26, 1995

RECEIVED 2.1.95

To Clayton H. Spikes:

I am writing to express my concern and opposition to the ATOC project. The DEIS is inadequate to allow the ATOC to go further. Both the adverse impacts to marine life and the researd benefits as Stated in the DEIC are uncertain. The irreversible effects of this ~~low~~ frequency sound on marine mammals are impossible to measure.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must be done before the project can proceed. 1 I-1

For the dolphins
(and whales,)

Amy S. Keyes

Amy Keyes

C-182

CLAYTON H. SPIKES,

RECEIVED 2.1.95

ATOC IS NOT AN ANSWER FOR MEASURING ANY TYPES OF TEMPERATURE. WE HAVE THINGS CALLED THERMOMETERS, COME UP WITH A BIG ONE AND MEASURE TEMPERATURES. NOW ON THE OTHER HAND I'VE HEARD THAT ATOC IS JUST A COVER UP FOR A GOVERMENT PROJECT TO BUILD BETTER NUCLEAR SUBS. WHAT YOU'LL HAVE FAILED TO REALIZE IS TO THE DAMAGE THIS WILL CAUSE OCEAN MAMMALS AND OTHER SEA LIFE. PLEASE THINK WITH YOUR HEART AND NOT YOUR POCKET BOOK FOR ONCE DON'T LET THIS GO THROUGH. KEVIN TYE 1 I-1

Dear Clayton Spikes

RECEIVED 2-1-95

I am writing to express my opposition to the ATOC project. The (DEIS) is inadequate to allow the ATOC project to proceed. It is impossible to estimate the irreversible effects of high decibel, low-frequency sound on marine mammals: such as gradual distress and damage to reproductive + immune systems.

1 It is clear that the true intensions of ATOC have not been revealed to the public + further analysis must occur before this project is allowed to proceed. I-1

Sincerely,
Miranda S. Drabik
314 N. Beaver #1
Flagstaff, AZ 86001

SAVE The Planet!

C-182

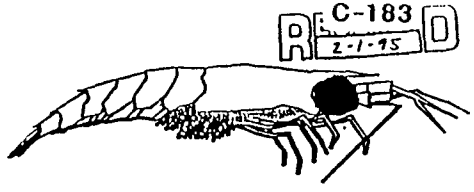
To Clayton Spikes-

RECEIVED 2-1-95

I am completely opposed to the A.T.O.C. project. It is uncertain the whether there will be adverse effects on marine mammals. When somebody like a big corporation or the U.S. government says that is uncertain about something. I take it to mean they are certain the opposite will happen. Therefore, I believe that you, along with the Scripps Institute, know that these acoustics will harm the marine mammals in question + possibly make them deaf, which could make it so they can't find food as easily. This project is a joke + in no

1 way should risk the health of marine mammals to [illegible] possibly be able + detect submarines better. Get a grip, the military is strong enough. I take that from a recent 'victory' over the world's 4th largest army.

Sincerely,
Dave Jensen



Thomas R. Kleckhefer
17595 Vierra Canyon Rd., Box 195
Prunedale, CA 93907
Phone (408) 663-3813

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

January 29, 1995

Dear Clay,

These are my comments on the CA Draft EIS/EIR and the two Public Hearings I attended. They are as follows:

PHASE 1

Further baseline studies and more intense effort are needed to identify potential adverse effects on marine animals and their prey:

1. **Sample sizes for vessel & aerial line transect surveys seem totally inadequate to me, considering there only executed 2 times every month for vessel and 1 time every other month for aerial.** In contrast with Kauai, the Pt Sur region is a feeding ground for most of these cetaceans, pinnipeds, and sea turtles where their movement patterns are constantly shifting due the movement of their prey (e.g., Schoenherr 1991, Kieckhefer 1992, Black 1994). To obtain adequate coverage and sample sizes for this productive, but patchy environment, more effort needs to be spent on both vessel and aerial surveys in order to make any conclusions. I have been working with the CA ATOC-MMRP aerial team since the start (June) and in December we sighted over 40 sperm whales on the 1st day and no sperm whales on the 2nd day. Also, there did not appear to be any mention of using a correction factor for dive times in both aerial and vessel surveys?. If correction factors were used it would yield higher estimates, which is more beneficial to the populations of animals in this case, since your justification for locating the source at Sur Ridge is based on the assumption that it is an unproductive area (Costa 1994 & 95 CA Public Hearings). More intensive effort during the ATOC sound transmissions (or potential playback) makes sense, but was not mentioned in the timetable in Appendix C: Research Protocol. Anyway, I guess I should probably direct these more detailed questions to John Calambokidis & Jim Harvey.

1 I-60

2. **Relative biomass estimates on prey should be conducted throughout the vessel surveys to ascertain potential indirect effects of the ATOC sound source on marine mammals.** Euphausiids alone represent a major fraction of the total biomass of plankton, and are a major food source for many

marine birds, seals, and baleen whales [e.g., Mauchline 1980; Smith-Beasley 1992 (Monterey Bay study)]. However, it is not their numbers alone that make them so important in the food chain, but that they live in great concentrations, especially near upwelling areas like Monterey Bay. Changes in the numbers of marine animals related to differences between the neighboring experimental site (Sur Ridge) and control areas can only be determined with a prey based study.

***Note:** for marine mammal/prey shifts see Nemoto 1959, Payne et. al. 1986, Krieger 1988, Piatt et al. 1989, and Piatt and Methven 1992. In addition, Smith et al. (1986) documented distribution of cetaceans associated with rich areas of food via measuring chlorophyll concentrations from satellite imagery (unfortunately this satellite is no longer operating).

Using a depth sounder of 160-200 kHz would be out of hearing range of most species you have identified in this study and will measure relative quantitative hydroacoustic estimates of associated prey biomass along transects, thus mapping out any indirect effects that may occur. Obtaining relative biomass estimates on fishes, squids, and euphausiids is possible. Dr. Bruce Robison of MBARI has catalogued many acoustic signatures for most of the prey items concerned in this study and Dr. Tim Stanton of WHOI has a system that automatically classifies animals by size and type. Other *in situ* information recorded during surveys should include temperature and salinity profiles (CTD) at various stations, along with real-time satellite imagery (SST and soon fluorescence measuring phytoplankton) to detect seasonal fluctuations in circulation patterns and mesoscale features correlated prey concentrations and their movement, as well as providing better understanding of the acoustic propagation of sound around the ATOC source. Aerial surveys will provide estimates of abundance and distribution, but this platform is not effective for determining behaviors and environmental factors. Vessel surveys will provide data concerning changes in marine animal abundance and distribution relative to the position of the sound source and the effects on their prey resources as potential indirect effects.

2 App. C

3. **Inaccurate information about humpbacks rarely have been observed feeding in Central California waters and their dominate prey (p. 4-32).** Off Central California, Cordell Bank, Gulf of the Farallones, and Monterey Bay have been identified as primary feeding locations for humpback whales, as well as blue whales (Calambokidis et al. 1989, 1990, 1991, 1993; Dohl et al. 1983; Kieckhefer 1992; Schoenherr 1991). In addition, both of these whales' primarily feed on the euphausiid prey species *Thysanoessa spinifera* , not *Euphausia pacifica* [directly determined by the identification of euphausiid hardparts in humpback & blue whale fecal samples; Kieckhefer 1992; Schoenherr 1991; Kieckhefer et al. (in prep)]. *T. spinifera* are dominant in the neritic (coastal) environment near the surface, and *E. pacifica* are usually found deeper in the water column during the day and offshore along the northeast Pacific coast, but vertically migrate to the surface at night (Brinton 1962a, 1962b; Hebard 1966; Youngbluth 1976; Smith and Adams 1988). Extensive surface shoals of *T. spinifera* form along the California coast from Fort

3 TC

Ross to the Channel Islands (Barham 1956; Brinton 1962; Harvey 1979; Smith and Adams 1988; Schoenherr 1991; Kieckhefer 1992).

4. **There is a potential impact on the food chain that ultimately could affect these whales in the vicinity of the study area (the opposite was stated on p. 4-32).** Indirect avoidance (or attraction) of marine animals from the ATOC sound source could result from the movement of their prey. Let me try to explain:

Epipelagic Fish (potential avoidance-- besides shark attraction)
The major prey items of importance off Central California coast to mysticetes are northern anchovy, euphausiids, and to a lesser extent Pacific herring, shrimp, and rockfish (e.g., Rice 1978; Calambokidis et al. 1989; Schoenherr 1991; Kieckhefer 1992). Playback experiments have demonstrated that anchovy and herring respond to low frequency sounds waves by coalescing and rapidly fleeing from the source (Schilt 1990; Blaxter et al. 1981 & Schartz and Greer 1984, respectively). According to Schilt (1990) sound pressure under 150 Hz was especially aversive to anchovies and habituation did not occur. He also suspected that anchovy hearing was especially acute at 54 Hz. Although an actual audiogram for northern anchovy is not available (?), their close relative herring has a relatively flat frequency response curve from 20 Hz to 1200 Hz (Enger 1967).

*Note: p. 4-29 minor correction--lanternfish..... make a significant part of the food chain for many marine animals (particularly odonotcetes--not baleen whales)

Epi-Mesopelagic Krill, Squid, & Fish (potential avoidance or attraction?)
In the epipelagic (diurnal vertical migrators) and mesopelagic zones luminescence appears to play an important role in the lives of the inhabitants (Young 1981). Euphausiid, squid, and fish shed bioluminescence during times of excitement, whether it's associated with countershading, feeding and/or mating swarms (e.g., Mauchline 1959; Young 1977, 1981). It has been documented with euphausiids (I'm not sure about squid & fish) that bioluminescence can be stimulated by mechanical stimulation (or sound vibration), thus possibly attracting predators (e.g., *M. norvegica*, Mauchline 1959; *E. Pacifica*, Kieckhefer 1982 unpub. report). Boden and Kampa (1964) state that there is a dusk and dawn burst of luminescence originating from the sonic-scattering layers; the frequency was least at midday. The function of this luminescence seems to bring about shoaling of particular population and thus facilitates mating. In addition, Mauchline (1959) demonstrated an experiment where one light source under mechanical stimulation will start a "chain reaction" with other euphausiids in creating a bioluminescent cloud. Behaviors such as--aggregations, diurnal vertical migration, and bioluminescence--displayed by euphausiid, squid, and some fishes (e.g., Myctophidae) may provide valuable visual cues for feeding responses of mysticetes and odontocetes (e.g., Gaskin 1967; Fobes and Smock 1981; Young 1981). According to Fobes and Smock (1981) maximal spectral absorptions of diving baleen whales and toothed whales are adapted to the blue-green and blue wavelengths, respectively [e.g., humpback (492 nm) vs. Baird's beaked whale (481 nm)]. The emission spectra of

bioluminescence from epi-mesopelagic euphausiid, fish, and squid peak around 480 to 520 nm [e.g., *Euphausia pacifica* (primary peak 476 nm & secondary at 520 nm), *Stenobrachius leucopsarsus* (492 nm), *Histioteuthis spp.* (480 nm), Mauchline and Fisher 1969; Lythgoe 1972; Young 1981]. In addition, many of the species that CA MMRP are targeting on, like the sperm, fin, humpback, Baird's & Cuvier's beaked whales are dark bodied, but have white heads, flippers, or mouths, which have been suggested to serve as a means of attracting prey (e.g., Gaskin 1967; Mitchell 1970; Würsig et al. 1990). Gaskin (1967) noticed bioluminescence radiating off sperm whales white lips, transferred from the squid they were feeding on, and myself, during a laboratory experiment in SE Alaska, I found that krill (*E. Pacifica*) were attracted to the reflection of their own bioluminescence off a white sheet of paper placed at either end of a tank.

In summary, without any coordinated study of the distribution and behavior of the marine animals in the CA DEIS associated with prey species, how can the MMRP
3 come to any conclusions if there are any direct adverse effects on the marine animals to the ATOC sound source? Maybe this is why the CA MMRP feel they will only be able to detect significant differences based on directed movements (traveling only), not undirected movements, like feeding and milling. If a whale is actively feeding (surface or deep), breaking that rhythm with onset of the ATOC source would be a concern! TC

5. **Behavioral field studies need to clarify and prioritize target species** (e.g., #1 blue, #2 humpback, #3 sperm whale, #4 beaked, etc.) to get an adequate sample size to be able to say something about the potential effects of the ATOC
4 sound source on their behavior. Since smaller odontocetes (i.e., Pacific white-sided, common dolphin) are not considered to be low frequency listeners do not spend the time and money to study them. It would make more sense to focus on one (or two) key indicator species that will provide adequate data to make some meaningful conclusions. TC I-61

6. **It is important to clarify (and disclose) how sound disturbance other than the ATOC sound will be opportunistically studied and compared to the potential ATOC sound impact.** Combined effort of ATOC & MMRP projects has access to the technology & scientific methodology to measure (or model) disturbance sound levels due to vessel tagging, vessel and aerial surveys, and especially large commercial ships. For example, determining whether or not
5 there is a potential impact of hearing lose (or TTS) in blue whales when the MMRP researchers' drive a boat right next to their ear to attach a satellite tag. This is probably far worse than any commercial ship(s) or ATOC sound transmission they will ever receive (based on their ability to swim away), considering that the underwater noise level of a 90 HP outboard engine near the ear of a whale is roughly 140-160 dB (anomalous source). Has the "recovery" or "habituation" period been identified (or is some time period arbitrarily set aside as initial disturbance data)? This information is valuable and needs to be disclosed! For instance, in the Kauai ATOC-MMRP study, we may be finding initial "startle responses" in humpback whales flying at altitudes of 457 m with possible "recovery" periods of TC

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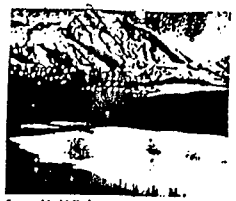

Sunrise, Mt. McKinley — Ansel Adams

C-184

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January 31, 1995

VIA FAX AND OVERNIGHT MAIL

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Re: Comments on the Draft Environmental Impact Statement/Environmental Impact Report for the California Acoustic Thermometry of Ocean Climate Project

Dear Mr. Spikes:

On behalf of a coalition of environmental and animal protection organizations[1], I submit the following comments on the Draft Environmental Impact Statement/Environmental Impact Report ("DEIS/R") for the California Acoustic Thermometry of Ocean Climate Project (ATOC). Each of these organizations may submit

[1] The coalition includes: American Oceans Campaign, Animal Rights Hawai'i, Citizens Against Noise, Coastal Advocates, Earth Island Institute, Environmental Investigation Agency, Great Whales Foundation, Greenpeace, Hawai'i Audubon Society, Hawai'i Fishermen's Foundation, Hawai'i's Thousand Friends, Humane Society of the United States, In Defense of Animals, International Wildlife Coalition, Kaua'i Friends of the Environment, Life of the Land, Marine Mammal Center, Marine Mammal Fund, Natural Resources Defense Council, People for the Ethical Treatment of Animals, Save Our Shores, Save Our Surf, Surfers' Environmental Alliance, Surfrider Foundation, The Fund for Animals, and Whale Rescue Team.

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individual comments as well; please consider all such comments to be incorporated by reference herein.

We have previously submitted detailed comments (dated April 14, May 6, May 14, November 4, and November 7, 1994) to the National Marine Fisheries Service ("NMFS") and the Advanced Research Projects Agency ("ARPA") regarding the scope of this DEIS/R and the related environmental impact statement ("EIS") for the Hawaii component of ATOC as well as the Scientific Research Permit applications that have been submitted to NMFS by Scripps Institute of Oceanography ("Scripps") for the Hawaii and California components of the ATOC project. These comments, which have been appended to Volume II of the Draft EIS/R for the Hawaii component of the ATOC program, remain relevant to the question of the adequacy of this DEIS/R, and we also hereby incorporate them by reference into these comments.

INTRODUCTION

A. Inadequate Time For Comments. We have protested what we believe to be an inadequate period of time in which to comment on this highly complex and technical DEIS/R, a document that required over nine months to prepare, and we have requested additional time, to March 2, 1995. See December 5, 1994 letter from Michael R. Sherwood to Rolland A. Schmitten, William W. Fox, Jr., and Clayton H. Spikes; Statement of Michael R. Sherwood submitted at January 6, 1995 Santa Cruz public hearing on DEIS/R. Unfortunately, our requests have fallen on deaf ears. Consequently, these comments are not as thorough and comprehensive as we would have liked, but are the best we can do in the limited amount of time granted us. 1 I-142

The refusal of ARPA, NMFS and University of California, San Diego to agree to a short amount of additional time for comments from the public does not inspire confidence that those agencies are truly interested in receiving informed public comment on ATOC and the DEIS/R. To the contrary, it is evidence that those agencies have decided that they will allow this project to proceed regardless of the public's views on it, and further that the agencies have been convinced by the project proponents that there is no time to waste. Given the extremely controversial nature of ATOC, the admitted uncertainty as to whether ATOC will be of any benefit to the study of global warming, and the potential adverse impacts of the project upon huge numbers of marine animals, including many threatened and endangered species, the urgent rush to get under way with the project is unseemly at best.

B. General Overview. In general, the DEIS/R is legally inadequate for a variety of reasons. Most fundamentally, it illegally treats the ATOC project in piecemeal fashion, evaluating only one small segment of the overall global ATOC project, thereby misleadingly minimizing ATOC's true overall impacts. Moreover, rather than being the objective, pre-decision document required by both the National Environmental Policy Act ("NEPA"), 42 U.S.C. §4321 et seq., and the California Environmental Quality Act ("CEQA"), Cal. Public Resources Code §§ 21000 et seq., it is instead quite blatantly a work of advocacy for a decision that has apparently already been made to proceed with the California portion of ATOC, including the Marine Mammal Research Project ("MMRP"). This bias is apparent in assumptions made throughout the DEIS/R such as that the ATOC sound transmissions simply will not adversely impact marine wildlife. Rather than err on the side of caution in respect to possible impacts on threatened and endangered species and other marine wildlife, as the law requires, the DEIS/R instead assumes no or minimal impacts until observations prove the existence of impacts. Instead the law requires the project proponents to demonstrate that there will be no adverse impacts before being allowed to proceed. The DEIS/R misleadingly minimizes potential impacts to marine wildlife. It fails to justify the need for ATOC at all, provides an inadequate discussion of reasonable alternatives to ATOC, including the "no action" alternative, and omits any discussion whatever of a range of reasonable and feasible alternatives.

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ARPA AND NMFS MUST PREPARE A COMPREHENSIVE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT ON THE ENTIRE ATOC PROJECT

2 I-2

It is clear that the California ATOC feasibility study is part of and connected to the similar Hawaii ATOC feasibility study, and that both of these in turn are merely the precursor to, and are intimately linked with, the long-term global ATOC program. Consequently, ARPA and NMFS must prepare a comprehensive and programmatic EIS that evaluates the need for, impacts of, and alternatives to the overall ten-year worldwide ATOC program. Only after having done so should ARPA and NMFS make the decision whether to proceed with the long-term project, and, in turn, whether to proceed with smaller incremental segments of the long-term project such as the California feasibility study and MMRP. Tiered site-specific EIS's for the incremental segments would then be appropriate. See 40 C.F.R. §§ 1502.4(d), 1502.20.

NEPA requires that "Proposals or parts of proposals which are related to each other closely enough to be, in effect, a

single course of action shall be evaluated in a single impact statement." Council On Environmental Quality Regulations To Implement the National Environmental Quality Act (CEQ regulations), 40 C.F.R. § 1502.4(a). A programmatic EIS is required for broad

> federal or federally assisted research, development or demonstration programs for new technologies which, if applied, could significantly affect the quality of the human environment. Statements shall be prepared on such programs and shall be available before the program has reached a stage of investment or commitment to implementation likely to determine subsequent development or restrict later alternatives.

Id., § 1502.4(c)(3) (emphasis added). See also id. at § 1508.18(b)(definition of "major Federal action" to include "[a]doption of programs, such as a group of concerted actions to implement a specific policy or plan"). Where there are large scale plans for regional development, NEPA requires both a programmatic and a site specific EIS. City of Tenakee Springs v. Block, 778 F.2d 1402, 1407 (9th Cir. 1985) (citing Kleppe v. Sierra Club, 427 U.S. 390, 409-414 (1976)).

CEQA has a similar requirement. CEQA Guidelines, Cal. Code Regs. Tit. 14, § 15378. The CEQA Guidelines define "project" to mean "the whole of an action" that may result in either a direct or indirect physical change in the environment. Id. Under CEQA, an agency cannot split a project into "many little ones -- each with a minimal potential impact on the environment -- which cumulatively have disastrous consequences." Bozung v. Local Agency Formation Comm'n, 13 Cal. 3d 263, 283-84 (1975). Moreover, when "future expansion or other action" is a reasonably foreseeable consequence of the project as initially conceived, and where the future expansion or action will likely change the scope or the nature of the initial project or its environmental effects, the impacts of such future action must also be assessed. Laurel Heights Improvement Ass'n v. Regents of the Univ. of Cal., 47 Cal. 3d 376, 396 (1988).

It is quite conceivable that after a comprehensive, programmatic evaluation of the global ATOC project the agencies would decide that ATOC simply may not provide the hoped-for information concerning global warming, or that any potential benefits of the long-term ATOC project would be far outweighed by its potentially huge environmental and financial costs, and/or that less environmentally stressful means of achieving the same

global climate measuring goals exist. In that case, any decisions to proceed with preliminary segments of the project would be unnecessary.

For example, the DEIS/R itself acknowledges that a fundamental question exists whether ATOC will do what it is supposed to do: "the ATOC project is experimental and is subject to fundamental uncertainties about the extent to which acoustic means can detect ocean climate changes." DEIS/R, p. 1-20. (Ironically, this acknowledgment appears in the DEIS/R as a justification for not preparing a programmatic EIS; it is, rather, a powerful reason why the larger project should be evaluated and a determination made whether it makes sense to pursue it before expensive and potentially very environmentally harmful preliminary segments are undertaken).

In short, by considering only one part of a larger project before having evaluated and made a decision about the larger project itself, the agencies have put the cart before the horse; a decision on the California feasibility study at this time would be premature and legally impermissible. See Kleppe, supra, 427 U.S. at 410 (when several proposals that will have a cumulative or synergistic environmental impact upon a region are pending concurrently before an agency, their environmental consequences must be considered together); see also City of Tenakee Springs v. Clough, 915 F.2d 1308, 1312 (9th Cir. 1990).

The DEIS/R's rejection of the public's call for preparation of a single, comprehensive EIS on the overall global ATOC program on the grounds that "any long-term ATOC program is highly speculative at this time, and cannot reasonably or feasibly be evaluated now in a programmatic EIS", DEIS/R pp. 1-20, 1-26, is unpersuasive and contradicted by the facts. In fact, the outlines of the long-term ATOC project, although only briefly mentioned in the DEIS/R, are quite well-known, at least to the project proponents. The DEIS/R refers to "a ten-year follow-on global ATOC program" (DEIS/R, Abstract), and states that the California feasibility demonstration evaluated in the DEIS/R is "part of" the ATOC project. DEIS/R, p. 1-1. Similar statements throughout the DEIS/R make it clear that the California ATOC project is merely part of a larger global design. E.g., pp. ES-1, 1-4, 1-7, 1-21, 1-22.

Documents outside the DEIS/R underscore this, and provide more detail. For example, Scripps' December 6, 1993 Special Research Permit application to NMFS (P557A) for the California portion of ATOC notes that the proposed MMRP "will evolve into a long-range marine mammal monitoring plan in parallel with the anticipated 10-year global ocean climate monitoring program".

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P557A, p. 25. Further, in their report on the Heard Island feasibility test, the proponents of the ATOC project discuss "future plans" for a world-wide "permanent [ATOC] system," and state that "reliable performance for ten years" of the source "is especially important, because source deployment and recovery are expensive." W. Munk and A. Baggeroer, The Heard Island Feasibility Test (Physics Today 45(9):22-30)(September 1992), p. 30.

Some of these same authors have painted an even more telling description of what they envision as the global ATOC program in their ATOC technical proposal to ARPA. In Acoustic Thermometry of Ocean Climate, Technical Proposal (1992) (Technical Proposal), W. Munk, R.C. Spindel and D.W. Hyde describe a global ATOC network that would "require . . . 6-8 sources and 35-40 receivers for long-term global coverage". Id., p. 6. The first phase of the project would involve procuring three low frequency sound sources, "install[ing] and operat[ing] first two of these, and then the third after reliable operations are established", and "conduct[ing] a development and testing program for a ten year reliable sound source." Id., p. 8. Emphasis is made throughout that this is a ten-year program. At page 40, for example, the authors state, "These systems must be reliable if they are to last for the decade planned for the ATOC program."

The Technical Proposal also makes it very clear that the proponents of the ATOC program intend it to be worldwide. Munk et al plan to "work out, in concert with our design iteration for a global network, arrangements for projector and receiver sites strategically located around the Atlantic and Indian Oceans -- in Asia, South Africa, Europe and South America -- whose scientific and logistical coordination efforts will be vital to extending the network to the global ocean." Id. The technical proposal places great emphasis on the need for a strong international component of ATOC (eg., pp. 24-5), and indeed states that the proponents plan to place the third ATOC source in Japan and a possible fourth source off the Kamchatka Peninsula, Russia. Id., p. 26. See also id., Figure 2 (p. 7)(showing, in addition to the Kauai and California sources, "[a]dditional source sites near Japan and Kamchatka that may be made possible by cooperative arrangements").

In our May 14, 1994 letter to Dr. Ralph W. Alewine, III (ARPA) and Dr. William W. Fox, Jr. (NMFS) (appended to the Kauai ATOC DEIS/R) in which we commented on Scripps' SRP applications for the Kauai and California ATOC feasibility projects, we discussed a host of additional evidence demonstrating that plans for a world-wide ATOC network and the related Acoustic Monitoring of Global Ocean Climate and Global Acoustic Mapping of Ocean

Temperature (GAMOT) efforts are not only well-developed but have been funded in the amount of some $106 million, over $21 million of which had already been spent as of December 31, 1993. See pages 2-5. We incorporate that discussion herein by reference.

Apart from the question of a comprehensive programmatic EIS, this DEIS/R is legally inadequate because it fails to discuss the obviously connected Kauai ATOC feasibility project and the cumulative impacts of the Kauai and Point Sur projects. NEPA requires that closely related, or "connected", actions be evaluated in a single EIS. E.g., Thomas v. Peterson, 753 F.2d 754, 758 (9th Cir. 1985); 40 C.F.R. § 1508.25(a)(1). Connected actions include actions that "[a]re interdependent parts of a larger action and depend on the larger action for their justification." 40 C.F.R. § 1508.25(a)(1)(iii).[2] CEQA similarly requires analysis of cumulative impacts of other past, present, or reasonably foreseeable future projects. See Cal. Pub. Res. Code § 21083(b) and Cal. Code. Regs. Tit. 14, § 15130.

The DEIS/R in various places acknowledges that the Kauai and California ATOC feasibility projects are closely related. For example, the DEIS/R refers to "This project" -- the ATOC feasibility study -- as using "two separate acoustic sources" one in Kauai, the other in California, and states that this DEIS/R will address only the "California portion of the proposed ATOC project." DEIS/R, p. 1-2. Similarly, the DEIS/R discusses the Hawaii and California components of the MMRP in the same sentence, as components of a single project (DEIS/R, p. 1-4) and states that, as part of a single ATOC feasibility study, "two low frequency sound sources are planned for the North Pacific, one north of Kauai and one west of Pt. Sur, California." DEIS/R, p. 1-7. As further evidence that the projects are connected, part of the function of the California component of the project will be not only to transmit sounds, but to receive sound transmissions from the Kauai source, and vice-versa. DEIS/R pp. ES-2, 1-7, 1-17.

In an attempt to overcome this problem, the DEIS/R states that it incorporates the recently released Hawaii ATOC DEIS/R by reference (DEIS/R, p. 1-2), and that the Hawaii DEIS/R will in turn incorporate the California DEIS/R by reference. DEIS/R p.

[2] Cf. Save the Yaak Committee v. Block, 840 F.2d 714, 720 (9th Cir. 1988)(sequential actions are connected if "it would be irrational, or at least unwise, to undertake the first phase if subsequent phases were not also undertaken"); Thomas v. Peterson, supra, 753 F.2d at 759-760 (preliminary segment is connected to subsequent phases if it does not have "independent utility").

1-26. This ploy to avoid the need to prepare a single EIS fails, however, because, among other reasons, the public has been given inadequate time to comment on the Hawaii DEIS as incorporated into the California DEIS/R. The Hawaii DEIS was not made available to the public until January 6, 1995. The minimum 45 day comment period mandated by the CEQ regulations, 40 C.F.R. § 1506.10(c), would end about February 20, 1995, and in fact ARPA and NMFS have allowed until March 9, 1995 for comments on the Kauai DEIS. If the agencies wish the two DEIS/R's to be treated in effect as a single EIS for NEPA and CEQA purposes, then the comment and decisionmaking timelines for each must be concurrent.

3 THE DEIS/R DOES NOT FULLY DISCLOSE POSSIBLE MILITARY PURPOSES OF ATOC I-1

The DEIS/R does not adequately disclose possible military applications of ATOC. Specifically, the reason for the interest and involvement of the Department of Defense in the project must be fully and honestly disclosed. Why, at a time when both the Administration and Congress are speaking of huge government spending cuts to balance the federal budget, is the Department of Defense investing millions of dollars in ATOC? What are the possible "dual" uses for ATOC referred to at p. 1-23 of the DEIS/R? Why does Dr. Munk's technical proposal for ATOC submitted to ARPA in 1992 state that "[a]spects of this project may involve the use of classified assets"? Technical Proposal, supra, p. 62 (emphasis added). In short, the public and decisionmakers are entitled to know whether possible military applications of ATOC are in part the driving force behind the project, and the DEIS/R should disclose the information.

4 THE DEIS/R IS NOT AN OBJECTIVE AND NEUTRAL EVALUATION OF THE PROPOSED PROJECT BUT INSTEAD IS IMPERMISSIBLY SKEWED IN FAVOR OF THE PROJECT I-162

The fundamental purpose of an EIS is to force the decision-maker to take a "hard look" at the need for, the environmental consequences of, and possibly less-environmentally harmful alternatives to the proposal, before the decision to proceed with the project is made. See 40 C.F.R. § 1502.1 (Purpose of EIS); § 1500.1(b)("NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken"); Baltimore Gas & Electric v. Natural Resources Defense Council, 462 U.S. 87, 97 (1983). Thus, the law is clear that the EIS must be a pre-decision, objective and neutral document, not a work of advocacy to justify a decision that has already been made. As the CEQ regulations state,

> Environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made.

40 C.F.R. § 1502.2(g). See also Conner v. Burford, 848 F.2d 1441, 1446 (9th Cir. 1988), cert denied, 489 U.S. 1012 (1989)("[t]he purpose of an EIS is to apprise decisionmakers of the disruptive environmental effects that may flow from their decisions at a time when they 'retain [] a maximum range of options'"). CEQA imposes the same requirements on an EIR. See Mount Sutro Def. Comm. v. Regents of Univ. of Cal., 77 Cal. App. 3d 20, 37 (1978) (EIR cannot be post hoc rationalization of decision already made).

Unfortunately, this DEIS/R assumes throughout that the project will in fact proceed, misleadingly minimizes the potential impacts of the project, and dismisses with inadequate discussion reasonable alternatives to the project, including the no action alternative.

In fact, it appears that the project proponents have already begun work on certain phases of the project, in violation of 40 C.F.R. § 1502.2(f), which states that "Agencies shall not commit resources prejudicing selection of alternatives before making a final decision." See also 40 C.F.R. § 1506.1(a)("Limitations on actions during NEPA process"); Conner v. Burford, 848 F.2d 1441, 1446 (9th Cir. 1988) (EIS "must be prepared before any irreversible or irretrievable commitment of resources.")

For example, the DEIS/R discloses that a section of the ATOC source sea cable has already been laid, to the vicinity of the proposed site for the source. DEIS/R, pp. 1:14-5. See also 1 July 1994 letter from David W. Hyde, ATOC Project Director, Scripps, to Commander Terry Jackson, Sanctuary Manager, Monterey Bay National Marine Sanctuary, requesting an extension of Permit MBNMS-10-93, which acknowledges that "the source cable was laid from the proposed site of the source on Sur Ridge to the three-mile limit off of Pt. Sur." This of course predetermines the site location, and exposes the discussion of alternative site locations as a sham.

In addition, Tables 1.1.2-1 (p. 1-6) and 2.2.1.1-1 (p. 2-5), as well as the Timetable appended to the MMRP Research Protocol (p. C-32) all indicate that much preliminary research work has already taken place and also illustrate the presumption in the minds of the authors of the DEIS/R that ATOC and the MMRP will be located at Sur Ridge. Further work in support of ATOC that has

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already been conducted includes the acoustic engineering test off the California coast in November 1994.

The eagerness with which the proponents of this project wish to proceed is further demonstrated in a letter dated November 29, 1994 from Andrew Forbes of Scripps to Peter Douglas, Executive Director, California Coastal Commission with respect to Coastal Zone Management Act certification. Mr. Forbes states, "It is extremely important to the ATOC project that all regulatory approval be secured and facilities installed by approximately April, 1995, so that the marine mammal Pilot Study can begin by May to June of next year [1995] during the prime early summer through early fall observation season . . .. [I]nstallation of all ATOC facilities, including the VLA and sound source, is necessary before the principle MMRP observations can commence." Id., p. 3 (emphasis added).

The MMRP itself presupposes that the ATOC climate transmissions feasibility study portion of the project will proceed regardless of the results of the MMRP. In fact, as detailed below, the MMRP is not truly an independent study of the impacts of noise on marine wildlife (something that most environmentalists would support so long as it were appropriately designed, truly independent of ATOC, and did not itself run the risk of harming marine wildlife), but is driven both by ATOC funding and the perceived need to proceed with ATOC. Indeed, as indicated in Table 1.1.2-1 (DEIS/R p. 1:6), the ATOC feasibility portion of the project is scheduled to commence in October or November 1995, months before the MMRP Pilot Study final report would be available in March 1996.

5 TC

The objectives of the MMRP are variously stated to be to "detect and evaluate potential effects of ATOC source sound transmissions on marine animals," to identify mitigation measures to avoid the potential impacts, and to determine "the optimum acoustic source parameters for ATOC feasibility operations." DEIS/R, pp. 1-21, 2-4; see also pp. ES-3, 1-4, C-8. Conspicuously absent from the listed objectives of the MMRP is the objective of providing data to decide whether to proceed with the follow-on ATOC feasibility study. Instead, the DEIS/R states that the purpose of the MMRP Pilot Study is to "determine how best to continue the project" -- not whether to do so. DEIS/R, pp. ES-3, 1-4, C-8.

6 TC

Further, the CEQA "mitigation measures" sprinkled throughout the DEIS/R and summarized at ES:15-16 also assume that the project will proceed. The mitigation measures include such items, in addition to the MMRP itself, as utilizing sound frequencies "anticipated to have minimal impacts" on marine

wildlife, "operating the sound source at the minimum power level necessary to support" ATOC, and operating the sound source "at the minimum duty cycle necessary to support" ATOC. Thus, the assumption in each of the mitigation measures is that ATOC will proceed, regardless of impacts, although at "minimum levels" necessary to satisfy ATOC objectives: actually stopping the transmissions if adverse impacts are found is nowhere included as a mitigation measure.[3]

Another fundamental way in which the DEIS/R is skewed in favor of the proposed project is the series of "null hypotheses" contained in the MMRP, beginning at DEIS/R p. C-10. Each null hypothesis with respect to the impacts of ATOC transmissions on marine wildlife is, by definition, that there will be no impact. Nowhere is an alternative hypothesis stated that ATOC will cause adverse impacts on marine wildlife. Moreover, rather than being open-minded and objective about what the results of the research might show, the MMRP states in numerous places that the researchers expect that the null hypotheses will be validated -- that is, that there are no impacts.

The basic assumption throughout the MMRP, thus, is that ATOC will have no impact; only if the results of the MMRP disprove this assumption does the DEIS/R admit of any possibility of modifying or terminating the sound transmissions. However, the proponents of the MMRP have acknowledged elsewhere that the MMRP is unlikely to be able to detect any short-term effects on marine animals. See, e.g., Special Research Permit Application P577A, p. 17 ("we do not expect any health effects (e.g., physiological stress) to be exhibited within the exposed animals. However, in free-ranging cetaceans, such physiological effects are extremely difficult, if not impossible, to detect given the current state of scientific and technological capabilities in this field of research") (emphasis added). Moreover, the MMRP is not designed to and admittedly will not detect the perhaps more important long-term adverse impacts on marine wildlife such as abandonment

[3]The proposed mitigation measures in the DEIS/R are insufficient under California law. See Laurel Heights Imprv. Ass'n v. Regents of the Univ. of Cal., 47 Cal. 3d 376, 408 (1988) (agency's adoption of mitigation measures must be supported by substantial evidence). Under CEQA, an EIR must identify impacts and identify mitigating measures. Cal. Pub. Res. Code § 21002.1. Proposed mitigation measures should be capable of, among other things, "[a]voiding the impact altogether by not taking a certain action or parts of an action." Cal. Code Regs. Tit. 14, § 15370.

of previous high-use areas, or a decrease in calving/pupping rates and/or total population size. See DEIS/R, p. C-7 (MMRP pilot study results will be used "to help design a long-term program to determine if the operational ATOC program has unacceptable long-term effects").

The MMRP as currently designed has numerous other fundamental flaws. These include, but are not limited to, an inadequate length of time for the Pilot Study, insufficient time for analysis of the study results, inadequate public review of those results, the fact that the MMRP is linked to and dependent upon ATOC, and that ATOC transmissions are planned to begin even before the Pilot Study final report is available. In addition, the DEIS/R does not adequately specify the decisionmaking protocol -- who would make the decision whether the results of the Pilot Study demonstrate that the ATOC transmissions will not harm marine wildlife and that those transmissions can safely proceed? With what input from the public? In what time frame? Moreover, the safeguards written into the protocol are inadequately spelled out. Again, who would make the decision that ATOC transmissions should stop if the MMRP demonstrates adverse impacts, and how precisely would that decision be made?

THE DEIS/R DOES NOT FULLY AND FAIRLY DISCUSS THE POTENTIAL IMPACTS OF THE ATOC PROJECT

An EIS must provide "full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. CEQA requires the same of an EIR. Cal. Code Regs. Tit. 14, § 15126(d).

This DEIS/R fails on both counts. As discussed below, its analysis of the alternatives to ATOC is inadequate; and it does not provide "full and fair" discussion of the impacts of ATOC. Rather, it consistently minimizes the potential impacts of the ATOC sound transmissions in a variety of ways, some of which are enumerated below.

First, as discussed above, it fails to consider the cumulative impacts of the California and Hawaii portions of ATOC, and fails altogether to discuss the cumulative impacts of the Hawaii/California feasibility study with the planned follow-on, long-term global ATOC project.

Second, with respect to the potential impacts of the California segment of the ATOC project, the DEIS/R simply assumes that there will be none, or that if there are any impacts they

will be inconsequential. For example, the DEIS/R states that "based on analysis of available data", no direct damage to hearing structures of marine animals is expected, no permanent threshold shifts are expected, no behavioral disruption is expected, and so forth. DEIS/R, p. 4-13. Yet practically in the same breath the DEIS/R acknowledges that "available information on subsea noise and its biological impact ranges from incomplete to nonexistent." DEIS/R, p. 4-15.

Thus the DEIS/R's assumption of no or minimal impact is based on incomplete or nonexistent information -- it is, in short, little more than a hopeful guess. With respect to the impacts on mysticetes, for example, the DEIS/R states that

> In summary, the potential for adverse impacts from long-term exposures to the ATOC sound fields is unknown; however, all marine mammal exposures to subsea sounds will be minimized wherever feasible.

(DEIS/R p. 4-30). It is precisely because the first part of this statement is true, that the second part provides scant comfort[4]: it is not possible to "minimize" the adverse impacts of ATOC transmissions when those impacts are unknown (and probably unknowable). As concluded by Darlene R. Ketten, an expert on hearing in marine mammals whose studies are much referenced in this section of the DEIS/R, "definitive guidelines for safe limits on underwater signals are not possible." Ketten, D. R., Comments on ATOC/Marine Mammal Research Program Permit Request: re: Acoustic Trauma/Marine Mammal Hearing (undated), p. 6 (emphasis added).

9 Nor, as mentioned above, will the MMRP answer the question whether ATOC transmissions are harming marine wildlife. Like the entire DEIS/R, the MMRP also is flawed with, among other things, the assumption that there will be no impacts, and it admittedly will not in any event detect long-term impacts. I-122

Third, the DEIS/R does not consider the possibility of impacts beyond the immediate vicinity of the source, but instead limits its discussion of impacts to those that marine wildlife might experience only near the source. In its description of the

[4]See also CEQA Mitigation Measure 5, which states that the duty cycles and power levels of the ATOC source "would be adjusted to the minimum necessary to support research objectives, so that potential long-term impacts to mysticetes would be minimized." DEIS/R, p. 4-31.

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affected "biological environment," for example, the DEIS/R discusses only the marine mammal fauna in the "general Pt. Sur region, including the proposed action site and Sur Slope site." DEIS/R, p. 3-16. See also Table 3.3.1-1 (Estimates of the stock of marine mammal and sea turtle species offshore central California). By so doing, the DEIS/R underestimates the true potential impacts of the transmissions. The basic premise of ATOC, after all, as demonstrated in the Heard Island study, is that the sound transmissions will travel huge distances across the oceans in deep sea acoustic sound paths and will be detectable around the world. See, e.g., DEIS/R pp. ES:1-3. Thus, as breathtaking as the numbers of species and individual animals that may be affected near the source are, nevertheless the total number of animals that could be impacted may be vastly underestimated. 12 I-7e

Fourth, the discussion of comparisons between natural and human-induced noise, and of sound transmission through the water and through the air, including Table 1.1.3-1 (p. 1-10)("Natural and human-made source noise comparisons") is misleading. See Comments on DEIS/R by Dr. Linda S. Weilgart (5 January 1995 and 16 January 1995), Dr. Hal Whitehead (16 January 1995), and Peter L. Tyack (25 January 1995). 13 TC I-7c

The discussion of impacts is so misleadingly skewed and result-oriented that the DEIS/R makes the remarkable assertion that the intentional introduction into the marine environment of extremely loud noise would not only be consistent with but would actually further the goals of the Monterey Bay National Marine Sanctuary Management Plan, the Grey Whale Monitoring Plan, Humpback Whale Final Recovery Plan, Steller Sea Lion Recovery Plan, and Northern Right Whale Recovery Plan. DEIS/R, pp. 5:12-18. As discussed below, this conclusion is absolutely erroneous; it could only have been arrived at by project proponents desperate to achieve their desired goal.

THE DEIS/R'S DISCUSSION OF ALTERNATIVES IS INADEQUATE

The discussion of the alternatives to the proposed project, including the alternative of not proceeding, should be "the heart of the environmental impact statement." 40 C.F.R. § 1502.14. The EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives". Id. While the discussion need not address every conceivable alternative, Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519, 551 (1978), it must set forth "information sufficient to present a reasoned choice of alternatives." Natural Resources Defense Council v. Morton, 458 F.2d 827, 836 (D.C.Cir. 1972). The EIS

may not disregard alternatives merely because they do not offer a complete solution to the problem. Id., 458 F.2d at 836. In addition, the EIS must provide support for its rejection of alternatives. Natural Resources Defense Council v. Callaway, 524 F.2d 79, 93 n.12 (2nd Cir. 1975). Similarly, under California law, an EIR "must consider a reasonable range of alternatives to the project, or to the location of the project, which (1) offer substantial environmental advantages over the project proposal (Cal. Pub. Res. Code § 21002); and (2) may be 'feasibly accomplished in a successful manner'. . . (Cal. Pub. Res. Code § 21061.1)." Citizens of Goleta Valley v. Santa Barbara Board of Super., 52 Cal. 3d 553, 566 (1990). Furthermore, "the EIR must contain facts and analysis, not just the agency's bare conclusions or opinion." Concerned Citizens of Costa Mesa, Inc. v. 12nd Dist. Agric. Ass'n, 42 Cal. 3d 929, 935 (1986). Under CEQA a " quantitative, comparative analysis" is required. Kings County Farm Bureau v. City of Hanford, 221 Cal. App. 3d 692, 735 (1990).

The discussion of alternatives in the DEIS/R fails to live up to these standards. It fails to weigh objectively the benefits and costs of the alternatives it discusses, trivializing their benefits and emphasizing their deficiencies, while maximizing the benefits and downplaying or ignoring the impacts of the preferred alternative.

Because of its bias towards the preferred alternative, the DEIS/R does not objectively evaluate less harmful reasonable
14 alternatives to ATOC. In particular, the "no action" alternative I-5a
is given short shrift throughout, as exemplified by, among other things, that alternative's complete omission from Table 4.1-1 (Summary of potential environmental impacts of the various alternatives).

Also, as discussed above, the impacts of the preferred alternative are simply assumed to be non-existent or minimal.

The entire discussion of alternative sites for the ATOC source is flawed because the key criteria for the MMRP and the ATOC feasibility study are in direct tension with one another. A TC
15 key criteria for the MMRP location is that the site be one where I-4b
marine wildlife is sufficiently abundant so that there are animals to observe. Eg., DEIS/R, pp. 2-15, 16; Table 2.2.3.2-1 (p. 2-24)(MMRP source site selection criteria). Thus, Sur Ridge is preferred "from a marine mammal research viewpoint" over other locations because abundant marine life exits there. Id.; DEIS/R, p. 2-27.

C-184

Yet this is clearly an inappropriate criteria for the location of the ATOC climate research sound transmission study. To the contrary, an important criteria for the location of ATOC itself should be that there is minimal marine life in the area, so that the possible impacts on such life would be minimized. The DEIS/R acknowledges this with respect to certain disfavored alternatives, but curiously is silent on this point with resect to the preferred alternative. For example, Table 2.2.4-1 (p. 2-42), summarizing the advantages and disadvantages of a moored autonomous source alternative, lists as one of its advantages that such a source "[c]ould potentially be placed in areas of low marine animal activity." Yet in discussing the relative advantages and disadvantages of the preferred alternative, the presence or absence of marine wildlife is not discussed as a factor. See Table 2.2.3.3-1 (p. 2-28)("ATOC source site selection criteria"), and so the Sur Ridge site is again able to be selected as the "most desirable of the six alternate locations from the perspective of ATOC operations," even though the other locations have less abundant marine wildlife, and are outside the Sanctuary. DEIS/R, P. 2-38. Table 2.4-1 (p. 2-54), summarizing the "relative response of the alternatives to the marine animal research and acoustic thermometry program criteria," is therefore misleadingly skewed in favor of the preferred alternative, because missing from the criteria for ATOC is any requirement that ATOC should minimize the possibility of adversely impacting marine wildlife by being located in an area of relative scarcity of such wildlife.

Finally, the DEIS/R entirely omits any mention, let alone discussion, of a range of reasonable alternatives that would flow from de-linking the MMRP and the ATOC portions of the project. Every alternative discussed assumes that the two must be coupled
10 together, that a single permit must be granted for both, and that I-17
the location and type of source must be the same for each. A reasonable alternative, however, would be that the MMRP be severed and made completely independent from ATOC, and that the decision whether to proceed with ATOC then be considered based upon the independently evaluated results of the MMRP.

In this alternative scenario, the site of the MMRP and that of the ATOC source would be separately located. An appropriately designed MMRP could, with proper safeguards, be located in an area of rich marine life, even within the Monterey Bay National
15 Marine Sanctuary, as proposed in the DEIS/R, whereas the ATOC I-4b
source would be located in an area with a minimum of marine wildlife and that meets the other physical criteria for ATOC. To be an acceptable alternative, such an MMRP would not use the ATOC
16 source, but would utilize instead more appropriate alternative I-6e
technology such as lower level mobile sound sources, and the

research protocol would have a duration of at least one year (preferably two years), with sufficient time for thorough analysis of the data and preparation of a comprehensive report for external review by a technically qualified group independent of any possible follow-on ATOC project, with the group's findings released for public review, before any decision to proceed with ATOC sound transmissions could be made. The MMRP would receive all approval and permits as a stand-alone project; the subsequent ATOC transmission project would proceed only after receiving its own separate incidental take permits under MMPA and ESA and all other required federal and state permits, following completion of the MMRP and review of its results.

THE DEIS/R ERRONEOUSLY CONCLUDES THAT THE ATOC PROJECT WOULD BE CONSISTENT WITH OTHER LAWS AND WITH THE MONTEREY BAY NATIONAL MARINE SANCTUARY MANAGEMENT PLAN, HUMPBACK WHALE RECOVERY PLAN AND OTHER RECOVERY PLANS

17 I-14c

Contrary to the claim in the DEIS/R (p. 5-13), the proposed project, or at least the ATOC portions of it, is absolutely inconsistent with the Monterey Bay National Marine Sanctuary Management Plan (Sanctuary Plan). For example, the Sanctuary Plan states that "the highest priority management goal for the Sanctuary is the protection of its marine environment, resources and qualities as well as reducing the threats to Sanctuary resources and qualities." Sanctuary Plan, Part II, p. V-6-7. Placing a powerful sound transmitter within the Sanctuary with significant potential long-term negative impacts on marine wildlife is obviously inconsistent with the goals of Sanctuary protection. Under no circumstances is location of the ATOC source within the boundaries of the Sanctuary acceptable.

As explained in other comments, however, for example those of Save Our Shores, a modified version of the MMRP Pilot Project might very well be appropriate and consistent with the research objectives of the Sanctuary Plan and could be located within the Sanctuary, if it were completely de-linked and independent from ATOC, were extended to at least one year (preferably two), and met the other criteria discussed elsewhere in these and Save Our Shores' comments.

Nor would ATOC be consistent with the recovery plans for humpback whales, northern right whales, Steller sea lions, or the with the gray whale monitoring plan.

With respect to the Humpback Whale Recovery Plan, for example, the DEIS/R has the hubris to state, "The ATOC MMRP is consistent with, and will further, the goals of the Recovery

Plan." DEIS/R, p. 5:15. The authors of the Humpback Whale Recovery Plan would no doubt be surprised to hear this. That plan lists among the "Known and Potential Impacts" to humpbacks, together with subsistence hunting, entanglement in fishing gear and collisions with ships, the problem of "acoustic disturbance." Humpback Whale Recovery Plan (NMFS 1991), pp. 25-7. The Recovery Plan states, for example, that "It would not be surprising if loud noises from ship engines or powerful sonar could potentially adversely affect humpback whales by disrupting resting, feeding, courtship, calving, nursing migration or other activities." Id., p. 27.

Far from encouraging the introduction of yet new unnatural sources of loud noise pollution into the humpbacks' habitat, the Recovery Plan lists, as a priority objective, "Reduce disturbance from human-produced underwater noise in Hawaiian waters and in other important habitats when humpback whales are present." Id., p. 40.[5] And far from recommending further research that necessitates increasing the amount of noise to which the whales would be subjected, the Recovery Plan notes that "Additional research could be performed, but it is likely to be expensive and may provide ambiguous results", and states instead that "A more direct and cost-effective approach will be to work toward minimizing human-produced underwater noise, particularly in critically important areas such as Hawaiian waters or other winter ranges, but also at other locations when whales are

---

[5]The Humpback Whale Recovery Plan states:

> Acoustic information is important in the life of a humpback whale. Feeding humpbacks may key in on sounds produced by other individuals or by prey. Migrating humpbacks may listen for sounds produced by other individuals, animals on the bottom, or echoes of their own vocalizations. They may also listen for calls of killer whales as warnings of the presence of those potential predators . . . .
>
> Human-produced noises could potentially reduce information available to whales, physically disturb them, prevent them from carrying out some activities, or even displace them from preferred habitats."

Id. (emphasis added).

present." Id. (emphasis added). The Recovery Plan concludes by noting that "Reduction of human-produced underwater noise could also benefit other marine species present, including some endangered species." Id.

Finally, if approved, ATOC would certainly be inconsistent with the Marine Mammal Protection Act, 16 U.S.C. § 1361 et seq., and the Endangered Species Act, 16 U.S.C. § 1531 et seq., which emphasize protection of marine mammals and endangered or threatened species, respectively, and prohibit harm to such animals. Each requires that federal agencies err on the side of protection. See, e.g., Balelo v. Baldrige, 724 F.2d 753, 756 (9th Cir. 1984), cert denied, 467 U.S. 1252 (1984). ("Congress' overriding purpose in enacting the MMPA was the protection of marine mammals"); Tennessee Valley Authority v. Hill, 437 U.S. 153, 174 (1978)(ESA); Sierra Club v. Marsh, 816 F.2d 1376, 1386 (9th Cir. 1987)("Congress clearly intended [in the ESA] that [federal agencies] give 'the highest of priorities' and the 'benefit of the doubt' to preserving endangered species"). Rather than erring on the side of caution and protection, this DEIS/R instead proceeds on the unproven assumption that ATOC will not harm marine wildlife.

CONCLUSION

In conclusion, while we appreciate the obvious effort that has gone into the preparation of the DEIS/R, it is apparent that the object of that effort has been not to prepare an objective, neutral environmental evaluation of ATOC and the alternatives to it, but rather to advocate and justify a decision to proceed with ATOC. Because this is a project with vast potential adverse impacts on marine animals throughout the oceans of the world, a thorough and objective environmental review of not just the immediate California component of ATOC but of the planned ten-year, world-wide project is essential.

For the reasons discussed above, this DEIS/R fails to provide the decisionmaker and the public with such a review. It is, in fact, so deficient and legally inadequate that it should be withdrawn and a new draft EIS/R circulated for public and agency comment. In the meantime, no further permits or approvals should be granted for any phase of the ATOC project, including

C-184

the MMRP component, and no further work or expenditure of funds on any part of the project should take place.

Very truly yours,

Michael R. Sherwood

MICHAEL R. SHERWOOD
Staff Attorney

With assistance from:

Torri Estrada, Research Assistant
Adria LaRosa, Associate Attorney
Cameron Benson, Law Student

cc: Dr. William W. Fox, Jr.
Director, Office of Protected Species
National Marine Fisheries Service

Marilyn E. Cox
Assistant Director, Physical Planning
Campus Planning Office
University of California, San Diego

California and Hawaii Coalition on ATOC

RECEIVED 2-2-95

C-185

MONTEREY BAY AQUARIUM®

26 January 1995

Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes,

This letter is in strong support of the Acoustic Thermometry of Ocean Climate experiment described in the draft EIS/EIR. The views expressed herein represent my professional opinion and do not reflect the institutional position of the Monterey Bay Aquarium.

It is my belief that global warming is among the greatest environmental threats faced by life on our planet, second only to uncontrolled human population growth. Yet our ability to predict the rate of warming, causal agents and relevant factors controlling global warming is poorly developed. A key component to global climate models is the role played by the oceans. The ability to measure a change in temperature of the ocean would certainly help scientists understand the interactions between the ocean and the atmosphere as they relate to global warming.

The ATOC experiment is a test of a relatively inexpensive, almost entirely benign and very elegant method of detecting change in the temperature of the ocean. Available oceanographic and marine biological data suggest that the effect of the acoustic signals proposed in the ATOC experiment will have minimal, if any, impact on marine mammals and other marine life. Furthermore, if impacts are detected through the Marine Mammal Research Plan (or other sources of information), the experiment can be terminated immediately, with no further risk. The potential benefits of conducting the experiment are enormous. We may learn the role of the ocean in regulating global change which could help humans manage their activities to minimize their contribution to global warming. We will also gain much information on the distribution, abundance and behavior of marine mammals whether or not the ATOC experiment is a success.

The risks of NOT conducting the ATOC experiment are, in my view, extreme. If the temperature of the ocean is changing, the potential impact of this change on ALL marine life is orders of magnitude higher than the potential risk to marine life by the ATOC experiment. We will remain completely ignorant of changing ocean temperature if this experiment is not approved.

886 Cannery Row Monterey, CA 93940-1085 Telephone (408)648-4800 FAX (408)648-4810

C-185

The proposed ATOC experiment provides an opportunity to conduct an experiment of immense significance and potential benefit while providing safeguards to monitor its potential impacts and to take immediate action if and when impacts are detected. We would be irresponsible as environmentally concerned scientists and citizens if we did not take advantage of this opportunity.

Regarding whether or not it is appropriate to conduct the ATOC experiment within the MBNMS, the proposed experiment is completely in keeping with the letter and intent of the MBNMS research mandate.

Sincerely,

Christopher Harrold, Ph.D.
Director of Life Sciences

C-186

RECEIVED JAN 95

1/29/95

To Whom It May Concern,

I&d like to say a few words about the proposed Scripps study (on global warming). I am amazed that this project is still a possibility. It seems more concerned with human-right-to-know than with how this will disrupt sea life.

How will aquatic life be impacted by this study? And what about the quality of life that exists in the ocean now-What is its value? Or does it only have value if humans can use it or exploit it? This is why I feel if imperative that I voice my objections to this project. I understand that the Military is backing it. This is a strange way of using tax payer's money--my money. If this noise-sound-pulse were generated across land instead of water there would be more of an outcry. It is an offensive act with not enough concern for another quality of life.

1 I-1

Please include my comments in your considerations. Thank you.

Sincerely,

Mariana Simpson

C-187

RECEIVED 2-2-95

1/25/95

Dear Clayton Spikes,

I am writing to express my concern regarding the ATOC project. I believe it is a waste of time and money, and that marine life may be harmed in the process.

If it is true that this program is to research global warming, why is the funding (35 million $) coming from the Department of Defense? Surely this suggests that there is more to this than global warming research. Could this research really be for submarine detection? Frankly, the global warming research arguement holds no water. We know global warming is happening, there is plenty of evidence to support this. If the DOD is really concerned about Global warming, then they would spend this money on energy efficiency and development of RENEWAL energy. Stop the ATOC experiment, please. Marine life should not suffer from our wasteful experiments.

1 I-1

2 I-3b

Sincerely, Lynn Cumiskey

LYNN CUMISKEY
20 13th ST NE
ATLANTA GA
30309

C-188

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington, Virginia

Jan 27, 199.

RECEIVED 2-2-95

To Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement (DEIS) is looking in proper full conclusions. Clearly the trade off between harm to marine life and the "research benefits" is weighted towards your agency. Even that certain components of ATOC are "classified" by the Pentagon, this does not come as a surprise.

1 I-1

If global warming is the true priority our tax dollars would be better spent on clean & renewable energy technology.

Sincerely
Michael Cole

C-189

RECEIVED 2-2-95

JANUARY 26, 1996

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS, INC.
2345 CRYSTAL DRIVE
ARLINGTON, VIRGINIA 22202

CLAYTON H. SPIKES,

I AM WRITING TO EXPRESS MY OPPOSITION TO THE ATOC PROJECT. THE DRAFT IMPACT STATEMENT (DEIS) IS INADEQUATE TO ALLOW THE ATOC PROJECT TO PROCEED.

SCRIPPS INSTITUTE HAS RECEIVED 35 MILLION DOLLARS FROM THE DEPARTMENT OF DEFENSE TO RESEARCH GLOBAL WARMING. IF GLOBAL WARMING WAS THE TRUE PRIORITY, THEN THE EXPENDITURE OF TAX DOLLARS WOULD BE BETTER SPENT ON CLEAN ENERGY, ENERGY EFFICIENCY, AND OTHER RESPONSIBLE EFFORTS TO REDUCE OUR IMPACT ON THE GLOBAL CLIMATE. THE "CLASSIFIED" NATURE OF THE ATOC PROJECT INDICATES THAT IT HAS NOTHING TO DO WITH GLOBAL WARMING AND SUGGESTS THAT ATOC IS A MILITARY OPERATION TO IMPROVE SUBMARINE DETECTION AND MAKE USE OF THE SOSUS LISTENING ARRAYS WHICH WOULD OTHERWISE BE SHUT DOWN.

1 I-1

IT IS CLEAR THAT THE TRUE INTENTIONS OF ATOC IS TO SUPPORT MILITARY INTEREST NOT PUBLIC INTEREST! STOP GLOBAL WARMING BY USING OUR TAX DOLLARS ON CLEAN ENERGY AND ENERGY EFFICIENCY.

SINCERELY
Jon Callender
JON CALLENDER
2112 ADAMS AVE
SAN DIEGO, CA 92116

P.S. PLEASE REPLY.

THE MARINE MAMMAL CENTER®

Marin Headlands

Golden Gate National Recreation Area

Sausalito, California 94965

(415) 289-SEAL

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C-190

RECEIVED

27 January, 1995

Clayton H. Spikes
Advanced Research Projects Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Dr. Spikes,

On behalf of the members and staff of The Marine Mammal Center (TMMC), we would like to offer comments on the Draft EIS/EIR prepared for the Acoustic Thermometry of Ocean Climate (ATOC) Program and the accompanying Marine Mammal Research Program (MMRP).

We commend you on a thorough DEIS/EIR document. We were pleased to see many of our earlier comments addressed in the environmental review. However, the Final EIS/EIR should incorporate the following aspects that require additional attention.

1. The document is explicit about the exploratory role of ATOC experiments for the verification and improvement of climate models and acoustic techniques. While we understand that this particular technique is in a preliminary stage, it is still appropriate to present the specific underlying principles. Currently, the document offers only a simplified explanation of sound transmission in the ocean. The final DEIS/EIR should contain a detailed discussion of projected models and other evidence that the data from an initial 2 years of transmission can meet the goals of ATOC. The timespan is sufficiently short that results will likely be mixed. 1 I-3b

While ATOC has the potential to answer critical questions and contribute to our understanding of ocean and atmospheric temperatures and climate, this remains highly speculative. As a result, the complete program (including ATOC and MMRP) must be extremely sensitive to possible effects on the marine environment. The onus is on the agencies and researchers involved to demonstrate that the research merits the risk of negative impacts.

For example, the introduction (Section 1.1.5) briefly discusses previous temperature measurements from Heard Island. ATOC will concentrate on the SOFAR channel (roughly 500-1000 m, page 1-7), which shows great mesoscale and larger variability (e.g. Figure 1.1.5-1: Ocean temperature changes in the Atlantic). Due to the nature of this variability, temperature averages taken over 2 years may be difficult to interpret and extrapolate to get overall conclusions about global ocean temperatures and large-scale warming. More explicit evidence that the measurements can be incorporated in an analysis to yield satisfactory results would strengthen the proposal (and probably diminish some of the general opposition).

2 Additionally, on page 2-49, the document states that the ATOC program will use XBTs and CTD/XCTDs to "validate" its temperature measurements. However, ATOC purports to measure a large-scale average, so what exactly will these point source values contribute? I-3.e

2. While the draft document discusses laudable MMRP objectives (page 2-15), these are not ATOC goals. The document is somewhat duplicitous in stating that ATOC goals include the study of the effects of low frequency sounds on marine mammals (pages 1-20 to 1-22). In fact, the impact on marine mammals was originally a major concern

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expressed by many people who commented on the NMFS permit application. The research team is to be commended for incorporating the marine mammal study into the overall approach. However, it now appears that part of the justification for conducting ATOC is to investigate the interplay between marine mammals and low frequency sound. The causal relationship between ATOC and MMRP results from the ATOC proposal, not the need for marine mammal research. That said, this project offers an opportunity to study marine mammals and low frequency sound. It is unfortunate that such research would be an unlikely candidate for funding on its own merit. The final document should remove the wording that implies that marine mammal research was/is a primary objective for ATOC. 3 TC

3. Additionally, the removal of MMRP goals from the list of ATOC objectives accordingly weakens the argument for sound source sites. The source site criteria seem secondary to the proposed site locations (obviously the site was chosen and later supported by diverse specifications). The major problems with Sur Ridge are two-fold: its location in a National Marine Sanctuary and the rich marine fauna associated with the site. The document would be more palatable if this was expressed directly, referring to the realistic financial and logistic limitations for other locations. The Pacific coastline of the U.S. is ample, and the choice of 6 (or more) sites was based on pre-existing military facilities and topography rather than marine mammal criteria.

For evaluations of alternate sites, the 6 locations are scored according to a variety of criteria. However, the scoring system is inherently biased. Not only are the designations of *H*, *M* and *L* somewhat arbitrary, but then they are allocated skewed relative values (10, 5 and 1 respectively). This value is further compounded by multiplication with a 'weighting factor' with no stated rationale. Given such a system, the preferred site could hardly fail to score markedly above the other sites.

4. Mitigation measure wording should be more precise and legally binding. For example, CEQA Mitigation Measure A-3 should read "ATOC sound sources shall (or must) operate at the minimum power level necessary to support MMRP objectives and feasibility operations." 4 I-6n

5. Many statements about the impact of the ATOC sound source suggest that coastal species would not be affected due to the distance from the source. Figure 2.2.1.2-1 (the FEPE acoustic performance prediction model) suggests, however, that sound levels will be greater toward the shore (relative to levels directed away from shore). Based on the FEPE predictions, coastal species may be subject to greater sound levels than pelagic forms. This is counter to assumptions stated in the document for species such as the gray whale. 5 TC

6. With respect to marine organisms discussed in the document, 'cumulative effects' are consistently taken to refer only to other potential sound-generating activities. However, if the ATOC sound sources affect specific marine populations through demographic shifts, other mortality factors would interact cumulatively with ATOC effects (including fishery catches, by-catches, oceanographic events such as El Niño, etc.). Discussion of these combining effects should be included in some form within the final EIS/EIR. 6 I-12

7. Many of the conclusions about potential impacts on marine organisms were set at 'minor', 'minimal' or 'less than significant' levels in a seemingly *a priori* manner. Given the paucity of data, frequently mentioned in the document, a truly conservative approach would acknowledge the possibility of greater impacts. Accordingly, there should be a monitoring plan in place, by which impacts are quantified, limits set, and a procedure established to cease transmissions if pre-set levels are reached. This monitoring plan should apply to all marine organisms being tracked (plankton, fishes, sea birds, marine mammals). Currently, the DEIS/EIR alludes to possible measures taken if impacts are found. The wording is vague and offers no substantive feedback process between MMRP (and related) monitoring and the ATOC transmissions once the experimental program has begun. A complete monitoring plan, detailing criteria for assessing significant negative impacts and the chain of events should such criteria be met, is necessary in addition to the mitigation measures already incorporated (none of which address what happens if significant impacts are detected). The terms 'significant impact' and 'safe' should be fully elucidated. 7 TC I-6g

8. The assessment for impacts on marine mammals and sea turtles assumes that most individuals will be unaffected by the sound transmission, due to brief exposure. However, this conclusion is apparently based on the idea that such animals will be passing through the immediate sound source area while traveling. However, not only may marine mammals and sea turtles be lingering and foraging in the vicinity, but some groups may well be resident in the local area (e.g. mysticetes, page 4-33). Additionally, the document cites Richardson et al. (1991) when concluding that isolated disturbance should not have serious effects. Counter to this statement, natural phenomena (such as the examples given) do not occur on a regular schedule in a fixed location. It is inappropriate to freely extrapolate from the cited reference to the ATOC transmissions.

The document repeatedly states that the 5-minute ramp-up period should offer nearby animals the time and leeway to avoid adverse exposure. No evidence is given to support this assumption; animals may not avoid the area until the source is at full intensity (and for some time after that), when an acute response leads to departure (especially if they are otherwise focused on immediate concerns like foraging, mating or social interactions). For marine mammal avoidance of the sound source, the document refers to the "area" of the source as easily avoided. While the site of the sound source is quite discrete, the 'area' is vague and requires definition for such a statement to be properly assessed.

8 I-6m

Pages 4-65 and 4-66 discuss seal bombs and the waning response over time, leading to tolerance of the disturbance. This tolerance does not mean that the hearing of affected animals remains unimpaired, merely that the individuals choose to stay and forage. 'Tolerance' does not equal 'no impact'. In the same sense, the behavioral changes anticipated for pinnipeds affected by the sound transmission are deemed "minimal impact", which is an unacceptable assumption.

The document repeatedly suggests that important locations for pinnipeds are the breeding sites. While this is true, rookeries are not the only important areas. Listed pinniped species should be considered around haul-outs and foraging areas (p. 4-64).

9. The population estimates for the proposed sound source area seem unusually low. The numbers are compounded by calculations of average densities in the study area (e.g. less than 1 sperm whale per 1000 km^2). Most of these marine mammal species do not travel singly, so this evenly spread distribution does not reflect the patchy nature of marine mammal populations. Where the probability states that 1 animal may be affected, the actual number of affected animals is likely to be somewhat larger (e.g. in small cetaceans, pods may be counted in hundreds or thousands; California sea lions also travel in groups, as do sperm and other whales).

9 TC I-8b

10. Loggerhead sea turtles exposed to loud low frequency sounds responded by swimming up to the surface (p. 4-74). Such a response would not alleviate the effects of ATOC transmissions near the source. However, based on the available evidence, a similar response could be expected in the wild, perhaps for all the local sea turtle species. Therefore, it is possible that sea turtles may experience more adverse effects than stated, and behavioral disruption seems likely (counter to statements on p. 4-75). Therefore, the "less than significant impact" is not justified in CEQA Impact 9. Mitigation Measures 9-1 and 9-2 offer little hope of real mitigation with the present wording "as practicable." While sea turtles are admittedly difficult to monitor and assess, this wording should be removed from the measures.

10 TC

11. Sharks are the most likely candidates for fish species impacted by low frequency sounds. On page 4-92, the document concludes that the attractive nature of the sound source may diminish with time. However, it is more likely that the sporadic 'on-off' nature of the transmissions may counter shark habituation, so that they continue to be attracted to the source and accrue impacts. On page 4-93, adverse long-term impacts are deemed unlikely for fish populations. The "acceptability of commercial fishing" is irrelevant to this particular argument and should be removed, as it obscures the issue.

11 TC

12. Insufficient attention is given to the overall project, including potential impacts on both of the preferred sound source sites - Sur Ridge and off Kauai. A full assessment of ATOC impacts should consider both sites. The present document allocates just a few paragraphs to possible cumulative impacts. We would like to see an expanded discussion of this summation. For example, if the transmissions are not cumulative, could the paths and transmissions be practically distinguished at the receivers (presumably this is the basis for transect measurements)? Therefore, could the effects from 2 sound sources be alleviated by transmitting on the same schedule?

12 I-12c

13. With respect to the MMRP, there are several areas that require clarification in the final EIS/EIR. The investigators claim that shipboard and aerial observers will attempt to capture and treat distressed marine mammals (in the presence of a veterinarian) (p. C-6). How will such activities be coordinated and performed? How can captures take place while aerial observations are made? As the primary responder for stranded marine mammals and sea turtles in central California, TMMC requests additional information. Will animals requiring extensive treatment be transferred to the "excellent marine mammal stranding network that currently exists within the Monterey Bay/central California region" (i.e. TMMC)? Later in the protocol (p. C-7), the MMRP proposes to assess stranding numbers and marine mammal trauma. Realistically, much of this responsibility lies with the present responders, who are members of the federal marine mammal stranding network (NMFS-Southwest Region and TMMC). How do the MMRP investigators propose to assume this responsibility and compare ATOC-related numbers with previous records? This section needs further clarification.

13 TC

From an aircraft, even one flying as low as the proposed 230-270 m, it is very difficult to distinguish California sea lions (deemed too common for species identification and counting, p. C-11) from Steller sea lions (threatened species with a dwindling population in California).

The cetacean behavioral observations are designed to be comprehensive. However, the observations planned for before, during, and after ATOC transmissions may be impossible to collect (p. C-17). This protocol relies on finding cetaceans at the appropriate time and being able to track them throughout, despite the low odds of having transmission days and vessel-worthy days coincide at the 2% duty cycle. At the 8% duty cycle, for a limited time, such observations may be more possible. As a result, the plan to compare cetacean behavior during ATOC transmissions with that outside transmission periods may yield no results (and therefore offer no additional information about effects on cetaceans, one of the stated goals of the MMRP and ATOC programs, leading to problems with long-term proposals for continued experimentation). Are there back-up protocols to alleviate this problem? Has a power analysis been performed to optimize this particular aspect of the MMRP?

14 TC I-6o

How far do the investigators anticipate they will be able to radio track tagged individuals (p. C-21)? As with the above comments on cetacean behavioral observations, it may impossible to collect comparisons across 5 different activity variables with the ATOC source on and off. Without such information, it will be difficult to assess the actual impact of sound transmissions on tagged marine mammals. Additionally, over pages C-21 and C-22, there is no indication of the maximum number of juvenile elephant seals subject to tagging and translocation. An estimate of the total number of animals manipulated in this way should be included in the final EIS/EIR. In addition, the permit from NMFS under which such experiments would be conducted would require fairly specific estimates.

In addition, there are inconsistent statements throughout the document. The following is a list of some of the more important areas that require clarification or change for overall consistency.

(i) Page 3-16: The Guadalupe fur seal should be added to this overview of federally listed species (as is mentioned on page 3-58). Also, the Marine Mammal Protection Act was amended in 1988 and 1994.

15 TC

(ii) Table 3.3.3-1 is missing notes 8-12, making it difficult to interpret for pinnipeds and sea turtles.

(iii) Clark 1993 is not an appropriate reference for dive depths in northern right whale dolphins (p. 3-25) or sea otters (p. 3-31). The document should list a scientific source for this information,

rather than an unrefereed prior ATOC application. Additionally, the document states that northern right whale dolphins dive to depths above 300 m but that the species feeds on organisms below 250 m. These facts are either contradictory or suggest an unusually limited foraging pattern for the dolphins.

(iv) Page 3-30: Año Nuevo Island is no longer the largest rookery in California for Steller sea lions. As with many other parts of the Steller sea lion range, this rookery is producing fewer pups, leading to widespread suggestion that the species is a candidate for upgrade from 'threatened' to 'endangered' (with the factors for population decline not understood). [National Marine Fisheries Service. 1992. Recovery Plan for the Steller Sea Lion (*Eumetopias jubatus*). Prepared by the Steller Sea Lion Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 92 pp.] 15 TC

(v) Guadalupe fur seals have been sighted north of Santa Barbara Channel annually over recent years. Such sightings are compiled by the Point Reyes Bird Observatory (for the Farallon Islands), NMFS and TMMC. Accordingly, this listed species must be fully considered for potential impacts in the Final EIS/EIR. For example, in Table 4.3.1.3.3-1 (p. 4-71), the maximum possible exposure for Guadalupe fur seals should read '135 dB', and potential effects should read 'rare in project vicinity'. 15 TC

(vi) Page 4-15: When considering the CEQA Standard of *Significance*, the document uses vague wording, stating that "any reasonably anticipated direct auditory injury or permanent threshold shift ...should be considered a significant impact. As with comment 7 above, the possible effects on organisms should be specified and incorporated into a precise, tiered monitoring plan with clear thresholds and actions if pre-set levels are reached. 7 TC I-6a

(vii) Page 4-16: Here and throughout the discussion of possible impacts on gray whales and other mysticetes, most conclusions are reached from considering the *northbound* gray whale migration *route* (close to the coast and correspondingly distant from the ATOC sound source). However, the southbound migration route is further out and closer to the sound source. The potential for impacts must take both routes into consideration. Related to this comment, CEQA Impact 5 (p. 4-31) states that the proposed site is not a migration route. Given that impacts may be expected through an area surrounding the ATOC sound source location, known migration routes will likely be involved. Perhaps it is the wording ('proposed site') that should be modified for clarity. 16 TC

(viii) Page 4-29: The adverse effects from mysticete (and other marine mammal) habituation to the sound transmission are deemed "non-existent" due to the speculative nature of the supporting evidence. A more conservative approach would designate such effects as less than significant. Additionally, on page 4-54, masking effects on odontocetes are considered "negligible" despite the stated exceptions of beaked and sperm whales. These species are at low population levels and/or relatively unknown, so impacts may be accentuated. And on page 4-56, while sperm whales may not be seen off Kauai, they are certainly seen in a more pertinent area (for this DEIS/EIR) - off central California. 17 TC

(ix) Page 4-68: The California sea lion should be included with elephant seals with respect to possible masking effects, based on the information given in the preceding pages of the document. Additionally, in Table 4.3.1.3.3-1 (p. 4-71), it is overstated (based on evidence presented in the document text) to say that California sea lion "hearing capacity prevents impacts". "Limits impacts" is more conservative wording. 18 TC

(x) Page 4-69: NMFS and TMMC have documented evidence of collisions between pinnipeds and ships, boats and thrillcraft in central California. While this information is not published, it is a matter of federal record. 19 TC

(xi) In the discussion of effects on invertebrates, page 4-102 suggests the potential for minor decreases in shrimp productivity. Given the information on the preceding pages, crabs and other commercially important species may also experience some decreases. Given that many of these invertebrate species may have patchy distributions dependent on rock outcroppings and other local variability, it is invalid to conclude that the affected area is not important. 20 TC

(xii) With respect to potential physical auditory effects on seabirds (p. 4-107), even at the 2% duty cycle [20 minutes, 6 times per day, every 4th day], the transmission can hardly be described as a 21 TC

"moment of acoustic transmission." As with other animals, the simple onset of transmission may not cause avoidance.

(xiii) With respect to chinook salmon and possible effects (p. 4-110), regardless of the primary oceanic habitat, salmon approach the coast to enter spawning streams. Therefore, they will be found in the coastal area at some stage (and for an unspecified period of time), transiting from the open ocean to rivers and streams along central California. The final EIS/EIR should consider effects on depleted salmonid stocks in a more thorough fashion. 22 TC

(xiv) The nearshore special biological resource areas mentioned in the document also include invertebrate and vertebrate species capable of moving in and out of a park or the ATOC source area. As a result of the presence of motile animals in biological reserves and other special regions, it is not justifiable to conclude that "no impacts are anticipated on any species found therein due to ATOC or MMRP activities." 23 TC

(xv) ATOC and the MMRP are neither 'public service' nor 'industrial' activities, so it is difficult to see why they fall within the intent of PRC Section 30233 (p. 5-8).

(xvi) While considerations of global warming are important, the document overstates the potential information to be gained from this experiment. It is unlikely to "help address the problem of [local] shoreline erosion" (p. 5-10) or "further the national interest" (p. 5-11). Such hyperbole is not appropriate in this type of assessment document and should be removed. 24 TC

(xvii) Page 5-12: "The ATOC program will operate in strict compliance with" what?

(xviii) Page 6-1: The possible information to be gained from the ATOC program will not be available after 2 years of preliminary experimentation, which is the sole focus for this Draft EIS/EIR.

(xix) Page 6-2: The document oversimplifies and overstates the section on irreversible environmental changes. While there is no evidence for massive impacts, it is still inappropriate to state that the protective measures in the proposed protocol "will prevent any irreversible harm to marine mammals or other organisms in the affected environment." In fact, the project could kill a variety of small organisms (during equipment deployment on the benthic fauna, through effects on nearby pelagic plankton and fish), but the overall effects on marine populations are expected to be negligible according to information provided in the EIS/EIR. 25 I-6k

The concerns we have raised do not mean that we oppose the ATOC program or its aims, the investigation of oceanic variation as related to global climate changes and the study of marine mammal acoustics. However, we continue to have reservations about the experiment and its potential impact. Related to our concerns, we cannot support the permit application to NMFS unless some of the issues raised are fully addressed in the Final EIS/EIR.

Thank you for the opportunity to comment on this Draft Environmental Impact Statement/Environmental Impact Report. We look forward to seeing the revised Final EIS/EIR.

Yours Sincerely,

Krista Hanni
Director of Science

Hilary M. Feldman

Dr. Hilary Feldman
Staff Marine Biologist

cc: Peigin Barrett, Executive Director, TMMC
Jerry Gibbons, Chairman, Board of Directors, TMMC
Marilyn Cox, Campus Planning Office, UC San Diego
Dr. William W. Fox, Jr., Office of Protected Resources, NMFS
Michael R. Sherwood, SCLDF

C-191 RECEIVED 2295

PACIFIC CETACEAN GROUP
Environmental Research, Education & Conservation

P.O. Box 378
Moss Landing, CA 95039
(408) 372-0671

Mr. Clayton H. Spikes
Advanced Research Projects Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

January 30, 1995

Dear Mr. Spikes,

The Pacific Cetacean Group supports the California Marine Mammal Research Program (MMRP) if the following comments on the Draft EIS/EIR are considered and implemented if possible.

1. Identify people in charge of stopping the ATOC sound transmissions if adverse effects on marine animals occur. TC

2. Specifically outline what MMRP considers adverse effects on marine animals that would stop sound transmission: Identify these effects for each species.

3. Considering that prey could be directly affected by the ATOC sound source which could indirectly affect the animals studied in the MMRP, we feel that a prey base study should be included in the research program. Central California is a prime feeding ground for many mammals, turtles, and sea birds inhabiting the area seasonally and year round. Detecting changes in the behavior, distribution, and abundance of marine animals in relation to the ATOC sound transmissions can only be addressed by looking at the same parameters of their assoicated prey. In addition, altered environmental conditions can elicit a severe a severe red tide bloom or an El Niño, which has been documented to change prey availability, thus affecting marine animals. TC App. C

4. Focus field behavioral studies on target species, those that may be most affected by the ATOC sound source. Limit target species to the top two or three. I-61

5. Conduct the playback experiment in Hawaii before proceeding with the California ATOC source. The situation in Hawaii provides for a better controlled experiement with shore observations and baseline data on humpbacks. Adverse effects would be easier to determine there. If no adverse effects are noted there, then begin the California ATOC experiment. I-6e

C-191

6. We have over ten years of marine mammal sightings near and around the Pt Sur site. Distribution of animals changes from year to year and is very patchy. The surveys conducted to date are very minimal and inadequate to detect such patchiness. Also, these surveys only began last year, and conclusions on the presence, absence, or abundance of speicies cannot be based on one year. I-6b, o

Sincerely,

Nancy Black
Vice President, Pacific Cetacean Group

Representing the Executive Board Members of the Pacific Cetacean Group
Daniela M. Feinholz, President
Thomas R. Kieckhefer, Secretary
Richard L. Ternullo, Treasurer

To: Advanced Research Project Agency RECEIVED Jun 24 '95

Why are we spending $55,000,000 on a "global warming" project, funded by the Pentagon when there is already ample evidence that global warming is here, now! The effects of the ATOC project on marine life have not been reviewed enough. This funding could otherwise go to energy efficiency, alternative energy and environment education. I urge you to extend the public comment period and to justify the deep need for this plan. 1 I-36

Thankyou.

Shawna Chong

RECEIVED

To Clayton H. Spikes,

I am writing to express my concern and opposition to the ATOC project.

Scripps Institute has recieved 35 million dollars from the DOD to research global warming. I don't understand why we would spend millions of dollars to prove that global warming exist when there is already overwhelming evidence that global warming is indeed happening! Don't you think the 35 million dollars would be better spent on researching clean alternative energy sources?

We do not know the effects this will have on marine mammals. I do know that marine mammals communicate by sound. I believe that ~~placing~~ transmitting loud (195 decibel) sound waves in the ocean will effect and harrass these mammals.

Is it your true intent to measure global warming or are there other reasons (perhaps military) for conducting this ridiculous experiment? Please respond to my concern.

Terry Palermo 2438 22nd St San Francisco CA 94114

RECEIVED

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS, INC.
2345 CRYSTAL DRIVE
ARLINGTON, VA 22202

JANUARY 24, 1995

TO CLAYTON H. SPIKES:

I AM WRITING TO EXPRESS MY OPPOSITION TO THE ATOC PROJECT. THE DRAFT ENV. IMPACT STATEMENT (DEIS) IS INADEQUATE TO ALLOW THE ATOC PROJECT TO PROCEED.

BOTH THE ADVERSE IMPACTS TO MARINE LIFE AND THE "RESEARCH BENEFITS" ARE STATED IN THE DEIS AS UNCERTAIN. IT IS IMPOSSIBLE TO ESTIMATE THE IRREVERSIBLE EFFECTS OF HIGH DECIBEL, LOW FREQUENCY SOUND ON MARINE MAMMALS SUCH AS GRADUAL DEAFNESS & DAMAGE TO REPRODUCTIVE & IMMUNE SYSTEMS. 1 I-12.

SCRIPPS INSTITUTE HAS RECEIVED $6 MILLION DOLLARS FROM DOE TO RESEARCH GLOBAL WARMING. IF GLOBAL WARMING WAS THE TRUE PRIORITY, THEN THE EXPENDITURE OF TAX DOLLARS WOULD BE BETTER SPENT ON CLEAN ENERGY, ENERGY EFFICIENCY, AND RESPONSIBLE EFFORTS TO REDUCE OUR IMPACT ON THE GLOBAL CLIMATE. ~~THE "CLASSIFIED" NATURE OF THIS ATOC PROJECT INDICATES THAT IT HAS NOTHING TO DO WITH GLOBAL WARMING, AND SUGGESTS ANOTHER MILITARY OPERATION TO ENHANCE~~

IT IS UNCLEAR THE TRUE INTENTIONS OF ATOC, AND FURTHER ANALYSIS SHOULD OCCUR BEFORE THIS PROJECT IS ALLOWED TO PROCEED.

SINCERELY,

JEFFREY B. ALLEN

1112 FRANKLIN ST.

1/24/95

RECEIVED

Advanced Research Project Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington Va. 22202

To Clayton H. Spikes,

Please stop lying to the citizens of this great nation of ours, whom as an employee of our government you are bound to serve.

It seems to me that, if the stated purpose 1 is to measure deep ocean temperatures, it would be easier cheaper and more logical to lower thermometers from research ships. In any case I strongly urge you to extend the period of public comment and to 2 come out of your "secret" closet and explain the true military purposes and nature of your program. I-5a I-1

Marine mammals are under enough stress already; blasting them with very loud (195 decibals is very loud) sounds does not seem like a good idea to me. I just don't trust military (please don't deny the essential truth of my assertion) programs can be good vehicles for marine mammal research.

Yours truly,
Chris DeMorselle

C-196

RECEIVED

January 27, 1995

ARPA
c/o Mr. Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, VA 22202

Dear Mr. Spikes:

I am writing today to express my concern over the proposed ATOC experiments earmarked to be conducted in the national Monterey Bay Sancutary.

After reading the Environmental Impact Report as well as other literature published on ATOC, it seems that other alternatives which are less harmful to the fragile marine life are being overlooked. As a result, I have a few questions that I feel need to be answered before the experiment is carried out.

1 Have locations, other than the Sancutary, been considered? Have other experiments, in particular the one published in the New Scientist Journal (Winter 1994) that utilizes satellites and has the capablitity to monitor the oceans and provide information on temperture fluctuations much more effectively than the ATOC experiment could without the devastating side-effects, been considered? Lastly, why hasn't the possiblity of conducting the experiment at 50 db rather than 190 db (which is significantly more damaging to the marine life) been seriously addressed and explored? I-42 I-52

Given the above, I implore you to do everything in your power to reconsider ratifying this dubious experiment until these questions are fully and adequately addressed.

Thank you for your immediate attention to this matter.

Sincerely,

Nina J Berkery

C-197

RECEIVED

ADVANCED RESEARCH PROJECT AGENCY
MARINE ACOUSTICS, INC.
2345 CRYSTAL DRIVE
ARLINGTON, VA 22202

TO CLAYTON H. SPIKES,

I AM WRITING TO EXPRESS MY OPPOSITION TO THE ATOC PROJECT. THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) IS INADEQUATE TO ALLOW THE ATOC PROJECT TO PROCEED.

BOTH THE ADVERSE IMPACTS TO MARINE LIFE AND THE "RESEARCH BENEFITS" ARE SHROUDED IN THE DEIS'S UNCERTAINTY. IT IS IMPOSSIBLE TO ESTIMATE THE IRREVERSIBLE EFFECTS OF HIGH PEAKED, LOW-FREQUENCY SOUND ON MARINE MAMMALS SUCH AS GRADUAL DEAFNESS AND DAMAGE TO REPRODUCTIVE AND IMMUNE SYSTEMS.

SCRIPPS INSTITUTE HAS RECEIVED 85 MILLION DOLLARS FROM THE DOD TO RESEARCH GLOBAL WARMING. IF GLOBAL WARMING WAS THE TRUE PRIORITY, THEN THE EXPENDITURE OF TAX DOLLARS WOULD BE BETTER SPENT ON CLEAN ENERGY, ENERGY EFFICIENT, AND OTHER RESPONSIBLE EFFORTS TO REDUCE OUR IMPACT ON THE GLOBAL CLIMATE. IT WOULD SEEM THAT THE TRUE INTENSIONS OF ATOC HAVE NOT BEEN REVEALED TO THE PUBLIC, AND THE TRUE ANALYSIS OF THE ADVERSE EFFECTS ON MARINE MAMMALS SHOULD BE CONSIDERED BEFORE THIS PROJECT IS ALLOWED TO PROCEED.

I WOULD LIKE TO URGE AN EXTENSION OF THE PUBLIC COMMENT PERIOD.

SINCERELY,

LISA IMMEL

C-198

RECEIVED 2345

100 N. Rodeo Gulch R.
#153
Soquel Ca 95073

Advanced Research Project Agency
c/o Clayton H Spikes
Marine Acoustics, Inc.
4 Crystal Park, Suite 901
2345 Crystal Drive
Arlington Va 22202

Dear Mr. Spikes

I am writing you regarding the Sonic Tests that are proposed for the Marine Sanctuary in Monterey Bay.

If it is Truly a Sanctuary, why would Such Tests even Possibly be Considered? It is reported that
1 Chics re: Ocean Warming could be observed at Considerably less expense and less or No harm to Marine Creatures. I-52

The Sanctity of Marine Creatures is apparently Not Being Considered as a factor in the Plans of the Dept of Defense. Shame on you.

Respectfully
Mary L Beyrer
Mary L. BEYRER

C-199

RECEIVED 2345

I'm writing to voice my concern over the ATOC project. The Environmental Impact Statement indicates that effect on marine life may not be negligible, and might offset advantage. Besides, the classified nature of the project tends to suggest that the research sought by it is not concerned with global warming, but rather, with submarine
1 detection - Don't go ahead with it! The money allocated for I-1
it ought to be better spent towards research and implementation of viable energy resources, which would strike at the root of the global warming problem -

Thanks alot!

C-200

RECEIVED 2-3-95

To Clayton Spikes:

I don't usually write letters, not what with my writing that's so bad. Who can blame me. But I had to write this letter to show how much I oppose the ATOC project with such facts as: the statement in the DEIS that stated both the adverse impacts to marine life and the research benefits are uncertain & the classified nature of the ATOC project suggests that this is a scheme that shouldn't be supported.

Without taking any more of your time, I would just like to ask you to do whatever you can do to see that the ATOC project does not happen & I would like a response

An angry citizen
Michael Lester

C-201

RECEIVED 2-3-95

Jan 29, 199

Advanced Research Projects Agency
Marine Acoustics, Inc.
2345 Crystal Drive
Arlington Virginia 22202

To Clayton H. Spikes:

I am writing today to oppose the ATOC project. The Draft Environmental Impact Statement does not contain enough facts & conclusions to allow ATOC to continue.

The DEIS concludes that both impacts to Marine life & Scientific benefits are uncertain. How then does this justify the expenditure of 35 million dollars? This & the classified nature of the project indicate an ulterior motive...

Surely this project requires further study and scrutiny. The true intentions of ATOC must be revealed before it is allowed to proceed.

Sincerely,

Christel D. Swift

I-1

Dear Clayton Spikes: C-202

RECEIVED 2-6-95

Please reconsider the efficiency of this Marine Mammal Research Project. Spending 1.4 million dollars on projects to measure deep ocean temperature to allegedly study global warming, with loud underwater sounds is obviously a project that deserves to be reexamined. It is clear that such
1 broadcasts harass marine mammals, and we do not know the effects on the general ecology these noises may produce. There might be other methods besides these that may be used in your
2 research which may be more efficient and much less dangerous. Please write me back with information on what you are doing in response to such questions.

I-15

I-52

Sincerely, Julian Friedland

JULIAN FRIEDLAND
112 FREDERICK ST. #28
SAN FRANCISCO, CA 94117

C-203

RECEIVED 2-6-95

DEEP OCEAN EXPLORATION AND RESEARCH
12812 SKYLINE BLVD.
OAKLAND, CALIFORNIA 94619

January 30, 1995

31 January, 1995

Clayton H. Spikes
Advanced Research Projects Agency
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202
FAX 703-418-1042

Rolland A. Schmitten
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Silver Spring, Maryland

Reference:

The Draft Environmental Impact Statement (DEIS) for the California Acoustic Thermometry of Ocean Climate Project (ATOC) and the related Marine Mammal Research Program (MMRP).

From:

Sylvia A. Earle, former Chief Scientist of NOAA, marine scientist with field experience in marine mammal research and chairman of two informal workshops convened in 1994 to bring together ATOC researchers and those concerned about the environmental impact of the project.

Comments:

During the past year, I have listened to scientists and other interested individuals describe their concerns about the effects of the ATOC project on marine life generally and marine mammals in particular. The remarks that follow are derived in part from discussions during two day-long "workshops" concerning ATOC in 1994.

It seems obvious that the proposed research will, in fact, have some impact on the behavior of marine organisms, although it is not clear what the magnitude of that influence will be, nor is there agreement on the best methods for finding out. Because of the uncertainties, the toughest question to be resolved seems to be whether or not the risks involved can be justified in the search for answers to questions of critical importance to the future of mankind -- and of life in the sea.

I share with many others deep concerns about adding additional stresses to ocean ecosystems already modified by recent human activities ranging from overfishing to various kinds of pollution including high levels of "noise pollution" generated by ship traffic and other sources. I am also concerned about the appearance as well as the fact of conducting research that may not be wholly benign in an area specifically set aside for protection as marine sanctuaries.

However, I am convinced that the greatest threat to the health of the oceans and to the planet as a whole is lack of knowledge and the profound mistakes in judgment that result from ignorance. Therefore, I believe it is important to try to resolve the problems associated with ATOC, if possible, and find ways to fill the enormous gaps in understanding the nature of the ocean and the effects of human activity on marine life. Some of the uncertainties about the nature of planetary temperature may be resolved by the proposed ATOC research and new insight about the impact of noise on marine life is likely to be derived from the proposed MMRP. While many have questioned the protocols and the likelihood of success of the ATOC research and the MMRP, there is general agreement that the scientists involved are of the highest calibre in their respective disciplines. It seems likely that if anyone can extract meaningful results from the research proposed, they can.

Criticisms have been raised concerning time and funding requirements, as well as other aspects of the proposed studies, but some of the most serious questions relate to the location of the sound sources within protected areas. Much of the criticism would likely
1 be softened by focussing only the MMRP in areas where marine mammals are concentrated, i.e., even within the sanctuaries, but moving the source for the long-term ATOC Project outside, and to seek sites where there are known to be few marine mammals or other species notably sensitive to noise. I-4b

Whatever is decided, caution is clearly needed and there should be protocols in place for discontinuing activities that appear to be causing problems -- even without definitive proof of damage. Despite the genuine worry that new and significant sounds in the sea
2 will have undesirable, even lethal impacts on certain creatures, it may well be that more damaging than the effects of the ATOC Project and the MMRP is the ignorance that will continue if such research is not conducted. With or without these projects, the volume of noise in the sea is likely to increase significantly. It is vital that better understanding be gained of what this means to marine life, to the health of the ocean environment, and to the human future. TC

Sincerely,

Sylvia A. Earle

Sylvia A. Earle

TORRI JON ESTRADA

5392 Miles Avenue #4
Oakland, CA 94618

RECEIVED 2-9-95

January 31, 1995

VIA FAX AND U.S. MAIL

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Re: Comments on the Draft Environmental Impact Statement/Environmental Impact Report for the California Acoustic Thermometry of Ocean Climate Project

Dear Mr. Spikes:

I submit the following comments below on the Draft Environmental Impact Statement/Environmental Impact Report ("DEIS/R") for the California Acoustic Thermometry of Ocean Climate Project (ATOC) and its associated Marine Mammal Research Project (MMRP). The comments provided are on my own behalf and in no way represent the views of the Sierra Club Legal Defense Fund or any of the organizations of the coalition that the Sierra Club Legal Defense Fund represents.

Section 1 - Introduction, Purpose, and Need for Action

1. ATOC Permitting (p. 1-1)

1 Scripps hopes to obtain a scientific research permit (SRP) for the MMPA rather than an incidental take permit to harass or incidentally take a small number of marine mammals for its proposed ATOC project. Scripps feels that the ATOC project qualifies as Level B[1] harassment and thus does not require a TC

[1] Level B harassment is defined as having "the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavior patterns, including, but not limited to, migration, breathing, nursing, feeding, breeding, or sheltering." In comparison, Level A harassment is defined as

"take" permit. As discussed on page 1-1 of the DEIS/R, NMFS is fearful that future research on the impacts of low frequency sound on marine mammals may be discouraged by requiring incidental take permits.

Many commenters, including Drs. Hal Whitehead and Lindy Weilgart, have expressed concern over what permit(s) would be applicable to ATOC. Because of the effects of ATOC transmissions may in some instances qualify as Level A harassment. ATOC is not marine mammal research, but rather addresses global climate change and ocean temperature monitoring. In contrast to NMFS' concern of setting a burdensome precedent for marine mammal research, a precedent could be established that would allow for takes of marine animals for any research experiment as long as marine mammalogists are monitoring it. A review of the DEIS/R confirms that at best, the MMRP is a mitigation measure and not purely scientific research aimed at addressing impacts of low frequency sound on marine animals. Thus, ATOC with its currently designed MMRP does not qualify as "scientific research" on marine mammals and should not qualify for an SRP.

2

2. Purpose and Need of ATOC (p. 1-4) I-3a

What is the proposed purpose of ATOC? There are many different and sometimes conflicting purposes for ATOC. One of the stated purposes seems to emphasize the validation of global climate computer models, while the other stresses the application of experimental results for a long-term global program:

Page ES-1: "Measuring average ocean temperatures is necessary to validate global climate computer models"

Page 1-4: "ATOC is a basin-scale research effort to use acoustic signals in the sea's deep sound channel to provide precise measurements of temperature on an ocean basin scale"

Page 1-7: "To prove the feasibility of the acoustic thermometry technique for future global ocean climate monitoring programs"

Page 1-21: "Obtain early baseline data on transmission times in Pacific pathways to compare with data that may be obtained in a follow-on global program"

Page 1-22: "Determine the constraints they [oceanographic factors such as tidal, internal wave fields, and mesoscale variations] impose on the design of a future (conceptual) ocean monitoring system."

---

having "the potential to injure a marine mammal or marine mammal stock in the wild."

Page 1-22: "To resolve questions about gyre and basin ambient processes and long path propagation which could affect the design of a global network"

Throughout the DEIS/R there has been no discussion of future, global ocean monitoring networks. Scripps has led the public to believe that this project is a short-term, feasibility project with the aim to validate global climate change computer models. However, documents submitted by ATOC to NMFS and ARPA have repeatedly made reference to plans for long-term, global ocean monitoring networks.

If ATOC is in fact a two-year, feasibility project aimed at validating global climate computer models, then its analysis should be aimed at justifying the minimum sound transmissions required to reach its objectives. However, if ATOC is a long-term project with many components and has implications for long-term impacts, then long-term impacts to marine resources should be analyzed and weighed against the benefits of the project(s).

2

3. Purpose and Need for MMRP (p. 1-4) I-3a

What is the proposed purpose of the MMRP? Throughout the DEIS/R, Scripps has conflicting purposes for the MMRP. One purpose for the MMRP is to "evaluate the potential effects of the proposed source transmissions on marine mammals" while the other is to conduct valid, scientific research to "broaden the information base" on the effects of low frequency sound on marine mammals. The purpose should be stated clearly and concisely in this section as well as Appendix C. See "Appendix C" comments for more detailed comments on the MMRP.

3

4. Previous Ocean Climate Research (p. 1-11) I-3b

The DEIS/R summarily dismisses the use of XBT's because they "take many weeks to complete and are rarely repeated." The DEIS/R should provide a detailed analysis including feasibility and costs. Similarly, the DEIS/R asserts that the 24 degrees North temperature measurements are very costly and time consuming. The DEIS/R should at least give references to these "costs" and discuss them more comprehensively so that they can be compared to the "costs" of the proposed ATOC project.

Despite the acoustic successes of ATOC's predecessor, the Heard Island Feasibility Test, there were observed adverse impacts of the sound transmissions on marine animals (see Anne Bowles, "Relative Abundance and Behavior of Marine Mammals Exposed to Transmissions from the Heard Island Feasibility Test," in The Journal of the Acoustical Society of America, Volume 96, No. 4, October 1994). In addition, Walter Munk, in another article in the same issue (see pages 2330-2342) states that "it is important to emphasize that acoustic thermometry addresses the issue of measuring climatic change in the oceans; it does not tell us anything about the underlying causes and about the

effects on the atmosphere." To date, there have not been any references to or citations of previous work or research in scientific publications to support the scientific basis of ATOC. The proponents have not made any attempt to justify the scientific basis of relating basin-scale averaged deep ocean temperature to global warming. The DEIS/R should provide a detailed discussion of models, research, and other evidence to support the conclusion that data from an initial two years of transmissions can realistically meet the goals of ATOC.

5. Subsea Listening System (p. 1-17)

According to Dr. Hal Whitehead, listening arrays used to detect, locate, and track vocalizing whales and dolphins (like
4 the horizontal and vertical line arrays proposed by ATOC) do not TC
provide reliable acoustic location coverage to 40 km from the array as is suggested by the DEIS/R. The work cited for this assertion (Frankel, unpub., 1993) actually discusses a range of only 15 km.

6. Programmatic EIS/R and Long-Term ATOC Program (p. 1-20)

Scripps rejects the need for the preparation of a programmatic EIS/R on the complete, long-term global monitoring system by stating that the ATOC project is experimental, subject to uncertainties about its ability to detect ocean climate
5 changes, and a long-term program is too speculative for review I-2
without analysis of the results of an experimental phase (i.e. the proposed program). Despite the DEIS/R statement that any plans for a long-term program are "speculative," much literature included in the DEIS/R (see comment #2 and attached portion of SCLDF's May 14, 1994 Comments on SRP 557 and 557A) has alluded to plans for a long-term, global monitoring system if there are no problems with stability, internal waves, acoustic propagation limits, or ocean boundary scattering.

NEPA regulations (see 40 CFR 1500.4 (i), 1502.4 (a) & (c) (2), and 1508.28 (b)) require a programmatic EIS and tiering to eliminate repetitive discussions of the same issues and to focus on the actual issue(s) ripe for decision. Despite the alleged differences between the Kauai and Pt. Sur sites (i.e. research programs and environmental setting), they and all of the currently proposed ATOC programs (including Kauai, GAMOT, various Navy SOSUS arrays and receivers, playback studies, array installations, etc) which have relevant similarities (i.e. common timing, alternatives, impacts, methods of implementation, media, or subject matter) should be reviewed within one, programmatic EIS. This approach would facilitate the discussion of the relevant issue at hand: Is ATOC as proposed necessary for global climate change monitoring efforts? Do the environmental impacts outweigh the possible benefits of the project?

7. Issues to Be Resolved by ATOC (p. 1-20)

6 While ATOC's need to resolve important acoustical issues is TC
understandable, it is important to place the unresolved issues with respect to marine animals at the forefront. Resolution of the uncertainties concerning the impacts of low frequency sound on marine animals, including those to mammals and fish, should be accomplished before ATOC transmissions are deemed "safe" or "less than significant." The DEIS/R in Section 4 infers the significance and likelihood of impacts from incomplete information.

NEPA regulations (see 40 CFR 1502.22 (a)) require that "information relevant to reasonably foreseeable significant adverse impacts" and "essential to a reasoned choice among alternatives where the overall costs are not exorbitant" shall be included in the EIS. A well designed MMRP could provide needed information on the impacts of low frequency sound like the ATOC source for a rather inexorbitant amount of money. Reasonably foreseeable impacts include those which may have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence. There is much scientific evidence to show the probability of reasonably foreseeable adverse impacts being realized by the project. However, the DEIS/R are silent with respect to this issue.

Section 2 - Alternatives Including the Proposed Action

8. Alternatives Considered and Rationale (p. 2-1)

7 TC
The last paragraph of section 2.2 suggests that Scripps will See not evaluate, at least qualitatively, other oceanic temperature 2.2.8
measuring techniques in comparison to ATOC. Why are other 2.2.10
alternatives not fully discussed and evaluated? Are they not viable alternatives that meet the objectives of the program? If they do not meet the objectives of the program, the DEIS/R should explain why.

9. Sound Fields (p. 2-6)

8 TC
After explaining that calculations of the sound field estimations used in the original SRP application were based upon spherical and cylindrical spreading models (Fig. 2.2.1.2-5) and that revised sound field estimates were based upon FEPE acoustic performance prediction model values (Fig. 2.2..1.2-5), the reader is asked to compare these figures to reveal that earlier sound field estimates were overestimated. These two figures cannot be so simply compared because they are in different units.

10. Alternate Project Site (p. 2-14)

9 TC
The second factor cited for project site evaluation compares the Atlantic and Pacific Oceans. The Atlantic is disqualified

because the mid-Atlantic ridge would "complicate" ATOC feasibility investigations and "limit" the ranges over which the ATOC concept could be tested. The DEIS/R should explain how the Mid-Atlantic ridge "complicates" investigations and "limits" the ranges of ATOC. Simply stating that it is so does not provide the reader with an analysis.

The fourth factor cited for project site evaluation is the need for at least two sources to "provide a greater number of acoustic pathways." This statement is very unclear. How many acoustic pathways are needed? How many sources would produce the desired number of acoustic pathways? Is there a need for more than two sources? How does the number of existing subsea listening arrays (the first factor discussed) contribute to the number of acoustic pathways, and, in turn, determine the number of sources needed? The DEIS/R must more clearly state the reasoning behind this fourth factor and discuss how each alternative meets it with respect to the availability of acoustic pathways.

11. Site Survey (p. 2-17)

10 TC

This section mentions the need for a sound source site with an unobstructed 360 degree view. Seamounts are generally ruled out because their rounds peaks do not provide for a 360 degree view. However, from a review of the description of the sound source, it seems that the two sources do not have a view greater than 180 degrees. Please reconcile this contradiction in your siting criteria and reasoning. Also, a "full range" of potential eastern Pacific source locations were evaluated against the stated criteria. The DEIS/R does not provide the analysis and evaluation of these sites and how the remaining six sites compare to them. Please provide more specificity with regard to the other sites.

12. Moored Autonomous Source (p. 2-38)

11 I-5a

The moored autonomous source, as recognized in the DEIS/R, provides some very clear advantages over a stationary source. Most notably, it could be placed in areas of low marine animal activity and reduce the possibility of adverse effects on marine life. If technological and engineering changes are made to moored autonomous sources that make them technically feasible, are there additional sites that could be evaluated? Are there many more sites amenable to the moored autonomous source and not to a stationary source which would provide for more acoustic pathways and which would take advantage of available subsea listening arrays? Could the deployment of moored autonomous sources reduce the need to propagate sound over large distances? Because of their siting flexibility, could not more autonomous sources be placed in such a manner as to resolve issues of local and regional oceanic variability? If so, these issues should be explored in the DEIS/R.

13. Restricted Source Transmission Times (p. 2-41)

The DEIS/R states that "there is no scientific basis for restricting sound transmissions times by season." However, in the preceding paragraph, scientific evidence shows that we generally know when species vulnerable to ATOC sound transmissions are present; further, it is quite possible to monitor for their presence and to restrict transmissions accordingly.

14. Frequency (p. 2-43)

This section explains the benefits of using a frequency of 75 Hz; namely, it is near the center of the spectrum of deep ocean ambient shipping noise and would not significantly overlap with the frequencies used by whales. However, it is unknown how significant to the whales such overlap in frequencies may be. It is quite possible that the overlapped frequencies in sounds may be the most important to some species. Although use of lower or higher frequencies may result in increased impacts, a much lower frequency (such as less than 5 Hz) is much less likely to impact whales (see Comments of Dr. Lindy Weilgart).

13 TC

15. Alternatives 7-11 (pp. 2-46 thru 2-51)

It would be beneficial for the DEIS/R to discuss how these alternatives, without the possible contributions of ATOC, could help validate global climate change models. Could other techniques of measuring ocean temperature achieve the same results as ATOC -- to validate the computer model and increase our understanding of climate change? Alternative technologies for measuring ocean temperature are summarily dismissed without adequate discussion and evaluation.

11 TC I-5a

16. General Discussion of Alternatives Analysis

The discussion and analysis of alternatives is simply biased. As noted in the comments provided above, many potentially feasible alternative sites and ocean temperature measurement techniques are either not discussed and analyzed or are simply incorporated as part of the ATOC program (see comments #8, #11-#13, and #15). As discussed below, the foundation for the analysis of alternative sites is fundamentally flawed, leads to the conclusion that ATOC siting criteria should be delinked from those required for marine mammal research.

12 I-5a

When one reviews Table 2.4-1, it is quite clear that if MMRP criteria are set aside, all of the proposed alternatives become quite comparable in terms of ATOC criteria. The assumption that the DEIS/R uses to frame its analysis of alternatives, namely that a site is needed for both the MMRP and ATOC components of the program, is inherently flawed. If the DEIS/R were to use an alternative foundation for its analysis -- that portions or the entire MMRP program could be sited in a different area than the

13 I-4b

ATOC program -- many more potential sites for ATOC are possible, potentially with extremely reduced environmental consequences. Additionally, other alternative techniques which may have environmental benefits (i.e. moored autonomous sources) become more feasible because the ATOC siting criteria are not restricted by MMRP criteria. The germane analysis would be to find a site that best meets ATOC siting criteria with the least environmental impact.

The MMRP objectives of detecting and evaluating effects of ATOC sound source transmissions on marine life and identification of mitigation measures to avoid potential disruption of behavior would not be needed if ATOC were sited in a area with extremely low densities of marine life. However, the objective of researching the potential effects of low frequency sound (similar to ATOC sources) on marine animals could still be pursued, even in a biologically rich area. The use of non-ATOC sources, such as mobile sources and hydrophones, would significantly increase the statistical power of any marine mammal research and optimize MMRP siting criteria, yet would not be restricted to using the frequency range and sound levels of the ATOC source and its associated risk of increased environmental impacts. This type of research using mobile sources was by the ATOC Advisory Board throughout its meetings in 1994.

14 I-6e

Section 3 - Affected Environment

17. Table 3.3.1-1 (p. 3-17)

Are the population estimates in the table corrected for diving animals missed during surveys? Numbers of sperm and beaked whales will be seriously underestimated if these numbers have not been corrected (see Comments of Dr. Hal Whitehead). Also, notes 8-12 are missing from the table.

15 TC I-8b

18. Marine Mammals (p. 3-20)

Recent scientific evidence suggests that sperm whales do not make seasonal migrations. Dr. Whitehead states that if sperm whales are in the ATOC project area, they are using it for feeding. (see Comments of Dr. Hal Whitehead).

16 TC

19. Beaked Whales (p. 3-28)

There is very little information pertaining to the number and distribution of beaked whales near the project area. This may be due to a number of factors, including scarcity of information and difficulty in locating them. Scott Benson, a member of the Heard Island marine mammal team, suggested in his March 4th, 1994 comments that the MMRP should consider monitoring deep diving beaked whales, possibly Baird's beaked whale. Dr. Benson believes that once located, Baird's would be easy to track. The southern bottlenose whale, a cousin of Baird's beaked whale, may have been adversely affected by sound transmissions at

Heard Island since the frequency of sightings of this animal after the transmissions began decreased. Thus, beaked whales are likely to be a good indicator of adverse effects from the ATOC sound transmissions.

20. Threatened and Endangered Fish (p. 3-59)

There has been a precipitous decline from historic levels in Pacific salmonids, as documented by a report published by the American Fisheries Society in 1991 (W. Nehlsen, et al. Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington. Fisheries 16(2):4-21). As a result, the coho (silver) salmon and steelhead (rainbow trout) were petitioned for listing as endangered species in October, 1993 and February, 1994, respectively. Both petitions were found to have considerable merit and it is likely that these fish will be listed as threatened or endangered within the next month or two in significant portions of their range, including the Central Coast of California. The DEIS/R should note this status and provide background information concerning these salmonids.

17 TC

Section 4 - Environmental Consequences

21. Table 4.1-1 (pp. 4-2 thru 4-8)

18 I-6k

The presumption that impacts to mysticetes, odontocetes, pinnipeds, sea turtles, fisheries, and invertebrates will be either "less than significant" or "not significant" because of the lack of information, the patchy distribution of the species, and the unlikeliness of significant exposure is simply unfounded. CEQA regulations, as stated on page 4-1, require that evaluation of impacts be based on scientific and factual data. Available scientific data and factual information indicate that there very well may be adverse impacts from an ATOC related sound source; less than significant impacts should not be presumed in the DEIS/R until they are proven to be correct (i.e. the goal of the MMRP).

Information from the Heard Island Feasibility Test (see Bowles 1994) would suggest that impacts from an ATOC sound source will have adverse impacts on many species; yet, the DEIS/R downplays the significance of these impacts. And, the conclusion that a 5-minute sound ramp-up procedure and limited duty cycle would mitigate potential impacts is unfounded and yet to be proven. Lastly, to state that there is no information on the impacts of noise on salmonids is incredible. There are numerous studies and experiments being conducted in the United States to ascertain the response of salmonids to low frequency sound and their ability to hear at these low frequencies. For example, low frequency sound is currently being used in the Bay-Delta to direct winter-run chinook salmon and steelhead (both species of considerable concern) away from pumping facilities and agricultural diversions. The statement on p. 4-96 directly contradicts the conclusions drawn about the impacts to fish

19 TC

species in Table 4.1-1: "although the number of fish affected at any one time [by the ATOC source] may be small, over a long period of time, the proportion of fish in a population exposed [perhaps multiple exposures to the same fish] to the source could be relatively large."

22. Noise (p. 4-11)

The conclusion that increases in the average ambient noise level in the immediate vicinity of the ATOC source will be less than "significant" is rather meaningless because there is no definition of what a significant increase may be. If ambient noise levels in the oceans are currently having adverse impacts on marine animals, it is possible that slight increases above this level (5 dB or greater) may be not significant.

20 TC

23. Permanent Threshold Shift (p. 4-13)

The DEIS/R expects that based on available data, no PTS's are expected to occur. The project proponent should provide monitoring to assure that PTS's are actually not occurring.

21 TC App.C

24. Behavioral Disruption and Habituation (p. 4-13)

It is misleading to state that behavioral changes from sounds can only be detected through sophisticated statistical analysis. In reality, many subtle and less subtle changes in behavior due to ATOC sounds will not be detected at all despite the use of sophisticated statistical analyses. Further, to state that behavioral changes generally are detected at sound intensities higher than the levels at which the sounds would be barely detected is a gross simplification.

22 TC

For many of the potentially affected species, as the DEIS/R admits, we do not know what levels are barely detectable and it is likely that only the most gross behavioral changes will actually be detected. Lastly, the DEIS/R correctly states that habituation to sound by marine animals does not mean they are not affected by the sound; it is quite possible that marine animals may be forced to stay in an ensonified area and could become hearing impaired as a result. Thus, it is difficult to tell whether becoming "less sensitive" to sound is beneficial or detrimental.

23 I-112

25. Scientific Uncertainty (p. 4-15)

The DEIS/R correctly states that NEPA regulations require that if there is incomplete or unavailable information regarding reasonably foreseeable significant adverse impacts and that information is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, information is to be obtained and included in the EIS/R for consideration. The DEIS/R does not provide any discussion of what information gathering may be prudent before finalizing the

24 TC Sec 4.3

EIS/R or if any of the information would be too costly to obtain.

The presumption is that there are some uncertainties which the MMRP will resolve. However, the lack of important information with respect to the impacts of low frequency, not necessarily ATOC sound levels, seems to necessitate some information gathering before impacts can be accurately assessed in the DEIS/R.

Inherent contradictions are numerous within this section of the DEIS/R and underscore the fact that the paucity of information concerning the effects of low frequency sound cannot reasonably be used to determine that those effects are likely to be non-existent or less than significant. Some examples of inherent contradictions are illustrative:

- Page 4-15: "As stressed in this EIS/EIR, available information on subsea noise and its biological impact ranges from incomplete to nonexistent, depending on the species being considered." However, the proponents are quick to conclude in the next paragraph that "the ATOC project and the MMRP are not anticipated, in most cases, to result in adverse effects on biological resources."

- Page 4-26: "In summary, variations in sensitivity to human-made noise between and within marine mammal species and lack of information about the consequences of short-term disruptions on marine mammals, make it difficult to define the criteria of their responsiveness and to assess the consequences of the disruption in their natural activities." Yet, at the end of the section, the proponents conclude that "this potential impact is believed to be less than significant."

25 I-6k

- Page 4-41, Table 4.3.1.1.3-1: This table illustrates the level of understanding of the effects of ATOC sounds on mysticetes ("uncertain") and how unfounded conclusions of "no acute responses [are] expected" really are.

26 TC

The DEIS/R in this section presumes that sound levels of 150 dB or greater will produce at most a temporary threshold shift. However, ATOC's Scientific Advisory Board (as well as NRC's report "Low-Frequency Sound and Marine Mammals") notes that ATOC's assumption that hearing damage will not occur if received levels at equal or below 150 dB may or may not be true. Therefore, evaluation of impacts based on the 150 dB threshold assumption may range from overestimation of impact to severe underestimation of impact. It would be more prudent to test target species at lower levels of sound rather than potentially place a large number of species at risk of hearing damage using sound levels equal to or exceeding 150 dB. Specifically, the NRC report calls for the testing of the 120 dB threshold.

27 I-7h

Further, the statement that many small animals, including invertebrates, provide no measurable indication of hearing

perception or acoustic impact is erroneous. Other measures, including reproductive output, have been used in the past to measure such impacts (as described, for example, on page 4-102 of the DEIS/R for shrimp, a small invertebrate). 28 TC

26. Potential Direct and Indirect Effects on Mysticetes (p. 4-17)

The statement that mysticetes' maximum residence time within the general area of the project site is less than 24 hours is erroneous. Dr. Hal Whitehead provides examples of mysticetes spending periods of weeks or more in a small area if there is food available. Dr. Whitehead states that one cannot estimate residence times based on densities. (see Comments of Dr. Hal Whitehead). This information on residence times also has relevance to the likelihood of mysticetes staying within the 120 dB sound field of the ATOC source (if food or shelter is available, individual whales may opt to stay in the region, thereby being impacted by sound transmissions). 29 TC

27. Potential for Auditory Effects (p. 4-19)

This section uses a number of unsubstantiated assumptions with regard to hearing abilities of marine mammals which do not correctly characterize the likelihood of adverse effects of the ATOC sound source. Most importantly, the DEIS/R relies upon estimates of Dr. Ketten that a sound must be 80 dB over the hearing threshold of an animal, at a given frequency, to produce a temporary threshold shift. Simply, there is no data on marine mammals to support this assumption. In fact, page 30 of Appendix C contradicts the 80 dB figure: "We have some evidence that broadband noise at levels approximating 25-40 dB above threshold are sufficient to induce TTS in air." Again, the DEIS/R assumes that the sound must be louder than 150 dB to cause TTS; this number is based on a hearing threshold of 70 dB (i.e. 150-80= 70 dB). As stated above, the ATOC Scientific Advisory Board stated that this may or may not be true. 27 I-9b

Underwater audiograms for odontocetes presented in Figure 4.3.1.2.1-1 and others for marine mammal species (see Comments of Dr. Lindy Weilgart) indicate that threshold levels are as low as 30-40 dB at peak sensitivity. Dr. Weilgart states that the average threshold for marine mammals is around the 40-50 dB range. If some species have thresholds down to 30-40 dB and assuming that the 80 dB figure is correct to calculate levels for TTS, TTS could be occurring at only 120 dB. If the 80 dB figure is too high to calculate levels of TTS (25-40 dB may be a more conservative figure for the purposes of this research), TTS or hearing damage could be occurring at levels less than 120 dB. Therefore, the calculation for the zone in which animals could suffer hearing loss could be seriously underestimated. For example, instead of a radius of 178 m around the source, animals as far away as 40 km or more could be suffering hearing damage. Obviously, this would change the DEIS/R's conclusions of minimal 30 I-9a

impact on various species.

28. Potential Behavior Disruption (p. 4-27)

In citing Richardson, et al. (1991), the DEIS/R admits that there may be long-term impacts due to "ongoing stress while in that area [sound source]." Yet, such effects as psychological and physiological stress are not addressed, monitored, or factored into conclusions concerning impacts. And, as stated on page 4-30, "physiological reactions, such as elevated heart rate, may occur even in the absence of overt behavioral responses." The project neither attempts to monitor for such impacts nor incorporates this information into its evaluation of impacts; they are simply classified as "unknown." 31 I-12b

29. Potential for Habituation (p. 4-28)

The DEIS/R rates the impacts associated with habituation as "non-existent." The evidence provided in the section along with other scientific information dos not support this conclusion. Specifically, the NRC report on page 66-67 states that "Hearing loss induced by exposure to intense sound is painless, so the creation of an exposure-induced loss does not produce a concomitant motivation to avoid that high-level sound in the future in the exposed animal. Thus, were there behavioral habituation to intense sounds, animals might, to their detriment, re-enter regions having dangerously high sound levels, thereby risking additional hearing loss." The NRC report and other studies suggest that this situation is not uncommon and could likely adversely impact marine animals. 32 TC

30. Potential for Masking (p. 4-31)

Despite the uncertainty of the effects of masking on marine mammals (i.e. they may be significant for some species), the DEIS/R presumes that all of the potential effects from masking will be less than significant. Again, scientific information (Payne and Webb, 1971) indicates there may very likely be adverse impacts from masking associated with ATOC sound transmissions. To presume that impacts are less than significant because of the lack of conclusive data is not logical, reasonable, or remotely protective of marine mammals likely to be affected by masking. 33 I-13 b,c

31. Potential for Indirect Effects (p. 4-32)

Although it is stated the impacts of intense sounds (i.e. 165 dB) on primary food species of marine mammals is unknown, the two studies cited, Banner and Hayt (1973) and Lagardere (1982), found detrimental effects to the food chain at levels of only 105-120 dB and 100-130 dB, respectively.

32. Potential Direct and Indirect Effects on Odontocetes (p. 4-43)

34 As noted earlier, individual odontocetes will often spend periods of weeks or more in a small area if there is food available. (see Comments of Dr. Hal Whitehead). TC

33. Potential for Auditory Effects (p. 4-50)

The calculation of the statistical probability of a sperm whale being exposed to the 150 dB sound field during the two-year period is erroneous. Correcting for animals at depth during surveys, the actual density of sperm whales in the study area is TC
35 4/1000 sq. km. Thus, the estimate of the mean number of sperm I-9c whales venturing into the project area during source transmissions would be 1.3, not less than 0.01 as stated in the DEIS/R. (see Comments of Dr. Hal Whitehead for actual calculations).

The Bowles et al. (1994) study of the effects of Heard Island sound transmissions on marine mammals indicates that there was a measurable impact on sperm and pilot whales. Further, hourglass dolphins could have been impacted as well if on
36 einterprets their frequent surfacing as responses to avoid higher TC sound levels at depth. As noted on page 4-74, sea turtles are known to have the same response. The DEIS/R's conclusion that impacts of ATOC sound transmissions would be minimal in light of this information is unfounded. It has not been proven that the proposed duty cycle and power level will mitigate these impacts.

34. Summary and Conclusions (p. 4-56)

37 The third paragraph confusingly discusses Kauai and Hawaiian waters with respect to sperm whales. This mistake should be TC corrected and the conclusions re-evaluated if the information relevant to Pt. Sur is different for sperm whales and other odontocetes.

The conclusion that a moored autonomous source could result in increased close encounters by sperm whales due to their diving
38 behavior is misleading. Moored autonomous sources could be I-5d placed in regions with almost no sperm and beaked whales, thereby significantly reducing encounters with sperm and beaked whales.

35. Potential for Physical Auditory Effects (p. 4-63)

Again, the conclusion that for a TTS to occur in an animal it must be able to hear signals below 90 Hz (maximum frequency of the ATOC coded sound signal) and have hearing sensitivity below
30 70 dB assumes that TTS would occur only if received levels are I-9b greater than 80 dB above the absolute threshold for a particular animal. Schusterman (1994) observed a TTS in air at 100 Hz from a noise of average sound level of 85-90 dB (air standard). If one uses the air/water sound level conversion factor in the NRC's

report (26 dB), this converts to only 111-116 dB in water. Thus, the 150 dB figure repeatedly used in the DEIS/R may be too high, thereby underestimating the impact to marine animals.

36. Potential for Physical Auditory Effects (p. 4-74)

39 Although the average dive depth of leatherbacks is only 61.6 TC meters, this does not mean that its maximum dive depths (1300 meters) are not performed and are not essential.

37. Potential for Indirect Effects (p. 4-77)

There is evidence to support the conclusion that there are
40 negative effects of sound on coastal algae, seagrasses, and other TC sea plants (see Woodlief, C.B. et al. 1969. Effect of Random Noise on Plant Growth. J. Acoust. Soc. Amer. 46(2) 481-482). The DEIS/R should cite any information supporting its conclusion.

38. Fish (p. 4-81)

41 TC

Fish are also important prey for mysticetes.

39. Hearing Capabilities and Sound Production in Fish (p. 4-89)

Despite the lack of documentation of the adverse effects of existing shipping traffic noise in the project area on fish species, many other studies indicate that there are responses
42 from fish species at levels as low as 160 dB (see page 4-91). TC Banner and Hyatt (1973) actually documented ambient noise levels and the levels at which fish eggs and larvae were exposed to were only 105-120 dB. Does Hasting's safe zone apply to fry and larval fish as well? Is so, there may be more than just a "few" fish in the potential hazard zone.

40. Potential for Physical Auditory or Behavioral Effects (p. 4-102)

In the second to the last paragraph, an upper estimate for ambient noise level is used to determine the extent of impact to shrimp production. If one uses the lower estimate (75 db versus
43 90 dB), a level of 105 dB could potentially affect shrimp TC production. This would enlarge the area affected considerably. And, a five minute ramp-up period would likely provide little help for invertebrates that move slowly and may be unable to avoid sound transmission impacts.

Section 5 - Consistency with Requirements, Plans and Policies

41. Steller Sea Lion Final Recovery Plan

44 The benefits that the MMRP will provide for Steller sea I-14c lions is limited to providing information on seasonal presence/absence and relative sighting densities in the project

area. This data will support, but not significantly further, Objective 1 (seasonal use patterns), Objective 3 (non-rookery focused surveys), and Objective 5 (dead animal and stranding information). Although Steller sea lion recovery objectives do, in general, call for more information, the MMRP does not contribute the information desired in the Recovery Plan. For example, the MMRP will contribute limited spatial and temporal information regarding seasonal use patterns in the project vicinity -- one of seven outlined points under Objective 1. The MMRP will not provide any of the desired information outlined under Objective 2, 4, and 6. Although the MMRP will provide surveys of animals encountered within the project area, Objective 3 states that site-specific information on rookeries (Pt. Sur is not a rookery) is needed. The MMRP will contribute information related to mortality and strandings confined to the project area (Objective 5).

The DEIS/R states that neither ATOC transmissions nor the MMRP will have any direct effect on the Steller sea lion; this determination is based solely on the diving depths of sea lions and the significant distance of the ATOC sound source from the Ano Nuevo rookery. However, as admitted, the MMRP does not employ the Steller sea lion as an target species; thus, it will not observe behavioral changes in these animals. Census and survey data indicates that Steller sea lions are present in the area, possibly for feeding and other activities. There are no guarantees that ATOC sound transmissions and MMRP observation activities will not impact the Steller sea lion. And, as stated in the Recovery Plan, the Ano Nuevo rookery is the largest breeding area and useable habitat for the Steller sea lion in California (although it was declined significantly over the last few years). This rookery may be of the utmost importance for the recovery of this dramatically declining species. In light of the fact that the population seems to be shifting northward, that the Farallon Island rookery is expected to cease as a viable breeding area, and that there are no other populations close to Ano Nuevo, any activities that could disturb breeding, feeding, and other biologically important functions of the Steller sea lion should not be viewed lightly. In conclusion, the MMRP will provide some seasonal use and mortality stranding information; but, it will not address many of the issues needing resolution for the animal's recovery and does not specifically monitor or research the sea lion for potential, yet unexpected, impacts on vital foraging areas, haul-outs, and associated activities.

42. Northern Right Whale Final Recovery Plan

44

Very little is known about the Northern Pacific population of this species. Therefore, recovery efforts are fairly limited and lack adequate information. The MMRP will be able to provide spatial and temporally limited data on presence/absence of these whales. However, the utility of such survey information is limited in terms of significantly contributing to needed information concerning population size, essential habitats, and

I-14c

potential conflicts with vessels. Since the MMRP will not be targeting this species for research and behavioral observation, ATOC sound transmissions and research activities could be precluding the use of essential habitat, such as the Sanctuary, and altering the normal behavior of these animals for foraging and other biologically important activities.

44

43. Grey Whale Research and Monitoring Plan

I-14c

The MMRP will provide limited spatial and temporal information concerning presence/absence and mortality/stranding of grey whales in the project area. However, as detailed in comment #44B below, the DEIS/R downplays the potential impacts of ATOC sound transmissions on this whale species. Figure 2.2.1.2-1 (the FEPE acoustic performance prediction model) indicates that ATOC sound transmissions could produce received sound levels in known areas of shoreline migration routes of the grey whale that could approach 120 dB. Research indicates that grey whales exhibit avoidance behavior to continuous sound of 120 dB or higher. Further, noise that overlaps with calling frequencies also influence other behavior, causing, for example, interference with socialization, reproduction, and communication.

When written, the Plan did not expect any new significant noise sources within its migration and critical habitat, nor any anthropogenic sound that would produce long-term and recurring impacts on local habitats. The ATOC sound transmissions are an unexpected, long-term, recurring noise impact on a known habitat and migration route for grey whales. Yet, grey whales are not a target species nor the subject of monitoring in the MMRP. It is interesting to note that oil and gas exploration operations along the California coast are required to obtain small take permits from NOAA due to the likelihood of noise impacts on critical habitat for the grey whale.

Marine Mammal Research Project, Appendix C

The MMRP as presented in the DEIS does not fulfill its stated objective to "assess potential effects of ATOC signals on the distribution, ecology and behavior of marine animals" and fails to address key issues with respect to impacts on marine mammals for the following reasons:

44. Target Species

45

A. Although most likely to be adversely affected by ATOC sound transmissions, the sperm whale is not a target species in the MMRP. Various commenters, including esteemed marine mammalogists, consider the sperm whale to be a very sensitive species that has a high likelihood of both being in the vicinity of the project area and capable of receiving ATOC sound levels possibly above its hearing threshold. At the very least, sperm whales should be carefully monitored so as to insure that they are not adversely affected by sound transmissions.

TC

B. Grey whales are similarly absent as a target species in the MMRP. Many commenters, including Drs. Lindy Weilgart and Peter Tyack, have expressed their concern that FEPE
46 calculations of the zone of influence indicate that received TC
levels near 120 dB may occur within the shoreline migrations routes of these species. Again, since there are many grey whales that travel near the project area, there should be at the very least monitoring of these species to assure that received sound levels are not adversely impacting the species.

C. The MMRP will record the depth and back scatter signal strength of the acoustic scattering field to collect "information" on fish and krill during and after ATOC transmissions in the Pilot Study period. Although the "information" collected is not defined in the protocol, one can
47 assume that the information is largely related to their relative I-12a
abundance and residence in a limited spacial and temporal scale. There is no mention of collecting baseline information on distribution, abundance, or behavior to use as control data. In addition, there is no proposed research to test the ways in which fish, krill, squids, and other important members of the food chain respond to human-induced sounds like ATOC or if chronic and acute effects are being experienced by them. CEQA Mitigation Measure 10-1 would monitor fish stocks for increased predation; is predation the only likely product of adverse effects of low frequency sound on fish and other prey species? Research and long-term monitoring need to be expanded to assure that the fish and other species in the food chain are not being adversely affected and to validate the assumption that impacts from the ATOC sound source will be less than significant, especially in light of the fact the this determination of impact is not precise and limited by the proponents "general lack of available measured data of the effects of low frequency sound."

D. The MMRP is ambitious in that it proposes to observe apparent populations of marine animals in the project area before, during, and after ATOC transmissions. These efforts
48 are limited to the predetermined confines of the project area. I6a, 8b
How will researchers detect, observe, and monitor distant marine animals avoiding the project and sound source area? What about those that are not at the surface, but at depth? And, those that cannot be acoustically tracked because they are not vocalizing?

45. Significance

A. Throughout the DEIS/R and Appendix C, the word "significant" is widely used. Who determines how "significant"
49 will be defined and implemented in the research and ATOC sound I-6k
propagation protocols? How does the MMRP define significant? For cetaceans, the chances of detecting any of the unacceptable effects (i.e. significant?) listed on page C-7 are highly unlikely:

- Section 3 of the DEIS/R and preliminary

results of data collected during the preliminary baseline period
50 by the MMRP (see C-63 to C-65) indicate there are no high-use I-10d
areas near the source and observed densities are relatively low. How could avoidance and abandonment be observed under such conditions?

- According to Dr. Hal Whitehead, dead animals are rarely observed at sea and strandings are rare. Even if there were some measurable occurrence of dead animals or
51 strandings, it would be extremely difficult in the time period TC
proposed to show a statistically significant change in these rates. Important changes in population parameters can easily occur without any detectable change in observations of dead animals or strandings.

- From a review of the DEIS/R, there do not
52 seem to be any measures designed as part of the MMRP to measure I-12b
for emaciation, stress or disease in cetaceans.

- Except for grey whales, there are no estimates of calving rates. Additionally, population estimates
53 provided in Table 3.3.1-1 have coefficient variations in the I-6a
range of 0.5. Thus, there is almost no possibility of detecting even an almost complete and sudden extinction of a species.

B. Following from comment #5, the goal of the MMRP "to identify the significance of any behavioral responses to ATOC" is absolutely impossible to do with any validity, especially with respect to cetaceans. To assess the importance or significance of observed changes would require knowledge enabling marine mammal researchers to distinguish between those changes that are detrimental to marine mammal populations and those that are more sustainable. Currently, marine mammal researchers do not enjoy such a privileged knowledge base.

46. MMRP Objectives

A. The DEIS/R admits that the hearing abilities and threshold levels of many marine animals, particularly cetaceans, have not been directly measured. Therefore, the evaluation and conclusion that impacts from ATOC sound transmissions are expected to be either less than significant or uncertain are
54 largely based upon inferences from incomplete or no information TC
on specific marine species. One of the main goals of the MMRP should be to provide clarification of these "uncertainties" and validate the inferences and assumptions which form the basis for the determination that impacts will be less than significant. This type of research would be extremely useful in deciding whether ATOC sound transmissions should go forward as scheduled, and if so, at what frequency and sound levels. However, as currently designed, the MMRP does not adequately accomplish this task for the majority of the potentially affected marine species.

47. MMRP Duration and Decisionmaking Protocol

A. A Pilot Study of six months is insufficient to detect both short-term behavioral changes and long-term "unacceptable" effects. At the most, the MMRP will only be able to detect and preliminarily assess stop conditions. Further, census data will be collected for a short-period before the Pilot Study experiment. Is this a long enough period to correct for natural seasonal variation? If not, it is not possible to detect
55 long-term avoidance of project area habitat (see March 20, 1994 comments by Peter Tyack and March 25, 1994 comments of Roger Payne). Additionally, Scott Benson (a member of the Heard Island Feasibility Test marine mammal research team), in his March 4, 1994 comments on the California Scientific Research Permit, stated that the ability of the Heard Island marine mammal team to draw conclusions about the effects of ATOC sounds on marine life were severely hampered by a lack of adequate baseline data gathered prior to the initiation of sound transmissions. The time frame with in which the MMRP is designed to work is very limited and likely will mean that insufficient data will be collected and the conclusions drawn from the data will be spurious. I-6b

B. It takes most researchers several months of lab analysis for each month of census collection. However, the MMRP researchers will have one month or less to organize, tabulate, evaluate, and review their data. The Advisory Board itself suggests that site-specific, in-the-field, semi-empirical modelling capacity and "quick-look" analysis will be needed to
56 complete and report on some of the main analysis within the one month timespan; to date, the ability to integrate these measures into a research interface has not been realized. Even if these capabilities were realized, the Advisory Board "considers it unrealistic to expect the MMRP to complete analysis of all types of behavioral reactions, and to prepare a comprehensive report for external review, within 1 month after the end of data collection." Yet, the Advisory Board realizes that this decisionmaking point "will be one of the most significant and potentially controversial decision to be made during the entire project (emphasis added)." (see ATOC MMRPAB Meeting 3, June 13, 1994 Summary at pages 6-7). I-6c

The environmental and conservation community, and likely many members of the public, agree with the Advisory Board that the timetable proposed and a mere two-day workshop "to present and discuss the findings with colleagues, interested parties, and media" are not adequate. This inadequacy is especially gross in light of the fact that the DEIS/R does not specify how the results and findings of the MMRP Pilot Study will be reviewed, evaluated, and used to decide if ATOC sound transmissions should commence. ATOC sound transmissions should not be allowed to commence before the Final Report of the MMRP is reviewed by a technically qualified group independent of the project, and the group's findings are released for public review.

C. The DEIS/R states that "climate-related transmissions will only begin if the system is determined to be safe for marine mammals and other sea life" and that "the protocols for suspending operations are described more fully in Appendix C." The protocol in Appendix C fails to clearly describe how a violation of "safety"[2] thresholds will change
57 project operations and research protocols, or who has the ultimate authority to make these decisions. An informal consultation with NMFS and the MMC does not constitute an adequate protocol for suspending operations. Criteria proposed in any suspension protocol to determine "biological significance" must be approved by NMFS (in consultation with scientists and the public) and must be directly linked to specific actions regarding further operations. As a safeguard, a long-term monitoring program must be implemented to assure that many of the adverse effects from sound transmissions that the MMRP lacks to capacity to resolve do not harm marine animals. TC I-6g

48. Research Design

A. The experimental protocol can only detect a small range of potential effects because it is fixed in space and tied to a particular, and biologically arbitrary, temporal scale (i.e. four days on, seven days off). This study will only be able to detect major changes in distribution over a small range of spatial and temporal scales. As recommended by noted marine mammalogists and the Advisory Board, the use of a lower sound level mobile sources would alleviate these problems (a wider
58 project area and direct observation could be done inside and outside of the project area) and would greatly increase the power of the research as well as the range of scales that could be examined. (see Comments of Dr. Hal Whitehead; ATOC MMRPAB Meeting 3, June 13, 1994 Summary, # 37, 39, 40, and 54 at pages 8-11). Mobile sources provide improved experimental control, better chances of useful sample sizes (which could lead to increased ability to actually detect impacts and therefore be able to effectively guide ATOC transmissions), enhance observations by vessels, and minimize risks to animals not under observation. I-6e

B. Data gathered from the preliminary baseline period will be used to assess how large a sample size is needed to get statistical power and conclusive results. What is the protocol
59 if the data shows that the data set is too small? Early assessment of data collected during the preliminary baseline period indicate that in fact the potential sample size will be small. What changes are likely to be made to assure that the data set is large enough for statistical significance, especially since the conclusions from that data set will advise the commencement and operation of ATOC transmissions? Discussions of I-6o

2 Actually, as designed, the MMRP cannot determine if the sound transmissions are "safe" because it does not attempt to research and understand many factors of marine ecology and biology that define the safety of a particular animal.

redistribution of sampling effort do not define how these problems would be corrected.

C. With respect to tagging studies, the proposed sample sizes for elephant seals, California sea lions, blue whales, and leatherback sea turtles are far too small to have statistical significance. As stated by the Advisory Board, a sample size on the order of ten is "unlikely to be a sufficient basis for meaningful statistical or final conclusions." (see ATOC MMRPAB Meeting 3, June 13, 1994 Summary, # 50 at page 10). The research protocol should specify how tagging information will be analyzed. If two sample t-tests or nonparametric and randomization tests are used as previously proposed, they will have low power to detect effects in tagging studies (supra, #51A at page 10).

60 I-6i

D. The MMRP will attempt to address issues of avoidance and very subtle changes in the behavior of targeted species. There are no provisions to monitor for long-term impacts, even though they will occur. Further, except for pinniped audiometrics, the MMRP will not test hearing threshold shift and hearing loss in various marine animals, although they will occur as a result of ATOC Pilot Study and climate-related transmissions. Thus, the assumption that sound levels of equal to or less than 150 dB (re 1 Pa) at the proposed frequency will not cause hearing damage and/or TTS will not be rigorously tested. This is very troubling in light of the fact that the assessment and evaluation of impacts of sound source transmission is based upon this assumption. If this assumption is wrong, then impacts deemed to be "less than significant" are erroneous and the number of species potentially exposed to harmful sound levels could dramatically increase (and, the MMRP will not be focusing attention on marine animals outside of the defined zone of influence). The Advisory Board raised this concern in their June 3, 1994 meeting and concluded "this assumption may or may not be true . . . . this and other auditory parameters may vary widely among the main marine mammal groups."

61 I-12a

E. The reasoning behind the use of the proposed duty cycle and sound level should be clearly stated in the DEIS/R. The Advisory Board asked for the rationale behind the selection of "a 4-7 day duration for the test periods and a 7-10 day duration for intervening recovery/control periods." Further, although it is stated that source levels would be reduced to the minimum necessary (p. 2-16), it is difficult to know if even the most subtle behavioral changes are "significant" and how duty cycles and sound levels should be adjusted accordingly. It would be prudent to start at a lower level and work up as appropriate.

62 TC App. C

F. There is no succinct discussion of how noise from observational vessels and planes (confounding effects) will be controlled or accounted for in the MMRP. These confounding variables could likely "skew" the data and therefore skew the conclusions drawn from them.

63 TC

Conclusion

In conclusion, my review of the document reveals that its preparers have spent much effort to justify a decision to proceed with ATOC. The DEIS/R is not an objective and comprehensive disclosure and evaluation of the alternatives and their associated impacts; nor does the document attempt to truthfully respond to the numerous questions and issues presented by the public.

Therefore, for the reasons stated above, the DEIS/R fails to furnish the public and the various government, permitting agencies with an adequate review of the project. The DEIS/R fails to meet the letter, intent, and spirit of NEPA and CEQA. Substantial revision and changes to the DEIS/R need to be made to allow for an informed decision by the public and decisionmakers. One only hopes that the project proponents and affiliated agencies will be responsible enough to see that these inadequacies are remedied.

Sincerely yours,

Torri J. Estrada

C-205

RECEIVED 2-6-95

UNIVERSITY OF CALIFORNIA, LOS ANGELES

UCLA

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO · SANTA BARBARA · SANTA CRUZ

DEPARTMENT OF BIOLOGY
SHILGARD AVENUE
LOS ANGELES, CALIFORNIA 90024-1606

January 30, 1995

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes:

I have just finished reading your Draft EIR/EIS for ATOC. I am generally very pleased. I found the draft to be a well written, thorough and informative. As I am getting this letter in just under your review deadline, I will make my comments as brief as possible.

My main concern with the draft (and ATOC/MMRP in general) is the preponderance of concern and focus upon marine mammals and sea turtles. I realize the public concern voiced and the legal complications associated with endangered species. It is relevant to investigate possible negative impacts upon these animals. However, the general tenor of this draft is that marine mammals and sea turtles are the most susceptible organisms to ATOC disturbance and that they will serve as our best indicators of associated impacts.

The lack of data concerning acoustic impacts upon marine organisms in general is of concern. Much research needs to be conducted (although this doesn't translate into it necessarily being done under the auspices of ATOC/MMRP). Your mitigation efforts include studies of animal behavior and distribution, but relatively little of this will be non-mammalian, non-reptilian research. I would have like to see less moneys focus upon one trophic group (top carnivores). I believe a smaller amount of money could yield more far-reaching results if it were spent on projects such as determining sound behavior in the OMZ/DSL, local marine fish auditory/lateral line thresholds (a conspicuous data gap in your report), fish behavioral responses to low frequency sounds, and crustacean/ cephalopod auditory capabilities/potential impacts. Indeed, statements such as "..fish compromise the greatest numbers of marine animals that could possibly be affected by the sound transmissions..."(p. ES-9) suggest that these organisms would be a major focus of the mitigation/research. Yet the few proposed studies pale in comparison to those concerning large vertebrates.

1 I-61

In closing I would again like to compliment the authors on their work and restate my support of both this report and the project in general. Please contact me if you are in need of further suggestions. Thank you for your time.

Sincerely,

Sean Anderson

(310)206-6514
E-mail: IZZY957@oac.mvs.ucla.edu

C-206

GERARD V. CAREY, CPA
11 NORTH RIDING DRIVE
CHERRY HILL, NJ 08003
(609) 428-7012

RECEIVED 2-6-95

January 28, 1995

Mr. Clayton H. Spikes
A Bird Contractor Representative
Marine Acoustics, Inc.
4 Crystal Park
Suite 901
Arlington, Virginia 22202

Dear Mr. Spikes:

Having reviewed the environmental impact study I do not feel the Acoustic Thermometry of Ocean Climate is in the best interest of nature due to the impact on our marine mammals.

Sincerely yours
Dori R. Carey

C.C. Ray Schleifer

C-207

RECEIVED 2-6-95

Advanced Research Projects Agency
c/o Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Va. 22202

Dear Mr. Spikes,

STOP the Acoustic Thermometry of Ocean Climate "test"! We should not endanger the other inhabitants of the earth. There are too many unknowns.

Lynne Lowe

Lynne Lowe

P. O. Box 296
Santa Clara, CA
95052-0296

C-208

RECEIVED 2-6-95

1677 Height St. 3A
San Francisco
CA 94117
January 24th 1995

Advanced Research Project Agency.
marine Acoustics Inc.
2345 Crystal Drive
Arlington
Virginia 22202

To Clayton H. Spikes,

I am writing to express my opposition to the ATOC project. The Draft Environmental Impact Statement is inadequate to allow the ATOC project to proceed.

Both the adverse impacts to marine life and the 'research benefits' are stated in the D.E.I.S. as uncertain. We cannot at this stage estimate the irreversible effects of high decibel, low-frequency sound on marine mammals such as gradual deafness and damage to reproductive and immune systems.

Scripps Institute has received $35 million dollars from the DOD to research global warming. If global warming is the true priority then surely the expenditure of tax dollars would be better spent on clean energy, energy efficiency and other responsible efforts to reduce our impact on the global climate. The 'classified' nature of the ATOC project suggests that it is a military operation to improve submarine detection and make use of the SOSUS listening arrays which would otherwise be shut down.

It is clear that the true intentions of ATOC have not been revealed to the public and further analysis must occur before this project is allowed to proceed.

Sincerely yours.

Abby Maher.

C-209

Advanced Research Project Agency
Marine Accoustics Inc
2345 Crystal drive
Arlington Virginia 22202

RECEIVED 7-6-95

Please stop the ATOC experiments

More money is spent studying global warming and not enough is spent changing to non-destructive renewable energy systems. Technology already exists to reduce our dependency on fossil fuels spend the money on these alternatives.

The whales are under enough stress without all the extra racket. This stress can cause irreparable damage to their reproductive systems - or immune systems as it does in other mammals. Because the whales use these sounds for communication, stress from tonnes of noise is inevitable

A Concerned Citizen

Sean Sobkowitz

C-210

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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

FEB 6 1995

Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

Dear Mr. Spikes:

As we agreed last week, enclosed are the official comments of NOAA's National Ocean Service, Office of Ocean and Coastal Resource Management (OCRM) on the Draft Environmental Impact Statement (DEIS) for the California component of the ATOC Project.

We strongly support the goals of the ATOC global climate change research and associated marine mammal studies. Furthermore, we commend Scripps, ARPA and the National Marine Fisheries Service Office of Protected Resources for recognizing the need for a strong Marine Mammal Research Program to ensure that these species are adequately protected. Our comments focus mainly on issues of direct programmatic concern, particularly as they relate NOAA's stewardship as a federal trustee of resources of National Marine Sanctuaries.

The comments of the Sanctuaries and Reserves Division focus on technical, programmatic and regulatory aspects of the DEIS, as they pertain to the Monterey Bay National Marine Sanctuary (MBNMS). Chief among these is our carefully considered conclusion that, based on the DEIS, it is not appropriate to locate the ATOC sound source - and thus the zone of greatest ecological risk and uncertainty - within the Monterey Bay National Marine Sanctuary. This Sanctuary was designated expressly to protect the area's irreplaceable marine ecosystems and resources from avoidable harm. In this area of special national significance, NOAA/SRD is required by law to adopt a higher standard of protection and stewardship than might apply to similar projects elsewhere. Thus, we urge ARPA and Scripps to elect either of the two alternate Central California sites identified as feasible in the DEIS. This solution would facilitate the ATOC project's initiation, minimize risk to sanctuary resources, and provide much-needed research and information on marine mammal ecology along the Central California coast.

The comments of OCRM's Coastal Programs Division relate to the Coastal Zone Management Act and the Federal Consistency review of the ATOC project by the California Coastal Commission. These comments, contained in a letter to ARPA which is incorporated by reference, should be addressed in the PEIS.

We appreciate your consideration of the NOS/OCRM comments on the complex and worthwhile project, and look forward to working with you and Scripps to resolve any outstanding issues.

Sincerely,

for James P. Lawless

Jeffrey R. Benoit
Director

cc:
SWilson, DEvans, NOS
JLawless, CWahle, DMalek, HGolde, OCRM/SRD
MJackson, MWeise, GCOS
DWieting, WArchambault, OPSP
TJackson, MBNMS
EUeber, GOFNMS/MBNMS
KKaufman, MBNMS-SAC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT
Silver Spring, Maryland 20910

Clayton H. Spikes
Marine Acoustics, Inc.
Four Crystal Park, Suite 901
2345 Crystal Drive
Arlington, Virginia 22202

FEB 2 1995

Dear Mr. Spikes:

I understand that ARPA has received written comments on the ATOC DEIS from the Sanctuary Advisory Council (SAC) of the Monterey Bay National Marine Sanctuary (MBNMS). To avoid any misunderstanding about the origin or significance of these comments, please be aware that the SAC is a citizen advisory group to the MBNMS, and that their comments do not represent the official position of that Sanctuary, the National Marine Sanctuary Program (NMSP) or the National Ocean Service on the ATOC DEIS. While the sanctuary program values highly the contribution of the SAC to the management of these irreplaceable public resources, we feel it important to clarify any possible confusion that their comments may have generated. The purpose of this letter is simply to clarify this relationship for your review, and not to make further statements for the official public record on the ATOC DEIS.

As I stated in my letter of January 31, 1995, the National Marine Sanctuary Program will submit its official comments to ARPA later this week, as per our verbal agreement. Chief among these comments is our conclusion that while we strongly support the global climate change and Marine Mammal Research projects associated with ATOC, the sound source should be located at one of the two alternate central California sites identified as feasible in the DEIS. Both Sur Slope and Pioneer Sea Mount fall outside the Monterey Bay National Marine Sanctuary boundary, and should yield comparable acoustic and marine mammal access. Either site would be acceptable to the NMSP, and we do not anticipate any significant permitting problems for associated cables or acoustic receivers within the MBNMS.

The MBNMS SAC is an *advisory* body which was established to provide advice and technical support to the local sanctuary on various issues. The Council makes recommendations to the Sanctuary manager and are not authorized to independently represent the National Marine Sanctuary Program. The SAC has three standing working panels: Conservation, Research and Education. Given the magnitude of

this project, the SAC also convened a special ATOC working group of the Research Advisory Panel specifically to assess the plans and NEPA documents.

Although the MBNMS staff and the national program were aware that the SAC was preparing comments, the final version has not yet been submitted to the NMSP. The sanctuary program welcomes the input from the SAC, and in fact, specifically requested that they review the ATOC DEIS. As reflected by the cover memo from the SAC Chair, the three working groups clearly had somewhat divergent views on various critical aspects of this project, while all are generally supportive of its overall goals. Our official NOS comments incorporate many of these concerns.

We regret any confusion this may have caused at ARPA and expect that the official NOS comments will establish and clarify our position.

If you have any additional questions about this issue, please feel free to call Dr. Charles M. Wahle, Technical Projects Branch Chief. (301-713-3145 x156).

Sincerely,

for James P. Lawless

Jeffrey R. Benoit
Director

cc:
SWilson, DEvans, NOS
JLawless, CWahle, DMalek, HGolde, OCRM/SRD
MJackson, MWeiss, GCOS
DWieting, WArchambault, OPSP
TJackson, MBNMS
EUeber, GOFNMS/MBNMS
KKaufman, MBNMS-SAC

NOAA's OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT

SANCTUARIES AND RESERVES DIVISION -

COASTAL PROGRAMS DIVISION -

COMMENTS ON THE ATOC DEIS FOR CALIFORNIA

1. MONTEREY BAY NATIONAL MARINE SANCTUARY ISSUES

NOAA's Sanctuaries and Reserves Division has completed a thorough review of the ATOC DEIS and related permit documents. Our evaluation focuses primarily on aspects of the project that are directly relevant to NOAA's resource protection and stewardship mandate under the National Marine Sanctuaries Act (NMSA) and the Monterey Bay NMS designation. Thus, central to our review of the potential risks posed by this project is the basic statutory tenet that this marine ecosystem is of special national significance and merits a higher level of protection by SRD. In essence, research projects involving inherent ecological risks may warrant serious consideration in non-sanctuary waters, but may exceed the regulatory threshold of acceptable risk inside this and other National Marine Sanctuaries.

LOCATION OF ATOC SOUND SOURCE

After a thorough review of the ATOC DEIS, NOAA's Sanctuaries and Reserves Division concludes that, given the profound scientific uncertainty about the impacts of noise pollution on marine animals, it is not appropriate to locate the ATOC sound source - and thus the zone of greatest ecological risk - within the boundary of the Monterey Bay National Marine Sanctuary. This sanctuary was designated expressly to protect the area's irreplaceable marine resources and ecosystems from avoidable harm. Thus, in this area of special national significance, a higher standard of protection and stewardship is required.

Toward that goal, we urge ARPA and Scripps to adopt either of the two alternative Central California transmission sites identified as feasible in the DEIS: Pioneer Sea Mount or Sur Slope. Both are near the MBNMS and provide comparable acoustic and ecological characteristics. This solution would facilitate the overall ATOC project, while minimizing risks to

sanctuary resources, and supporting much-needed marine mammal research in the Central California region. Outlined below are several issues relating to ATOC in or near the MBNMS.

SANCTUARY PERMIT

The FEIS will identify a preferred site for the ATOC sound source off Central California. If the final site selected in the FEIS remains within the MBNMS (i.e. Sur Ridge), the ATOC project will require a new permit from the MBNMS in order to complete the installation of the sound source, VLA and associated cabling. If the final site selected is one of the two alternative Central California locations outside of the Sanctuary, a MBNMS permit will be required for installation of the necessary cabling and possible associated listening devices. A sanctuary permit is required because any such installation will violate the statutory prohibition against "alteration of the seabed".

The original 1993 MBNMS permit application and its subsequent review by SRD were very narrow in scope, and dealt only with the relatively minor impacts of alteration of the seabed caused by the installation of ATOC cable and instruments. Little detailed information on the entire ATOC project was included in the initial application; potential impacts were characterized as "non-major" and were to be addressed in the application for an SRP from NMFS. The initial Scripps permit, granted by SRD in 1993, was allowed to expire in July 1994. Subsequent authorization was issued by SRD in late 1993 to allow Scripps to retrieve equipment lost during the earlier unsuccessful installation attempt.

Since the actual scope of the ATOC project became known publicly (following the publication of the Scripps SRP application in 1994), SRD has stated that any future Sanctuary permit reviews will consider the entire scope of the ATOC project and its full range of effects, including the operational-scale sound transmissions stemming from and dependent on the installation of cables and sound sources in the sanctuary (ref.: Jan. 6, 1995 Public Hearing, Santa Cruz, CA). The Scripps permit renewal application (received by SRD on Jan. 24, 1995) will, therefore, be evaluated comprehensively based on information in both the DEIS and the FEIS. The permit, which includes the MBNMS and two alternate sites, also adds a request to conduct overflights during the Marine Mammal Research Program (MMRP), potentially triggering a second permit requirement under the MBNMS regulations.

Fundamental to SRD's review of the Scripps permit for ATOC is the regulatory requirement that NOAA may only issue a Sanctuary permit for any prohibited activity within the MBNMS only "...if the Director or designee

finds that the *activity will have only negligible short-term adverse effects on Sanctuary resources and qualities, and will further research related to Sanctuary resources* (15 CFR Sect. 944.9(d)). These findings must be based primarily on the available information about the project submitted by the applicant. In this case, SRD assumes that most available scientific information on the project's potential effects on Sanctuary resources and qualities is contained in the DEIS, although additional information may become available in the FEIS and associated permit applications.

In addition to finding only negligible short-term adverse effects, SRD is further required to evaluate a number of other factors when reviewing a permit application, including the following (15 CFR 944.9(d)):

- *"the duration of the activity and the duration of its effects."*
- *"the extent to which the conduct of the activity may diminish or enhance Sanctuary resources and qualities."*
- *"the cumulative effects of the activity."*
- *"the appropriateness of the methods and procedures proposed by the applicant for the conduct of the activity."*
- *"the end value of the activity."*
- *"... such other factors as he or she (i.e. the OCRM Director or designee) deems appropriate."*

Based on the information in the DEIS, it appears unlikely that the preferred ATOC source location (Sur Ridge) will meet these MBNMS regulatory standards for issuance of a new permit. The DEIS clearly and repeatedly acknowledges the profound lack of basic scientific information on the role of natural sound in marine mammal biology and ecology, on their sensitivity to various artificial sound sources and levels, on their basic patterns of migration and movement, and on the likelihood and detectability of subtle, long-term, non-lethal, and chronic effects of low frequency sound. For example, the ATOC DEIS contains numerous definitive statements of biological uncertainty about the very regulatory criteria upon which a sanctuary permit is evaluated. Three such examples are listed below:

"As stressed in this EIS/EIR, available information on subsea noise and its *biological impact ranges from incomplete to nonexistent*, depending on the species being considered." (page 4-15)

"... there is no evidence of a significant effect from current noise sources, but it must be recognized that *such effects would be exceedingly difficult to observe*.." (page 4-77)

"*Virtually no scientific data* appear to exist on the possible *long-term effects* that low frequency sound transmissions could have on *invertebrates*.." (page 4-102)

The FEIS should more fully explain the rationale for the timing and scope of the baseline studies and follow-up monitoring, and should reconcile apparently conflicting statements regarding the existence and significance of seasonality in marine mammal abundance in the study area. Moreover, the Marine Mammal Research Program focuses, appropriately, on marine mammals, and does not fully assess adverse impacts to other Sanctuary resources such as fish and invertebrates. This compounds the uncertainty by minimizing the potential to observe, assess and mitigate any adverse impacts to sanctuary resources other than marine mammals.

1 TC App C I-5e, 6b, 8b, 8c

CONSISTENCY WITH MBNMS POLICIES

The DEIS states that the project poses "no conflicts" with applicable Sanctuary plans, policies or resources. It further stresses the sanctuary program's mandate to support research and monitoring in justifying the choice of site within the MBNMS. However, paramount among all statutory mandates in the NMSP is resource protection - the long-term stewardship of the natural and cultural resources for future generations. In weighing this and any proposed research project, we are required to consider first and foremost, its potential effects on Sanctuary resources and values entrusted to NOAA/SRD through the NMSA. To date, it is unclear whether the DEIS' preferred alternative site fulfills that primary criterion.

IMPACTS ON ALL SANCTUARY NATURAL RESOURCES

The National Marine Sanctuaries Act defines "sanctuary resources" to include all living species and cultural resources of the sanctuary. Consequently, NOAA's SRD must evaluate any proposed project broadly, based on its potential impacts to *all* sanctuary resources, particularly those of major ecological or economic significance. In response to public comment during the scoping process, ARPA and Scripps have included considerable discussion on possible impacts to sanctuary resources other than marine mammals, including fish, invertebrates and birds.

2 In general, while these sections provide useful insight, they do not provide sufficient information to adequately evaluate potential impacts on these

TC

sanctuary resources. For example, the DEIS states that some fish and invertebrate species may be impacted by ATOC transmissions, but concludes that the population-wide effects would be minimal since so many others will survive outside of the zone of maximum sound. Moreover, the DEIS states that although some fish may become stunned and disoriented by the transmissions, they will likely be eaten by local predators - thus providing a "benefit" to the sanctuary ecosystem (DEIS at pg. 4-88).

It is essential that the FEIS include a more detailed description of likely impacts to fish, invertebrates and birds. Moreover, the FEIS should outline a focused monitoring program targeted on sanctuary resources other than marine mammals that have particular ecological or commercial significance. This monitoring program should assess both the effectiveness of the 5 minute-ramping up period as a mitigation measure, as well as the short- and long-term effects of sound transmissions on target species considered to be at risk to prolonged exposure.

3 TC Sec 4.3.2.2, 4.3.2.3, 4.3.2.5 App. C

CULTURAL RESOURCES

The description of submerged cultural and historical resources in the DEIS is incomplete. Existing documents give locations, depths and descriptions of 10 known shipwrecks in the Point Sur area that would be eligible for the National Register of Historic Places. Moreover, the US Naval Airship, USS MACON, crashed and sank off Point Sur in 1935, and now lies in roughly 1,500 feet of water within the MBNMS. The FEIS should address the possibility that ATOC activities, whether installation or sound transmission, might affect these sanctuary cultural resources, and indicate how regulatory compliance will be ensured.

4 TC Sec 4.6.3

The DEIS states that the National Historic Preservation Act (NHPA) does not apply to ATOC off Point Sur. NOAA's SRD recommends that the FEIS address this issue in consultation with the California State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation.

FACILITY CONSTRUCTION AND REMOVAL

The DEIS states that any ATOC facilities (e.g. cable and sound source) might be removed from the seabed at the end of the experiment, to the "extent economically and practicably feasible". MBNMS will require that the applicant demonstrate that any cable or hardware left on the seafloor would not adversely impact sanctuary resources.

5 I-19

SEABIRD RESTORATION SITE

NOAA, USFWS and the state of California are co-trustees in a major bird recolonization project aimed at reversing population declines and catastrophic losses in the Central Coast Common Murre population. These efforts are ongoing at Devil's Slide Rock, Castle Rock, and Hurricane Point Rock, relatively near Point Sur. The FEIS should address the sensitivity of these critical habitats relative to planned ATOC-related operations such as overflights.

6 TC

2. MARINE MAMMAL RESEARCH PROGRAM

The ability to rigorously assess and monitor potential impacts on marine mammals and other protected taxa will be crucial to the long-term success of the ATOC global climate change project. This need is repeatedly underscored in the DEIS by the widespread lack of quantitative data on the role of sound and noise pollution in the behavior and ecology of marine animals. The MMRP, as presented in the DEIS, represents a well-developed combination of surveys and experiments designed to detect certain short-term impacts in selected marine mammal species. The National Marine Sanctuary Program strongly supports the goals of the MMRP, and will actively work to facilitate its operations, should a central California site be adopted.

CONTROL OVER ATOC OPERATIONS

The DEIS relies heavily on the MMRP as a mitigation measure capable of dictating a cessation or alteration of ATOC's operational transmissions if an adverse impact is detected. In effect, the MMRP's link to ATOC operational control is the trip wire upon which the whole system depends. Nevertheless, the document does not adequately outline the mechanism through which monitoring results will influence ATOC operations. Consequently, the FEIS *must* clarify explicitly how observations of adverse impacts (both acute and chronic) will result in termination or alteration of ATOC transmissions. Specifically, the plan must present clear and rigorous plans or criteria on:

7 TC

- behavioral or abundance *criteria* for determining impacts;
- practical and ecologically meaningful definitions of adverse impacts, including short- and long-term, chronic and acute, and cumulative impacts;
- statistical designs and significance levels for distinguishing between ATOC impacts and other patterns of unknown origin;
- power analyses for establishing sampling protocols - *a priori*;
- decision trees, time lines and clear lines of authority for MMRP results to trigger cessation of ATOC operations should adverse impacts be detected;
- review processes and criteria for re-instating ATOC operations;

- independent review panels for major operational decisions.

Without this critical link, the risks posed by ATOC simply cannot be evaluated or assumed to be minimal or manageable.

REVIEW OF RESULTS

Given the global and controversial nature of this project, the results of the ATOC Pilot Study and MMRP (during which the MMRP experimentally modifies the sound characteristics) should also be reviewed by a panel of outside experts not affiliated with the project. Moreover, the results, and any recommendations for future operations in or affecting the MBNMS, should be reviewed by the MBNMS and NOAA/SRD, with input from the MBNMS Sanctuary Advisory Council. Any required MBNMS permits may contain, as a condition, a requirement that the applicant demonstrate no significant harm to sanctuary resources before operational-level transmissions are initiated. Clearly, the likelihood of demonstrable harm would be lower in the two alternative sites outside the MBNMS.

8 TC

SOSUS / HLA ACCESS

The DEIS states that acoustic data from the existing USN SOSUS listening network will be integral to interpreting movements and behavioral impacts among marine mammals. To date, these data have not been made available to the MMRP researchers, nor will they be available to researchers lacking the necessary security clearance. The FEIS should clarify the status and plans for access to the SOSUS data, and if they are limited, explain the consequences on the MMRP's ability to assess chronic behavioral impacts to marine mammals.

9 I-6p

3. GENERAL DEIS ISSUES RELATING TO NOS/OCRM CONCERNS

The DEIS contains a number of statements and assertions that are not sufficiently explained, documented or justified to allow a thorough evaluation of the project by the general reader. Where this information exists, it should be included. Toward this end, the FEIS should:

10 TC I-4b

- reconcile the *a priori* arguments for choosing Sur Ridge over the alternative sites due to high marine mammal abundances (and thus a realistic potential to assess potential impacts) with the MMRP's own data demonstrating higher marine mammal abundances on Pioneer Sea Mount; and ensure that, in the analysis of alternative sites, the relative site scores and final rank accurately reflect those results.

- clearly define and justify the assumptions or evidence underlying the assignment of weights and scores to alternative sites in the analysis of the optimum location of the ATOC sound source. 11 TC

- fully explain the similarities and differences between the ATOC sound source (fixed location, moderate duration; repeated regularly, and deep) vs. those compared in the document (moving ships and drilling rigs), particularly as these characteristics influence the impacts on marine mammals. 12 I-7c

- describe and evaluate the potential cumulative impacts of increased low-frequency noise pollution, when added to that generated currently by other known sources of acoustic research and/or military activities (e.g. GAMOT project, anti-submarine operations, etc.) 13 I-12c

- more fully address the relationships between the California and Kauai ATOC projects, and specifically evaluate the potential for cumulative impacts on species common to both sites (e.g. humpback whale). 14 I-12c

- clarify and correct statements regarding the jurisdiction of the California Coastal Commission's in reviewing the ATOC project under the Federal Consistency provision (section 307) of the Coastal Zone Management Act (letter from OCRM Director Benoit attached as Attachment B, and incorporated into these comments by reference). 15 TC I-14c

ATTACHMENT A

OCRM DIRECTOR'S LETTER TO ARPA CLARIFYING FEDERAL CONSISTENCY ISSUES.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT
Silver Spring, Maryland 20910

JAN 27 1995

Andrew Forbes
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, CA 92093

Dear Mr. Forbes:

This letter addresses various Coastal Zone Management Act ("CZMA") federal consistency issues regarding the Acoustic Thermometry of Ocean Climate ("ATOC") project raised by the California Coastal Commission ("Commission") and the Scripps Institution of Oceanography ("Scripps") in various letters and the Department of Defense's Advanced Research Projects Agency's ("ARPA"), National Marine Fisheries Service's ("NMFS"), and University of California's draft environmental impact statement, dated November 1994 ("DEIS"), for the ATOC project. The purpose of this letter is to clarify several inaccuracies and misunderstandings regarding the Commission's federal consistency authority and Scripps' and federal agencies' responsibilities. This letter is not a decision on the Commission's request to review, as an unlisted activity, Scripps' application to the Office of Ocean and Coastal Resource Management ("OCRM") for a permit renewal to install hardware for the ATOC project in the Monterey Bay National Marine Sanctuary ("MBNMS").

Before addressing the specific federal consistency issues, it is our understanding that the Commission is reviewing Scripps' federal consistency certification as submitted to the Commission in a letter from Andrew Forbes, Scripps, to Peter Douglas, Executive Director, Commission, and Tami Grove, Central California District Director, Commission (Nov. 29, 1994)("Scripps Consistency Letter"). Scripps and the Commission have endeavored to consolidate all consistency reviews in this one-stop review. The Commission intends to complete its review by March/April. However, both parties are reserving various federal consistency procedural issues. Therefore, to avoid future misunderstandings it is important to address these procedural issues now.

OCRM encourages the Commission and Scripps to continue the consolidated review, but recognizes that the federal consistency requirement applies to several different actions. The DEIS and Scripps' Consistency Letter describe five potential triggers for CZMA federal consistency. In addition to these federal consistency triggers there are some general federal consistency matters that need to be addressed: "unlisted activities" and "effects."

Unlisted Activities

Several of the potential federal consistency triggers are "unlisted activities." An unlisted activity is an activity that requires a federal license or permit, but is not listed in a state coastal management program ("CMP"). For unlisted activities, in or outside the coastal zone, the state CMP must notify the applicant and the relevant federal agency that it intends to review the activity. The state must make this notification within 30 days of receiving notice of the license or permit application to the federal agency, otherwise the state waives its right to review the unlisted activity. The waiver does not apply where the state CMP does not receive notice of the application. OCRM must approve the state's intent to review the unlisted activity for consistency. The applicant and the federal agency have 15 days from receipt of the state CMP's request to provide comments to OCRM. OCRM will make a decision usually within 30 days of receipt of the state's request. The sole basis for OCRM's decision will be whether the proposed activity can be reasonably expected to affect any land or water use or natural resource of the coastal zone. The permitting federal agency may not approve the activity until the consistency process is complete.

Effects

The determination of effects is based on reasonably likely effects to any land or water use or natural resource of the coastal zone. 16 U.S.C. § 1456; H.R. Conf. Rep. No. 964, 101st Cong., 2d Sess., at 970-71.[1] Location of the activity, whether within or outside the coastal zone, is not a determining factor. Id. State CMPs identify natural resources that migrate through state waters as coastal resources. The California CMP identifies marine mammals that migrate through California waters as coastal resources. Thus, an activity that affects or is reasonably likely to affect marine mammals that migrate through California waters, whether within or outside the coastal zone, is subject to federal consistency in accordance with the CZMA and 15 C.F.R. Part 930.

Potential Federal Consistency Triggers

1. National Marine Fisheries Service Scientific Research Permit

Scripps applied for a scientific research permit from NMFS for the incidental take of marine mammals as a result of the ATOC project. The NMFS permit is a federal license or permit activity under CZMA section 307(c)(3)(A), but is not listed in California's coastal management program. However, for the application to NMFS for this particular permit,

[1] The CZMA was reauthorized and amended in 1990. See P.L. 101-508. The CZMA federal consistency regulations, 15 C.F.R. Part 930, predate the 1990 reauthorization. Thus the regulations are authoritative only to the extent that they are consistent with the 1990 changes.

California withdrew its request to OCRM to review the activity as the state determined that its request did not meet the timeframes required by 15 C.F.R. § 930.54. Letter from Mark Delaplaine, Federal Consistency Supervisor, Commission, to Andrew Forbes, Scripps, at 2 (Dec. 29, 1994).

2. OCRM Monterey Bay National Marine Sanctuary Permit Renewal

The MBNMS issued a research permit to Scripps for the installation of the hardware associated with the ATOC project within the MBNMS. Scripps was unable to complete the installation. Scripps did not seek an extension of the permit and the permit expired July 1994.[2] If Scripps seeks to continue installation of the ATOC hardware in the MBNMS, Scripps must apply for a permit renewal. The permit renewal is a federal license or permit activity under CZMA section 307(c)(3)(A). OCRM received Scripps' application for the permit renewal on January 24, 1995. Letter from Andrew Forbes, Scripps, to CDR Terry Jackson, MBNMS, OCRM (Jan. 17, 1995). California has not listed OCRM National Marine Sanctuaries research permits in its program, however, the Commission formally requested OCRM permission to review Scripps' MBNMS permit renewal application whenever it is submitted to OCRM. Letter from Peter M. Douglas, Executive Director, Commission, to Jeffrey Benoit, Director, OCRM (Dec. 30, 1994). California made this request to ensure that its request would be timely if Scripps unilaterally that the DEIS and Scripps' Consistency Letter were notice of the application for a permit renewal that triggers the 30 day requirement.

Upon review of the DEIS and Scripps' Consistency Letter and after discussions between David Kaiser of my staff and Susie Pike of Scripps, OCRM has determined that the DEIS and the Scripps Consistency Letter do not constitute notice of Scripps' application to OCRM for a permit renewal. Therefore, OCRM will treat the Commission's December 30, 1994, request as notice to Scripps of its intent to review the permit renewal application.

As a preliminary matter, Scripps, citing 15 C.F.R. § 930.51(b), asserts that the Commission cannot request OCRM permission to review the application for a MBNMS permit renewal as the Commission agreed with a negative determination submitted by the Navy for the ATOC project installations and the Commission withdrew its request to review the NMFS permit application. Scripps Consistency Letter at 7, n.5. This is incorrect.

First, the Commission's decision to withdraw its request to review the NMFS permit application is irrelevant as to whether the state may review other or future requests for federal approvals for the ATOC project. Each federal action, instance of federal funding, or

[2] Scripps applied for an extension, but withdrew its application. In light of Scripps' withdrawal; OCRM concluded that the Commission's request to review the application for an extension as an unlisted activity was moot. The Commission may renew its request within 30 days of receiving notice that Scripps has applied for a permit renewal.

federal license or permit triggers the federal consistency requirement. The review of one permit application, or waiver thereof, does not preclude the consistency review of other federal approvals needed for the same project.[3]

Second, the Commission's agreement with the Navy's negative determination was not a review or concurrence of Scripps' application for a MBNMS permit. The Commission did not review for consistency with its coastal management program the original Scripps application for a MBNMS permit. Further, the original MBNMS permit application explained the ATOC project in general terms, but did not give details of the exact nature and duration of the sound transmissions and focused primarily on the limited impact of the installation itself. Also, discussions of the potential impacts on marine mammals were deferred pending the application to NMFS for a scientific research permit. Therefore, California may request OCRM permission to review the MBNMS permit renewal application as an unlisted activity under 15 C.F.R. § 930.51(b)(1)(renewal of federal approval not previously reviewed). Even if the state had reviewed the original MBNMS application, the state may request permission to review the renewal under 15 C.F.R. § 930.51(b)(3)(renewal of federal approval previously reviewed by the state which will cause effects substantially different than those originally reviewed by the state). The only issue that will be before OCRM in considering the Commission's request will be whether the activity can be reasonably expected to affect any land or water use or natural resource of the coastal zone.

3. Army Corps of Engineers (Corps) Rivers and Harbors Act Section 10 Permit ("section 10 permit")

Scripps needs a Corps section 10 permit to lay cables on the bottom of the territorial sea. This is a federal license or permit activity under CZMA section 307(c)(3)(A) and is listed in California's coastal management program. Upon submission of a section 10 permit application Scripps must also provide the Commission with a consistency certification. The Commission's review includes a review of all associated facilities in accordance with 15 C.F.R. § 930.21. An associated facility is subject to consistency if it is covered by 15 C.F.R. § 930.21(a) or (b). This is further clarified by 15 C.F.R. § 930.21 which states, "the proponent [(federal agency or entity seeking federal approval or funding)] of a Federal action must consider whether the federal action and its associated facilities affect the coastal zone . . . " (emphasis added). Thus, for a listed activity an applicant for federal approval must consider individual and cumulative effects from associated facilities in making its consistency determination. The Corps may not approve the activity until the Commission has

[3] Applicants shall, to the extent practicable, consolidate related federal activities and approvals. 15 C.F.R. § 930.59(a). States shall, to the extent practicable, review the consolidated activities and permit applications in a one-stop multiple review. Id. This was not previously possible for the ATOC project as the various federal actions and approvals were not concurrent and were not consolidated by Scripps. This is occurring now, however, the Commission still needs OCRM approval to review the application for a MBNMS permit.

concurred with Scripps' consistency certification, or, if the Commission objects to the certification, Scripps appeals the objection to the Secretary of Commerce and the Secretary overrides the Commission's objection.

4. Navy Authorization to Use Facilities at Point Sur

If Navy authorization is required to use the Navy's facilities at Point Sur, then such approval is a federal license or permit activity as defined under CZMA section 307(c)(3)(A). The Commission has not listed such authorizations in its coastal management program. Therefore the activity is an unlisted activity under 15 C.F.R. § 930.54. Upon notice to the Commission that Scripps requested authorization from the Navy, the Commission has 30 days to notify the Navy and Scripps that it intends to review the unlisted activity.

5. ARPA Funding to Scripps

Funding for the ATOC project is provided primarily by ARPA. Scripps Consistency Letter at 5. As Scripps is a state institution and ARPA a federal agency, federal financial assistance from ARPA to Scripps is subject to federal consistency under CZMA section 307(d) and 15 C.F.R. Part 930, Subpart F.[4] The Commission does not need OCRM's approval to review federal financial assistance activities that are reasonably likely to affect any land or water use or natural resource of the coastal zone, and that are in the coastal zone or in a described geographic area outside the coastal zone. See 15 C.F.R. §§ 930.95(b), 930.98. While a state should list federal assistance activities subject to consistency review in its management program, it is not required. 15 C.F.R. § 930.95(a). If, through the intergovernmental review process adopted by the Commission, or through other means,[5] the Commission has asserted consistency review for ARPA funding to Scripps, then ARPA may not provide funding until the Commission has concurred with Scripps' consistency certification, or, if California objects to the certification, Scripps appeals the objection to the Secretary of Commerce and the Secretary overrides California's objection.

Scripps asserts that the activity is outside the coastal zone. Letter from Andrew Forbes, Scripps, to Jeffrey Benoit, Director, OCRM, at 5 (Jan. 13, 1995); Scripps

[4] The CZMA does not provide for retroactive review of funding already approved by a federal agency. However, future funding approvals by ARPA will be subject to Commission federal consistency review if the Commission has so notified ARPA and Scripps.

[5] The intergovernmental review process established pursuant to E.O. 12372 is only a recommended means of reviewing federal assistance activities. 15 C.F.R. § 930.94. States may certainly use any other means of notifying federal agencies and applicants of federal assistance activities that require federal consistency review. Thus, even if ARPA grants are not subject to the intergovernmental review process, they are subject to CZMA federal consistency.

Consistency Letter at 6. If a state CMP chooses to review federal assistance activities outside the coastal zone, the state must generally describe the geographic area within which federal assistance activities will be subject to routine state consistency review. See 15 C.F.R. § 930.95(b). If the state has not described the geographic area the state must immediately notify the federal funding agency, the applicant, and OCRM, of its intent to review. 15 C.F.R. § 930.98(a). OCRM interprets immediate as a reasonable time after the state receives notice of the application for federal assistance. OCRM must approve a state's intent to review pursuant to 15 C.F.R. § 930.54. 15 C.F.R. § 930.98(b). In this case, it is not clear that the ATOC project is entirely outside the coastal zone.

Please call David Kaiser, Federal Consistency Coordinator, OCRM, at 301.713.3098, ext. 144, if you have any questions regarding this letter.

Sincerely,

Jeffrey R. Benoit

Jeffrey R. Benoit
Director

cc: Peter Douglas, Commission
Tami Grove, Commission
Dr. Ralph W. Alewine, III, ARPA
Ann Terbush, NMFS
CDR Terry Jackson, MBNMS

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

PUBLIC HEARING

CALIFORNIA
ACOUSTIC THERMOMETRY OF OCEANIC CLIMATE PROJECT
AND MARINE MAMMAL RESEARCH PROGRAM

SCRIPPS INSTITUTION OF OCEANOGRAPHY
INSTITUTE FOR GEOPHYSICS AND PLANETARY PHYSICS

(Scientific Research Permit Application P557B)

JANUARY 6, 1995

SANTA CRUZ CIVIC AUDITORIUM
SANTA CRUZ, CALIFORNIA

MONTEREY BAY AQUARIUM:
DR. STEVEN WEBSTER, MODERATOR

NATIONAL MARINE FISHERIES SERVICE:
PERMITS DIVISION, OFFICE OF PROTECTED RESOURCES
JEANNIE DREVENAK

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
SANCTUARIES AND RESERVES DIVISION,
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PROCEEDINGS

5:30 p.m.

DR. WEBSTER: Ladies and gentlemen, thank you for joining us this evening. I'd like to get started. This is the public hearing for the Draft EIR of the Acoustic Thermometry of Ocean Climate Project.

My name is Steve Webster; I'm the Education Director at the Monterey Bay Aquarium and I'll be your moderator this evening. And I'd like to begin by outlining the order of events tonight, give you some sense of the length of the proceedings and also the order so that you can be planning to come to the microphone about the time that you'll be asked to give your testimony.

The order of events will be this: We will hear four agency statements from the four folks that are seated with me at the table this evening, each of them, in turn, going from my left to right, then we will hear the public testimony, that is, any of you who have signed the sign-in sheets or planned to do so hopefully in the very near future, i.e., in the next few minutes and, following the public testimony -- and with the numbers of folks signed in so far, I would guess that will be in the neighborhood of two to three hours from now -- the project team will present project information. And Dr. Munk and Dr. Forbes have suggested that, at that time, they could give a very brief review of the overall nature of the project, something they did at the beginning of the proceedings here back in May. But, since everyone has had a chance to become more familiar with the details of the project since, the project team would like to reserve that for last in the proceeding.

The project team has also suggested that they will remain, following the hearing, to interact and answer questions any of you have of them individually after the meeting has been closed. So, if any of you would like to discuss the project further with any of the members of the project team, they are all quite agreeable to that.

The rules of the road will be similar as they were for the hearing in May, each speaker will have a time limit. I would like you to aim, please, for three minutes, that will bring us to a close somewhere in the neighborhood of 11:00 o'clock this evening, I believe. But we have fewer speakers than we did in May, so I will give you just a little more leeway than I did in May; I will not bring out my large hook until around three and a half minutes, maybe. I will give you a warning when your three-minute limit is approaching, at about two minutes and 30 seconds, and it will be with my human powered fog horn here, a very brief toot (demonstrating), like that. That will warn you you have about 30 seconds left and please come to your closing remarks within those 30 seconds. If you fall on over into three and a half minutes, we'll allow that this evening.

Please show mutual respect and consideration for everyone; although you may not agree with everything that's said this evening, each of our thoughts are valuable and we deserve the right to express them on whatever side of the question you may reside.

I will name three people in succession as you have signed in, the first person to come directly to the microphone and then the next two, please migrate from where you are to the edge of the exit tunnel there so that, as soon as the person ahead of you concludes their remarks, you are ready to come directly to the microphone.

So I will read three names at each transition. As soon as you hear your name, that means you probably have a maximum of six minutes to get yourself down here and ready to speak. We will take a break at about 7:30 p.m. if I last that long. If I don't, it may be a little before 7:30. But I think you can plan on a 15-minute break at about 7:30 p.m.

With that outline of the evening's proceedings, I think we will move directly to the agency statements and first is Al Cheaure representing Dr. Ralph Alewine with the Advanced Research Projects Agency.

AGENCY STATEMENT BY AL CHEAURE
REPRESENTING DR. RALPH ALEWINE
ADVANCED RESEARCH PROJECTS AGENCY

MR. CHEAURE: Good evening. It's nice to be here in Santa Cruz. Let me read the statement for Dr. Alewine, please. This statement is made on behalf of the Advanced Research Projects Agency. ARPA, as it's called, is a separate

federal agency under the Office of the Secretary of Defense reporting to the Director of Defense Research and Engineering. ARPA is the central research and development organization of the Department of Defense. Its mission is to develop imaginative and innovative research ideas which offer significant technological impact and to pursue these ideas from demonstration of technical feasibility through development of prototype systems. As you know, the purpose of this hearing is to accept testimony from the public on the Draft Environmental Impact Statement filed by ARPA and the National Marine Fisheries Service in cooperation with Scripps. The Draft EIS has been prepared to facilitate consideration by the National Marine Fisheries Service of the Scripps' application for a scientific research permit to evaluate the potential effects of low frequency transmissions on marine mammals and sea turtles. This research is part of a larger research project aimed at better understanding global environmental change.

It is universally recognized that global energy cycles and the biological processes upon which all life depends are critically influenced by the ocean. Systematic global observations of world oceans are required to improve our climate predictive capabilities and for more effective understanding of the marine climate environment.

Making accurate measurements of ocean structure by means of conventional instruments is difficult, time-consuming, and cost-prohibitive, if it can be done at all. This has led to the development of a technique called ocean acoustic thermography which looks at the ocean on a basin scale and creates a three-dimensional image of the area transversed by the acoustic signal.

Since the speed of the acoustic signal is influenced by temperature, it is possible to develop detailed information on overall temperatures of the oceans. To understand the atmosphere variability and to eventually forecast climate variability, an understanding of the ocean variability is crucial. The acoustic monitoring of global ocean climate experiment is a definitive study to show that ocean temperatures, which can prove direct evidence of existence and amplitude of global climate change, can measure accurately on a basin-sized scale. This is an experiment only at this stage.

The ATOC technology is expected to afford significant benefit for understanding global atmospheric climate trends and for continuing related research on marine biology and global warming environmental issues. This program should also help to obtain and implement useful, affordable spatial maps of internal ocean viability.

The project is part of the overall U.S. global change research program, among whose many priorities is climate change and greenhouse warming. More commonly known as ATOC, the project is one of many funded by the Strategic Environmental Research and Development Program.

SERDP was established by public law in November, 1990 to address environmental matters of concern to the Department of Defense, Department of Energy, and the Environmental Protection Agency. It is intended to identify research technologies and information developed by DOD for national defense purposes that would be useful to government and private organizations engaged in environmental research.

Global environmental change is one of six technology areas that make up the SERDP program.

Active program participants in the ATOC program, in addition to Scripps, include Woods Hole, the Navy Post Graduate School, NOAA, the Navy Research Lab, HUB Sea World Research Institute. In the academic community, it includes the University of Alaska, the University of California Santa Cruz, Cornell University, Florida State University, MIT, the University of Michigan, Mississippi State University, Pennsylvania State University, the University of Texas at Austin, and the University of Washington.

Australia, Canada, Japan, New Zealand, Russia, and Taiwan comprise the ATOC Pacific Basin international partners.

It is important to understand that ATOC researchers have recognized from the beginning that no harmful effects should occur to marine mammals and have committed to an unprecedented marine mammal study program.

The Marine Mammal Research Program is motivated by a paucity of data regarding the possible impact of low frequency sound on marine mammals. In this regard, it is noteworthy that ARPA is sponsoring additional research by the National Academy of Sciences Oceans Studies Board in this specific area of interest.

At the same time, MMRP will carry out broad-based research and will study the ecology and behavior of these animals through the entire ATOC experiment. Simply stated, the proposed Marine Mammal Research Program will provide valuable scientific data and will serve as a benchmark for good stewardship and responsibility.

We look forward to your comments on the Draft Environmental Impact Statement.

DR. WEBSTER: Thank you Mr. Cheaure. Next will be Jeannie Drevenak of the Office of Protected Resources for the National Marine Fisheries Service.

AGENCY STATEMENT BY JEANNIE DREVENAK
NATIONAL MARINE FISHERIES SERVICE
OFFICE OF PROTECTED RESOURCES

MS. DREVENAK: Good evening. My name is Jeannie Drevenak and I represent the Permits Division in the Office of Protected Resources, National Marine Fisheries Service in Silver Spring, Maryland. Also in attendance from the Service are Ann Turbush, Chief of the Permits Division, and Mr. Martin Freeman, Office of the General Counsel.

The National Marine Fisheries Service has responsibility for reviewing applications for scientific research permits involving marine mammals and sea turtles and for issuing or denying such applications based on the best scientific information available at the time of review.

In accordance with the Marine Mammal Protection Act and Endangered Species Act guidelines, an application for a permit for scientific research on the potential effect of low frequency sound associated with the Acoustic Thermometry of Ocean Climate Project off the California coast has been submitted to the NMFS by Scripps Institution of Oceanography.

Because of potential environmental concerns regarding the proposed activities, a joint federal-state Draft Environmental Impact Statement/Environmental Impact Report has been prepared by the Advanced Research Projects Agency and the University of California, San Diego.

The NMPS was a cooperating agency in the preparation of the Draft EIS and is attending this hearing in that capacity. In that regard, NMPS notes the articulation of standards of significance, identification of impacts, and conclusions as to the significance of impacts set forth in the document are strictly California Environmental Quality Act related requirements and are not intended for any broader purpose such as national Environmental Policy Act standards or requirements.

Further, the conclusions regarding significance reached under CEQA do not necessarily reflect review of the NMFS which believes that insufficient information exists in some cases to make any determinations as to the significance of a potential impact.

Therefore, the NMPS will not be considering CEQA determinations in our decision-making process.

Finally, the NMPS has recently received a revised scientific research application for the Acoustic Thermometry of Ocean Climate Project, Marine Mammal Research Program for the California site from Scripps Institution of Oceanography which incorporates the DEIS/DEIR as its basis.

Upon completion of NMPS's internal review of the revised application, it will be made available to the public for a 30-day comment period. We look forward to hearing your comments tonight and to reviewing the written comments submitted to ARPA on the DEIS.

DR. WEBSTER: Thank you. Next will be Charles Wahle, National Marine Sanctuaries Chief, Technical Projects Branch, of NOAA in Washington, D.C.

AGENCY STATEMENT BY DR. CHARLES WAHLE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DR. WAHLE: Thank you. Good evening. My name is Dr. Charlie Wahle. I am the Chief of the Technical Projects Branch of NOAA's Sanctuaries and Reserves Division in Washington.

My group in Washington is responsible for the science and education programs in the Sanctuaries overall and, in addition, for the resource protection programs including permitting, which is why we're here this evening.

I'm here representing both the national program and the Monterey Bay National Marine Sanctuary tonight.

In keeping with the purpose of this meeting, I will present a brief overview of the relationship between the proposed ATOC project and the Monterey Bay National Marine Sanctuary. My talk will focus on two distinct aspects of this project.

The first is our review of the pending National Marine Fisheries Service Marine Mammal Research Permit and the accompanying Draft EIS, which many of you have seen; and the second is the Monterey Bay National Marine Sanctuary Research Permit which will be needed for this project to continue in the future. On the Marine Mammal Permit, as many of you know, Scripps have applied to the National Marine Fisheries Service Office of Protected Resources for a Marine Mammal Research Permit to conduct the ATOC pilot study in Monterey Bay National Marine Sanctuary. Clearly, this project is of profound interest and concern to NOAA's National Marine Sanctuary Program largely because of its proposed location within this local sanctuary. Consequently, the program has been working closely with NMFS throughout this process to ensure the continued protection of the natural and cultural resources of the Monterey Bay National Marine Sanctuary.

Toward that end, scientists and resource managers in the Sanctuary program are currently conducting an extensive technical review of the DEIS. We will submit detailed comments and recommendations to NMFS and to ARPA prior to the close of the public comment period on January 31st.

Our highest priority in this DEIS review is to ensure the selection of a site for the project and an experimental design that guarantees the long- term protection of the unique natural values of this ecosystem as a place of special national significance. Specifically, the Sanctuary program's review of the DEIS will focus on the fundamental aspects of this project that most directly related to the Sanctuary program's resource stewardship responsibilities under the National Marine Sanctuary Act.

In sum, these are three: The potential impacts of the ATOC experiment on the natural and cultural resources and qualities of the National Marine Sanctuary here in Monterey; two, the assessment of alternative sites outside of the sanctuary boundary which would still maintain the scientific validity of the original project design; and three, the design of the Marine Mammal Research Program associated with the ATOC project.

The National Marine Sanctuary Program remains committed to full public involvement in our management of all Sanctuary resources across the country. Consequently, although our written review of the ATOC DEIS is routinely a matter of public record, we will make copies available directly to the public through both the local and the national sanctuary offices immediately after they are submitted to ARPA and NMFS.

Now, on to the Sanctuary Research Permit. In addition to the pending NMPS Marine Mammal Permit, any installation of ATOC-related hardware on the seafloor of the Monterey Bay National Marine Sanctuary also requires a permit from the Sanctuary Program.

In 1993, Scripps applied for and received a Sanctuary Research Permit for the initial deployment of the ATOC hardware off Pt. Sur. Scripps allowed the permit to expire in July of 1994 before all the necessary hardware had been successfully installed.

In late '94, NOAA authorized Scripps to recover some critical instruments that were inadvertently lost during an earlier unsuccessful installation attempt.

If the final site selected for the ATOC project actually remains within the Monterey Bay National Marine Sanctuary, Scripps will be required to submit a new research permit application to the Sanctuary Program for continued equipment installation. This application will be reviewed once the ATOC final Environmental Impact Statement is completed.

Our review of the new Scripps installation permit application will then be based largely upon the technical content of the FEIS, the final, and on consideration of the end value of the research to the Monterey Bay Sanctuary versus the potential environmental risks to Sanctuary resources and qualities posed by this project.

Further, in order to issue a research permit, the sanctuary program must find that the activity will have only *negligible short-term adverse effects* on Sanctuary resources and qualities. As part of this review, then, we will explicitly evaluate the entire scope of the ATOC project on all Sanctuary resources, not only the limited physical effects of deployment of these instruments on the small area of the deep seafloor. This review will be coordinated closely with the NMFS Office of Protected Resources and with the California Coastal Commission.

This concludes my statement on the National Marine Sanctuary Program's involvement in the review of the California component of the ATOC project. Copies of this statement are available here, I believe, and at the local and national marine sanctuaries' offices.

In closing, I urge you that, if you are interested in any way in this project and would like us to hear your views, please write to us, either at the local or at the national office, and share your support or concerns with us. Thank you.

DR. WEBSTER: Thank you Mr. Wahle. Marilyn Cox, Assistant Director of Physical Planning, University of California, San Diego.

AGENCY STATEMENT BY MARILYN COX
UNIVERSITY OF CALIFORNIA, SAN DIEGO

MS. COX: Good evening. As Steve mentioned, I am the Assistant Director of Physical Planning at UCSD, which is the state lead agency for this project for the purposes of the California Environmental Quality Act.

From the university's perspective, the purpose of tonight's public hearing is to provide citizens with an opportunity to comment on the proposed Acoustic Thermometry of Ocean Climate Project and Marine Mammal Research Program, and the Draft Environmental Impact Statement/Environmental Impact Report.

As the primary purpose of this public hearing is to take testimony on the adequacy and accuracy of the EIS/EIR, I will assume that most of you have received a copy or have had access to a copy of the Draft EIS/EIR. For those of you who would like to receive a copy of the report, you may sign up on the request list in the lobby or contact me next week at the address or phone indicated on the bottom of this evening's program.

Also, for your convenience, we have a limited number of copies of the Executive Summary of the EIS/EIR available on the information table in the lobby.

To very briefly summarize the findings of the EIS/EIR, the available information from the limited research carried out to date on the potential effects of low frequency sound on marine mammals, including marine mammals and sea turtles, either indicates minimal impact should be expected from the proposed ATOC sound transmissions or the measured data are so sparse that the possible effects must be stated as uncertain.

ATOC feasibility operations that would be dedicated to climate-based studies will be preceded by an approximately six-month Marine Mammal Research Program pilot study which will allow marine biologists to utilize the source strictly for research studies into the potential effects of low frequency sound on marine mammals.

For the purposes of the California Environmental Quality Act, the EIS/EIR identifies 20 potential impacts that are deemed less than significant based on the application of 25 mitigation measures.

With regard to biological resources, the standard for a significant impact is one that would substantially reduce the number or restrict the range of a rare, endangered, or threatened plant or animal; cause a fish or wildlife population to drop below self-sustaining levels; or adversely affect significant wildlife habitats.

Measured by these criteria, potential impacts from the proposed ATOC source are deemed less than significant.

It should be noted that the designation of a potential impact as less than significant is not intended to imply that it is unimportant or not worthy of concern. This is demonstrated by the adoption of mitigation measures for several less than significant impacts, even though the California Environmental Quality Act does not require mitigation of such impacts.

As has been noted, at this hearing we will be taking public testimony only and any questions or comments will be responded to in the Final EIS/EIR. If you have not yet registered to speak but would like to do so, you may register at the information table in the lobby.

Tonight's public hearing will be tape recorded and recorded by a certified shorthand reporter. Following the hearing, a transcript will be prepared and response to the environmental points raised during this hearing will be provided in the Final EIS/EIR.

The University, as well as other responsible federal and state agencies, will then review and consider the information contained in the Final EIS/EIR prior to deciding if the project should be approved, modified, or disapproved.

The comment period for the Draft EIS/EIR has been extended to 5:00 p.m. Pacific Standard Time, January 31st, 1995. Those of you who may have presentations lasting longer than the allotted time, or who did not wish to speak tonight but would like to present comments, may submit your written comments to the Advanced Research Projects Agency at the address indicated in the Draft EIS/EIR and shown at the bottom of the program for tonight's public hearing. Thank you.

DR. WEBSTER: Thank you, Marilyn. That concludes the agency statements and we will now go right into public testimony beginning with the following three people; first will be Congressman Sam Farr, followed by Jean Brock, followed by Ray Chuan. Is it the sense of the house that we should allot Congressman Farr the three minutes the rest of us are allotted or, since he has had a very busy week, might we consider five minutes for Congressman Farr? What is the sense of the house? All in favor for five? Congressman Farr, the house has allotted you five minutes.

EVENING SESSION
6:00 p.m.

TESTIMONY OF CONGRESSMAN SAM FARR

MR. FARR: Thank you very much, Dr. Webster, and I appreciate the five minutes. I hope I can do it in three. I heard there were going to be sounds in town tonight and I really came here expecting to see the Santana Band, but I'm glad you're here because, just a very short while ago, I requested that you have this hearing on this issue. I want to thank the National Marine Fisheries Service for calling the public hearing on the Draft EIS/EIR for ATOC.

ATOC is part of the national research effort to develop credible prediction models for climate change. And, as I've previously stated, global warming is a very important environmental issue that we need to explore much more.

We need to know more about the oceans' role in climate change and how the ocean temperature is affected by greenhouse gases in order to be able to predict how our global climate may change.

I've worked my entire political career in the Central Coast of California to try to create Monterey Bay as the world center for marine sciences and I'm a strong supporter of marine research and I support the overall objectives of ATOC.

But I'm also concerned about rate of marine sound pollution and its potential effects on marine life.

We are here today to review and discuss the EIS developed by the Department of Defense and Scripps Institute of Oceanography. The EIS describes the potential impacts of the project on the marine environment; suggests how those impacts could be mitigated or avoided; and evaluates alternatives, including alternative sites, for the project. The EIS recognizes that there is very limited research data on the potential effects of low frequency sounds on marine life and admits that we are uncertain of the nature of the potential effects.

I'm very interested to hear the opinions of the critics of the project, especially with regard to whether the location of the device outside the boundaries of the Sanctuary isn't a better option, given the unknown risks and the potential negative effects of low frequency sounds on marine life.

I also look forward to hearing the opinions on whether a six-month pilot study is sufficient time to determine whether the sound emissions are safe and whether the Marine Mammal Research Program is broad enough in scope to answer our concerns adequately.

Given the magnitude of the proposed study and the limited knowledge we have of the potential effects of low frequency sound emissions on marine life, I believe we must be very, very cautious before proceeding.

I want to thank you all for being here and I can assure you that I will continue to ensure that time is available for maximum independent public scrutiny of the project before the ATOC is launched. I would be glad to answer any questions you might have and I appreciate, again, your coming to Santa Cruz, having this hearing. And you might note that, on a Friday night which is predicted to be one of the stormiest nights of the season, you've got an incredible turnout and I think that speaks well to the concern of the people here in the Central Coast that, indeed, a sanctuary is a sanctuary is a sanctuary. Thank you very much.

DR. WEBSTER: Thank you, Congressman Farr. Next in order will be Jean Brock, Ray Chuan, followed by Jim Christmann.

TESTIMONY OF JEAN BROCK

MS. BROCK: He's going to toot the horn for about three and a half seconds for me now; if you would please do that? It's part of my testimony. (Dr. Webster complies.)
MS. BROCK: Louder. Three and a half seconds?
DR. WEBSTER: You've made your point.
MS. BROCK: My name is Jean Brock, that rhymes with ATOC. I am completely opposed to it. It used to be Adams, for anybody that knows me and doesn't recognize me. If every speaker honks that horn for two percent of their three-minutes time allotment, then we will have a single scientific idea of how annoying this ambulance siren, rock concert, garbage disposal, cello will be to the life forms of the marine environment. Well now -- and do that, everybody, two percent of your allotted time, make some noise.

It appears that ATOC has magnanimously been changed from a $35 million rationalization for an obsolete, multi-billion dollar Navy submarine spy system to just a bunch of caring scientists doing marine mammal research.

How stupid do you bureaucrats think we are? I have three points: Number one, all sea life is endangered, all sea life, not just endangered marine mammals. All oceans are sanctuaries, they are the basis of our life. Others can argue with you -- I'm sorry -- others will argue with you about what should be put in the sanctuary or put out of the sanctuary; that was much like saying, "Should Diablo Canyon Nuclear Power Plant be built at Nacoma Dunes or in San Luis Obispo?" It's not a matter of where we put it, it's do we put it.

With regard to global -- the issues of global warming (sic) -- warming -- "warming" -- the state of the world in 1989 already discussed most of the stuff that we think we're going to be learning with this new experiment. I'm not going to read it, it's two or three paragraphs. It already discusses all of the greenhouse gases.

And then, the Department of Energy, in 1993, actually discusses where all the greenhouse gases are coming from, where they've come from between 1985 and 1990 in the United States. I'm done; I think I've made my point. Thank you very much.

DR. WEBSTER: Thank you, Jean. Next will be Ray Chuan, followed by Jim Christmann, followed by Virginia Handley.

TESTIMONY OF RAYMOND CHUAN
KAUAI FRIENDS OF THE ENVIRONMENT

MR. CHUAN: My name is Raymond Chuan; I'm from Kauai. I'm Co-Chair of the Kauai Friends of the Environment.

We would like to take this opportunity tonight to present our comments on the Draft Environmental Impact Statement. Since the so-called California ATOC is a part of the overall ATOC project, which includes the Kauai project, our comments apply equally to both aspects of the project, notwithstanding the persistent effort on the part of the Scripps Institution of Oceanography to segment these parts for the purpose of the environmental process.

We believe, and we will demonstrate with additional comment that will be submitted to you in writing, that the Draft EIS fails fundamentally to address the issues of alternatives and potential impacts, as well as the requirements of the statutorily-mandated consultation and scoping process.

The EIS completely ignores the hundreds of comments offered by the public at the three scoping hearings in April and May, 1994. And the argument put forth in those sessions of the Draft EIS dealing with impacts are highly presumptive; often self- contradictory; and where scientific data are concerned, grievously incomplete.

T1 The Draft EIS fails to support any of its arguments against alternatives other than the proposed action. We conclude, on the basis of all information presented, that other than the repeated use of the phrase "presumed to be less than significant", Scripps has failed to make a convincing case for the eventual finding of no significant impact. I-6K

On a more fundamental basis, we believe the correct choice of alternatives should be the one of no action instead of the proposed action because Scripps has failed to demonstrate, against a backdrop of scores of theoretical and experimental projects specifically addressing the issues of global warming, that the ATOC project can yield meaningful information on global climate change.

It would take hours, not three minutes, to enumerate all of the defects of the Draft EIS. With the time remaining, we will simply highlight a few of these.

DR. WEBSTER: Thirty seconds, Mr. Chuan.

MR. CHUAN: Well, let me skip to the end here.

There has been a lot of discussion within the marine biology community that the MMRP part of ATOC has its own intrinsic value and deserves support. We agree that marine mammal research is necessary but we disagree that it should be a part of ATOC.

Both as environmentalists and as taxpayers, we of Kauai Friends of the Environment feel strongly that our national, human, and financial resources should not be wasted on such an ill- conceived project ATOC. All of the environmental processes that have been exercised in support of ATOC so far have essentially been a waste of time and money. The cost of the preparation of the Draft EIS alone can probably support a significant portion of an independent MMRP.

Thank you.

DR. WEBSTER: Mr. Chuan, thank you very much. Next will be Jim Christmann, Virginia Handley, followed by Norman Seaton.

TESTIMONY OF JIM CHRISTMANN

MR. CHRISTMANN: My name is Jim Christmann and I've lived in Santa Cruz since 1969. I'm going to have to pretty much just read through this; I've no experience in public speaking.

I've run small coastal research boats between Pt. Reyes and Baja California since about 1976, with most of that work between Pt. Sur and San Francisco.

One of my personal reasons for pursuing this line of work is that my clients take almost nothing from the ocean environment besides information.

After the first round of hearings on this project, ATOC managers were required, rightly I believe, to go back to the drawing board for more information before getting approval to start up the sound source. So, since about August, they've

had me taking groups of five to six advance degree marine mammal biologists out to the area of the proposed sound source site to census marine mammals.

I'm here tonight to throw rocks at both sides in this controversy because I'll probably end up making everybody mad at me because I believe both sides have been remiss in allowing this whole issue to polarize as badly as it has.

I'll try to also show what I believe to be some common ground --

DR. WEBSTER: A little closer to the microphone, please, Jim.

MR. CHRISTMANN: I'll also try to -- oh, yeah, that's a lot louder.

I'll also try to show what I believe to be some common ground between the two groups. Has everybody kind of heard what I've said so far? All right.

First, my clients, the upper managerial people at ATOC, whom I've not met, I believe that they must by now acknowledge a certain complacency or naivete early on about the public's interest level these waters and worse, a continuing inability for whatever reasons to tell us in understandable language -- that's the key word -- what they want to do, what they want to learn from it, and how it might affect some species.

There are good rebuttals to each of these points, but I want to leave them alone while I throw a rock at the other side, who I think we can well agree is represented by the Save Our Shores organization.

Now, I'm on the Save Our Shores mailing list because I've supported them, when I could afford to, since their earliest days with Dan Hinckley.

I read their literature and I feel that this group must acknowledge a pretty fast and loose editorial hand in choosing often the most inflammatory language whenever possible to excite controversy for whatever their reasons.

That's enough said about the two ends of this spectrum; I'm already --

DR. WEBSTER: Thirty seconds.

MR. CHRISTMANN: I can't believe that.

Well, I was going to try to take you on a little imaginary boat ride down to the sound source site; that's clearly not going to work. I'd better go right to the end here. I think ATOC and its critics should not logically be such polarized groups. I think that they have become that way largely because of poorly chosen words, both ways.

The cetacean biologists I know are in the process of devoting their entire careers to the enhancement of the planet's health, in smaller or larger ways depending on their fields. They have much more in common with the long-range goals of Save Our Shores than some would have us believe, which is why so many of them have been so deeply hurt by careless portrayals of themselves as environmentally thoughtless or irresponsible.

The sound source site, its frequencies, its depth, its distance offshore, everything about the study that I've been able to understand about it, were chosen carefully to minimize even the remote possible effects on the smallest possible number of species.

DR. WEBSTER: One more sentence, Jim.

MR. CHRISTMANN: If both groups would both speak and listen more carefully than I've heard either one to date, I think more people will see the common ground that's been quietly there between the two groups during the entire heated debate.

DR. WEBSTER: Thank you very much. Next is Virginia Handley, followed by Norman Seaton, followed by Dolly Alley.

TESTIMONY OF VIRGINIA HANDLEY
FUND FOR ANIMALS

MS. HANDLEY: My name is Virginia Handley for the Fund for Animals. And you'll have to excuse me, I have laryngitis and I may not be able to fill my three minutes.

I'm California coordinator for the Fund for Animals, which is a national animal welfare organization. We are interested in the welfare of all animals and, most especially, we're interested in the welfare of individual animals.

We are for the alternative, too, that one of no action. I might add that that is an alternative that is in this document only because that is required by law that it be put in there as one of the alternatives. Otherwise, I do not believe it would be in there.

T-2 The very question of the feasibility of the project, of whether it will actually do any measurement of global warming, is one that has not been really addressed in the EIS and, in fact, when the EIS, on page 126, listed what were the issues that were brought before them in the scoping session that we hadn't heard before, that was brought before you by Dr. Seaton, who is following me, and by people such as Ray Chuan, that question was not listed in the EIS. That is so important as to why are we doing all this. We are so busy arranging the chairs on the deck of the Titanic, why are we on board at all? I-14a

T3 The EIS, in discussing what the purposes are of ATOC, makes out as though it's just a happy coincidence that the military already has $20 billion worth of hardware down there already. The military wants more money for that to maintain it, they want to expand it. ATOC will meet those needs. That is not discussed fully in the EIS what the true purpose is behind ATOC. I-1

That is not a coincidence; I believe that's the very purpose, is the military concerns.

As you state in the EIS, the military was mandated by Congress that they were to spend some money on environmental issues. This is their way of spending money on environmental issues on a project that will do nothing about that environmental issue but will benefit them greatly.

Whether ATOC falls on its face or not, they will have made millions of dollars, they will have been able to help what they already have, they will have new facilities put in in existing Navy facilities.

DR. WEBSTER: Thirty seconds.

MS. HANDLEY: Whoa.

ATOC is the tip of the iceberg. This EIS doesn't want to talk about the ten-year program that is going to come after that. They don't want to talkabout it, they want to just segment this whole thing.

As far as the effect on the animals, this eight percent that's going to go on, that's 20 minutes every four hours for two months; that's 120 hours. That is an invasion in the deep sound channel. I-7

The fin whales and the blue whales that are down in that sound channel, they are dependent on it. In all of the effects that are measured in this EIS, I have not once seen the word "stress" within that. They are not counting stress; stress is cumulative.

DR. WEBSTER: Your last sentence, please?

MS. HANDLEY: Throughout the EIS and its conclusions of words that are -- loopholes you could drive a tanker through of what is a cute response, significant response. The benefit of the doubt is given entirely to ATOC. The benefit of the doubt should be given to the marine animals and their environment.

DR. WEBSTER: Thank you very much.

Norman Seaton, followed by Dolly Alley, followed by Vickie Nichols.

TESTIMONY OF NORMAN SEATON
LABORATORIES FOR SCIENCE, INC.

DR. SEATON: Yes, my name is Norman Seaton. I'm a physicist, a graduate of the University of California in Berkeley and my basic research has been in lasers lately but I've had a long-time interest in other features of the environment.

I would like to read you a couple of things starting out here about from the proposed action feasibility demonstrations.

"The ATOC project is an international research effort to determine long-term ocean climate changes on global scale by measuring the acoustic sound paths in the deep sound channel to precisely measure ocean temperatures."

Then it goes on to say, in this section here, that, "The net effect is that the sound channel very efficiently transmits sound for long distances. This effect also tends to limit the sounds that are trapped in the sound channel from being detectable at depths outside the sound channel."

Well, that's very interesting because sound is a reversible process. This means that, if you have a sound on the surface, very little of that sound energy will get into the deep sound channel. On the other hand, if you have a source down in the deep sound channel, most of it will tend to stay there over very long distances, including probably all the way to New Zealand.

The reason I bring this up is because, very frequently, the proponents of the ATOC project so frequently equate the sound levels of the super tankers, say at 195 db, to that equal to their source. But the super tanker is not in the sound channel and it does not have the same effect down there. As a matter of fact, the super tanker, when you're probably ten miles away, has practically no sound of interest to the sound channel. So that's a very significant fact.

There is another significant fact in all this and that is the frequencies that are used in the sound channel. When you speak to somebody locally, they speak in, say, a certain high-pitched voice and you can sense where the sound is coming from. In the case of the ATOC signal, which is on, say, in the average of 75 hertz, that corresponds to a wave length of, oh, 20 meters. And 20 meters is 60 feet -- let's call it 60 feet, and the average fish or whale, that has a relatively small distance between its ears, cannot sense where the sound is coming from; it doesn't know, it just feels this sound.

And something like -- sometimes -- I was walking by a power transformer last night, up on a telephone pole, I could hardly tell where the sound came from because the sound was a low frequency sound. And these poor whales, they may hear this sound, they don't know which way to go; and, as for the fish, an even smaller distance between their ears, they will have no idea which way to turn.

DR. WEBSTER: Thirty seconds.

DR. SEATON: The whales also, you know, are required to move out of this area within the allotted time of five minutes or so. They don't travel very far in five minutes; they don't have that kind of speed. So I'm afraid that they will -- they can't swim out -- they don't know where to swim and they can't swim out. I can give you a lot longer statement on the ATOC project itself but my time is up.

Thank you.

DR. WEBSTER: Thank you very much. Dolly Alley, followed by Vickie Nichols, followed by Ana Weinstein.

TESTIMONY OF DOLLY ALLEY
WOMEN'S INTERNATIONAL LEAGUE FOR PEACE AND FREEDOM

MS. ALLEY: Good evening. My name is Dolly Alley and I'm a member of the Women's International League for Peace and Freedom, the
National Organization of Women, the Democratic Women's Club, and I forget, there are so many others -- but those -- Greenpeace, most of all.

I wouldn't have known that there was another way to check on global warming if I hadn't got a little statement on TV about scientists who thought that measuring rainfall was another way to prove it. I haven't heard a bit about that at all in the news or anywhere else, just that one little blurb.

Why is so much attention being placed on this blasting of the ocean, which is already under attack?

I watched a CIA awards meeting where Dr. Wheelan received an award for being the father of the space satellites that are listening in on us now. At the same time, we said -- we were putting up the wonderful space program.

So, on the one hand, you have one thing; on the other, you have another.

Dr. -- what is it? -- Mr. Woolsley is the head of the CIA, he said, "Remember, science and espionage are partners." Now, I heard that and I thought, you know, this program -- all these things that we're being bombarded with, there's ATOC -- not ATOC -- H-A-A-R-P, HAARP, going on in Alaska, scheduled to start this year. That is an electromagnetic pulse generator that's going to bombard the ionosphere. God only knows what is going to become of all these things. And there must be an end to it.

When are we going to be natural human beings? When are we going to be real people again? You know, Francis Bacon, he said, "We must tease and torture the secrets from Mother Nature." They've been doing that and doing that. And, if science is so wonderful, why is the world in such a mess?

A sanctuary is a sanctuary is a sanctuary; and this is a real world and we live in a real world. And women are all basically so worried about their children, we just have to stop what we're doing.

DR. WEBSTER: Thirty seconds.

MS. ALLEY: Well, I could close with Rachel Carson's words: "It is a curious situation that the sea from which the first life arose should now be threatened by the activities of one form of that life, that the sea, though changed in a sinister way, will continue to exist; the threat is rather to life itself."

Please, don't spend any more of our dollars on this.

DR. WEBSTER: Thank you. Vickie Nichols, Ana Weinstein, Stanley Flatté.

TESTIMONY OF VICKIE NICHOLS
SAVE OUR SHORES

MS. NICHOLS: Hello. My name is Vickie Nichols and I am the Director of Save Our Shores, that ferocious marine conservation group dedicated to protecting and promoting a sustainable ecosystem in the Monterey Bay National Marine Sanctuary.

Save Our Shores does not support ATOC as proposed in the Sanctuary due to the rich habitat values unique to this region which could be adversely affected because it emits a very loud sound, fixed sound frequency that is, for over a two-year period. And there are other alternative locations outside of the Sanctuary for this type of research.

We do, however, support further research that would address the impacts of low frequency sound on marine life, especially marine mammals. Once the data has been analyzed and peer-reviewed, we would then reconsider a project such as ATOC outside of Sanctuary boundaries.

T-4 As the DEIS states, the rationale for ATOC is to gather deep ocean temperature data because existing computer models have been criticized as inaccurate and over-simplified, therefore they have had little impact on governmental decisions regarding greenhouse gas emissions. This is not an adequate justification for placing a powerful, long-term, low frequency sound source within a marine sanctuary. Responding to inadequacies in computer models is not the best means of providing a persuasive basis for policy formation. I-42

A marine sanctuary is designed to accommodate research. However, the Sanctuary Management Plan specifies that research should result in effective solutions to management problems. ATOC does not meet this standard because there are no clear management actions tied to research outcome.

Rather than solve management problems, ATOC could, in fact, lead to new problems within our Sanctuary.

The current MMRP is designed to study direct impacts to marine mammals by sensing their level of disturbance, evaluating the behavior or changes of behavior and will address whether long- term, underwater, low frequency sounds are safe for marine mammals.

As we know, large tankers passing through this Sanctuary have a similar decibel level and may create disturbing noise for many kilometers around the vessel. Why are we encouraging installation of the ATOC sound source as a means of studying the effect of low frequency sound when other sources already exist and the consequences have not yet been studied?

The Sanctuary Advisory Council has supported a proposal to establish areas to be avoided, i.e. –

DR. WEBSTER: Thirty seconds.

MS. NICHOLS: – the entire Central Coast of California in order to move large commercial vessels further off the coast. Noise pollution is a problem and advocating for a new stationary sound source within Sanctuary boundaries does not further the goal of reducing sound impacts.

I believe that we could conduct a research project, an MMRP, that would evaluate some of the sound problems in our Sanctuary and I hope that we can further those goals by working together and learning more about the marine environment.

Thank you.

DR. WEBSTER: Thank you, Vickie. Ana Weinstein, followed by Stanley Flatté followed by Paul Stuart.

TESTIMONY OF ANA WEINSTEIN
CENTER FOR MARINE CONSERVATION

WEINSTEIN: Hello, I am Ana Weinstein and a staff biologist for the Center for Marine Conservation, which is a national, non-profit group dedicated to protecting marine species and their habitats.

We first want to emphasize that we are enthusiastic supporters of scientific research within the Sanctuary. And we also support the overall goal of the ATOC project to track and model global climate change. But, given the realities of the project, its global scope, long time frame in the deep sound channel, the proposed siting in the Sanctuary, and most of all its uncertainties, this project must proceed cautiously.

This means that ATOC must fully adhere to meet the CEQA procedural requirements because these requirements will give the scientific community and the public the tools to determine whether the benefits expected from this project outweigh the risk to marine life.

So, as the Center further reviews the Draft and prepares written comments, we will specifically address the following three issues: One is the Marine Mammal Research Program; and second is the relationship of the Marine Mammal Research Program to the initiation of the two-year ATOC feasibility study; and third is the long-term monitoring program.

The Marine Mammal Research Program must focus exclusively on investigating the effects of the ATOC sound source on marine life and not be couched as an investigation into important but separate questions of the effects of low frequency sound on marine life in general.

While, as Vickie Nichols pointed out, this research is desperately needed, the sole objective of ATOC is to measure changes in the temperature of the oceans over time.

The Marine Mammal Research Program is a permanent requirement of the ATOC experiment, yet the DEIS elevates the MMRP, the research program, to the purpose of, rather than a requirement for, ATOC's initiation.

We noted that this bolsters the case for placement of the sound source in the marine mammal- rich Sur Ridge site that shows as an alternative in the DEIR. We would like to see these criteria pulled out of the site selection process of choosing an alternative.

Second, the relationship of the MMRP's pilot project to the initiation of the two-year ATOC feasibility study must be clearly defined. We noted in the DEIS/R the contingency that, "Climate-related transmissions will only begin if the system is determined to be safe for marine mammals and other sea life." And I quote, "The protocols for suspending operation are described more fully in Appendix C."

T-5 However, the protocol in Appendix C fails to describe how a violation of safety thresholds will change the project's operations or who has the authority to make these decisions. I-69

DR. WEBSTER: Thirty seconds.

MS. WEINSTEIN: Okay.

Concerning how much seems to hinge on these data, these details must be disclosed and a technically-qualified group that is independent of ATOC must review these data and it must be disclosed to the public.

And the monitoring program, it must be designed to detect physiological, behavioral, and disregional changes in a variety of species, including endangered leatherback sea turtles. Leatherback sea turtles feed heavily in the Monterey Bay area and there is evidence that, in the presence of low frequency sounds, they won't dive as deeply for their food.

And, above all, it needs to be acknowledged that even an elegantly designed Marine Mammal Research Program pilot project is too short in duration and it treats too few species to provide answers as to the potential cumulative impacts of the sound source, the critical question that's pointed out by Representative Farr and Charlie Wahle –

DR. WEBSTER: Thank you very much.

MS. WEINSTEIN: So we just – DR. WEBSTER: Please close.

MS. WEINSTEIN: Okay. Thank you.

DR. WEBSTER: Stanley Flatté, followed by Paul Stuart, and then Ron Walding.

TESTIMONY OF STANLEY FLATTE

DR. FLATTE: I am a professor of physics at U.C. Santa Cruz –

DR. WEBSTER: Closer to the microphone, Stanley, please.

DR. FLATTE: I am a professor of physics at U.C. Santa Cruz and I've been working in ocean acoustics for the past 15 or 20 years.

It would be nice to respond to some of the comments that have been made already but it's very difficult since they are in such different areas.

We have, on the one hand, people saying, "Don't spend any more money on things of this sort." and, on the other hand, we have been hearing, "We need different and more ambitious marine mammal research projects."

It's not correct to say that the Marine Mammal Research Program is not an important goal of the ATOC project; it's there in the discussions and certainly there are people within the project who are being furthered explicitly for doing that project and they would not like to hear that the work is not the purpose of the project.

We've been asked also to try to make a more clear statement, that is more understandable to people, about the project. I think I want to concentrate only on the one item here tonight, which is a point discussed in the press and in a way which I think most people are able to understand in a clear manner.

The analogy was made, in fact, in our San Jose Mercury-News article of recent week that you would not allow a car to enter Los Angeles County without smog controls on it, you would not increase the amount of smog in the L.A. Basin -- or allow that, even though there are millions of cars there already.

I think the analogy in this form is incorrect for two reasons. First, the ATOC experiment is not analogous to a car without controls because th amount of sound emitted by the ATOC source is not larger than hundreds or even thousands of other sources, in particular the hundreds of super tankers and thousands of large whales which have the capability of putting out this kind of sound.

Second, ATOC is not just another sound source out there. I would try to put to you that the correct analogy is between denying ATOC its permits and denying permits for the trucks used by the Environmental Protection Agency for monitoring the smog levels in L.A. County --

DR. WEBSTER: Thirty seconds.

DR. FLATTE: -- in order -- excuse me.

Would it be reasonable to require the EPA to use electric cars to monitor smog put out by millions of cars and trucks? No, it would not be until you eliminated -- until everybody in L.A. County was using electric cars. In the same way, the ATOC source is not a significant increase in the noise level of the ocean because, unfortunately -- we can't change that -- the ocean is a very noisy place already.

Thank you.

DR. WEBSTER: Thank you.

Paul Stuart, followed by Ron Walding, followed by Jim Miller.

TESTIMONY OF PAUL STUART

MR. STUART: My name is Paul Stuart. I'm a Principal Systems Engineer --

DR. WEBSTER: Paul, closer to the microphone, please.

MR. STUART: My name is Paul Stuart. I'm a Principal Systems Engineer at a software engineering consulting company in Mountain View and I live in Berkeley.

Neither I nor my employer are affiliated in any way with any organizations or entities involved in the ATOC project.

Informed public debate is essential for good public policy but, unfortunately, the subject of this hearing is misinformed public debate. Arguments in favor of ATOC are based on scientific facts and they are compelling, but they have generally appeared only in scholarly journals like Physics and Science, inaccessible to the general public. And they've been ignored by the popular press and by ATOC opponents, for the most part.

Most of the arguments against ATOC, on the other hand, have generally ignored scientific facts and appeal to emotion and ideology, and they have received widespread publicity.

I personally deplore the misrepresentations, distortions, innuendo, and outright lies that have been used to depict ATOC in editorials and some statements by ATOC opponents. I think NMFS should evaluate the ATOC proposal on its scientific merits and take into account that public opposition to ATOC is largely due to widespread publicity given to irresponsible, inflammatory rhetoric and baseless accusations in some cases made by ATOC opponents.

At least one group has chosen to exploit misrepresentation of ATOC and the scientific illiteracy of the public for fund-raising purposes. I know this because they came to my door. Organized misrepresentation of ATOC has pretty much mobilized the public opinion against it.

Many ATOC opponents have routinely cited laws in support of their position, including the Marine Mammal Protection Act and the Endangered Species Act. But none of them -- all of them have ignored really the most important law that applies to ATOC, which is the inverse square law. This describes how sound intensity changes with distance. At two meters, sound is four times quieter than it is at one meter; at three meters, it's nine times quieter; and, at ten meters, it's a hundred times, or 20 decibels, quieter.

Sound sources comparable to the ATOC device already exist. Foghorns operate at a frequency comparable to the ATOC device. Like the ATOC, they operate at a fixed location, at 240 db, they are more than 10,000 times louder. They operate intermittently over a period of decades, their location near the surface places them closer to the supplies of food and air needed by marine mammals. Furthermore, some of them are located in positions that could expose migrating gray whales to the sound.

All near-shore marine mammals could be impacted by foghorns but I doubt that anyone would claim that foghorns have ever posed a serious threat to any marine mammals. And there is no evidence that they have.

DR. WEBSTER: Thirty seconds.

MR. STUART: At a distance of one meter, the ATOC source is 195 db. But it is located more than half a mile down. It's not near any significant sources of food for any marine mammals. A hundred meters away, the sound level is 10,000 times quieter. Less than 200 meters from the source, it's still nearly a half a mile down, it's down to 140 db, that's less than the intensity of a ringing telephone.

I think no sensible person would believe the sound of this intensity could endanger, harm, injure, or threaten anything.

I think ATOC is a brilliant and important research proposal that promises to provide data, important data, about both the effects of global warming and the effects of commercial shipping noise on marine environment.

DR. WEBSTER: Last sentence, please, Paul.

MR. STUART: I strongly urge NMFS and all other permitting agencies to grant all permits necessary for ATOC to proceed.

DR. WEBSTER: Thank you. Ron Walding, followed by Jim Miller, followed by Daisy Martin. Ron Walding? Jim Miller, please.

TESTIMONY OF JIM MILLER

NAVAL POST GRADUATE SCHOOL

MR. MILLER: I'd like to address -- My name is Jim Miller. I'm a professor of electrical engineering at the Naval Post Graduate School in Monterey. I'm an ATOC investigator and I'd like to address -- just pardon my rudeness to the people; I think the important people are over here, not over here (indicating).

I wanted to do two things in my three minutes. One thing in three minutes. I wanted to explain to the people who use the ocean, boaters, fishermen, surfers, swimmers, divers, what the number that the decibel numbers mean.

So we took some measurements, Carl Escari (phonetic) from the Monterey Bay Aquarium Research Institute and I, took some measurements of boats going by the aquarium, and how loud is a boat going by the aquarium, and then how close is ATOC compared to that, because then you can make effective decision.

Up on the viewgraph machine here, Lash has put up two boats going by the aquarium. The first boat is a whale-watching boat and you can see it's about 140 decibels measured about 30 feet down -- there's a hydrophone at the bottom of the ocean there -- 30 feet away, the boat went right over it, followed by a speedboat about a hundred feet away.

The ATOC source, in shore, about 30 feet of water, would be about 110, 105, something like that, at maximum. You can see that that -- that's not even on my scale there, I had to put it in there to show you how quiet there it would be.

At the ATOC source located -- that's off the aquarium, that's one location.

Next viewgraph. At the Pt. Sur site,there is a Navy horizontal array of hydrophones that was put in in 1957, the year I was born, to search for Russian submarines. It's not being used any more because there's no Russian submarines left.

So what do we use? This is an opportunity to use a multi-million dollar investment for something a little bit more politically correct.

This is the noise measured on a ship driving right over that array, about another 145, 150 decibels. If I take the ATOC source and measure at the surface where the ship was -- the source and the array are going to be at about the same point if you approve it. And, if you take the source and you go to the surface and you measure how loud the ATOC source is, it's that green line.

The numbers, the inverse square law that the gentleman previous to me talked about is a very powerful force in physics. And I'll stop there; that's all I need.

Thank you for your patience.

DR. WEBSTER: Thank you. Daisy Martin, followed by Jean Wideman, followed by Mardi Wormhoudt.

TESTIMONY OF MANUELA LARRIOS
SAN LORENZO VALLEY HIGH SCHOOL
MS. LARRIOS: Oh boy.

Hello, my name is Manuela Larrios and this is Pam. We have other people speaking with us.

We are currently enrolled in SLV High School and we have studied on ATOC for about a month now on this project in our school.

ATOC, as you know, is Acoustic Thermometry of Ocean Climate.

The Scripps proposal is to put a transmitter 25 miles off the shore of Big Basis in the water, in the floor. That's 2,950 feet deep. And about -- miles from the Marine Sanctuary, is about 35 to 40 miles.

The sound decibels is about 195 and will be going for 20 minutes every four minutes -- every four hours, excuse me. The environmentalists most concerned is that the impacts on the marine life on the social, as well as its eco-location.

In closing, I would like to say that I believe ATOC should be delayed until more research is done, until we know all the effects that it will have on all marine life animals.

In the words of Mr. Wilgart (phonetic), I would like to say a dead whale is a dead whale.

Thank you very much.

DR. WEBSTER: Your group has two minutes.

TESTIMONY OF JACK BRAZIL
SAN LORENZO VALLEY HIGH SCHOOL

MR. BRAZIL: Hi, my name is Jack Brazil. I'm just going to make this quick. I disapprove of ATOC because I believe that there are other alternative, less controversial ways of measuring the ocean's temperature. And, although I do support the overall goal of ATOC, I think that more research should be put forth on the effects of low frequency sound emissions on marine mammals.

Thank you.

DR. WEBSTER: Thank you, Josh. A minute and a half.

TESTIMONY OF TRACY
SAN LORENZO VALLEY HIGH SCHOOL

TRACY: Hi, my name is Tracy. I'd like to say that the biggest public concern on this issue is its threat to marine mammals.

What some people don't realize is that the second highest priority of this project is to obtain evidence regarding the effects of low frequency sound on marine mammals and leatherback turtles. It will be a controlled study broadcasting only two percent of the time, while nearby tankers have been broadcasting at the same frequency for several years.

Conclusive evidence of the harmful effects of low frequency sounds on marine mammals will be essential in the regulation of these tankers, thereby decreasing the risk posed by the threat of low frequency sound on marine mammals.

Thank you.

DR. WEBSTER: Thank you. You have 30 seconds left.

TESTIMONY OF DAVID KELLY
SAN LORENZO VALLEY HIGH SCHOOL

MR. KELLY: Hello, my name is David Kelly and I'm against ATOC because I disagree with blasting noise to another species' environment, such as ATOC is going to do. It would be like having a mosquito buzz around your ear, like happens in the summer; and I disagree with that.

DR. WEBSTER: Thank you, Dave. Next will be Mardi Wormhoudt, followed by Hal Whitehead, and then Lindy Weilgart.

TESTIMONY OF MARDI WORMHOUDT
SANTA CRUZ COUNTY SUPERVISOR

MS. WORMHOUDT: Good evening. My name is Mardi Wormhoudt and I am the Supervisor for the Third District here in Santa Cruz County.

Our Board will be considering written comments to the Draft EIS/EIR at our meeting on January 24th, and we will submit those to you before your deadline of January 31st.

So I am not speaking for the Board of Supervisors tonight but really for myself in urging you, please, to find the Draft EIS/EIR inadequate in that I believe it is seriously flawed in its inability to speak to the long-term impact of this project on marine life and on fish.

It seems to me that the last half of the Twentieth Century is fairly littered with the disastrous effects of well-intentioned scientific projects in which people did not see the disastrous consequences that were to come.

If we've learned anything as we approach the millennium, I hope it is, if you don't know what the effects are, please don't do it.

I agree with the speakers who have said that, if this is a bad project, it certainly shouldn't be done anywhere; but I would also like to say, as a resident of the Monterey Bay area, as someone who has watched the fight, the struggle in this area for decades now against offshore oil drilling, to protect the Monterey Bay, those of us who finally saw the Monterey Bay made a sanctuary only a few years ago find it very, very difficult to see, at a time when the ink is barely dry on those agreements, that we are once again needing to muster our resources to protect this very, very valuable environmental resource.

It is not here as our laboratory, it is not here as a place that's free for all of us to do what we wish, it is in fact a sanctuary. We welcome scientific study and research but only if it is respectful of the --

DR. WEBSTER: Thirty seconds.

MS. WORMHOUDT: -- sanctuary itself. So I hope that you will very seriously consider this project. It may, in fact, have a useful scientific application but, whatever that application may be, it is not worth the risk to one of the most valuable resources that we possess, the Monterey Bay Sanctuary to which we owe our considered stewardship.

Thank you very much.

DR. WEBSTER: Thank you, Mardi. Hal Whitehead, followed by Lindy Weilgart, followed by Susan Jordan.

TESTIMONY OF ANNE NOTHOFF
PRESENTING FOR HAL WHITEHEAD

MS. NOTHOFF: My name is Anne Nothoff,I'm with the Natural Resources Defense Council; and I will be presenting Dr. Whitehead's testimony.

And the gentleman following me will be presenting Dr. Weilgart's testimony. Susan Jordan's son has been hospitalized and will not be presenting her testimony this evening.

These are the comments of Dr. Hal Whitehead. Imagine me with a beard. "I am an associate professor of biology at Dalhousie University and a university research fellow of the Natural Sciences and Engineering Research Council of Canada. My graduate degrees are in mathematical statistics and zoology and my research is principally on population biology, social organization, and ecology of the deep- water whales, that is, sperm and beaked whales.

"I have a number of detailed questions and comments on the DEIS which will be submitted separately; but this is a summary of my major impressions thus far.

"The document was clearly put together with extreme haste. One of the results of this is shoddy presentation. For example, many of the cited references are not listed, inappropriate sources such as the ATOC scientific research permit application are cited for biological information. Some parts are in incomprehensible and are irrelevant and the document succinct suddenly lapses into describing the effects of the Hawaiian rather than the Californian environment.

"In the areas where I have the most expertise, the document is often seriously wrong, invariably in the direction of minimizing the potential effects of the ATOC source on the marine environment. For example, on page 4-50, there is a calculation of the number of sperm whales likely to come within the 150 db contour. When the calculation is carried out correctly, that is, including the whales missed when diving, the proportion of time at depth, the tidal sampling, and the mean speed of movement of whales, the number of sperm whales affected is increased by more than a factor of 100. Given this and other serious deficiencies which occur throughout this DEIS in the areas where I know something, it is hard to take the other parts on faith.

"But the major structural problem with the document is that it refuses to consider the most sensible and environmentally acceptable alternatives as legitimate, especially the no- action alternative or an autonomous source for ATOC and low power mobile source for MMRP.

T-6 "The no-action alternative is desirable because there are no financial costs and no short- or long-term effects on the environment. The possible costs or a downside of this alternative is lack of knowledge gained about global ocean climate. I-4a

However, as the acoustic method is only one, and a rather dubious one, of several methods of looking at ocean temperature changes, the loss of ATOC's potential results are of very little consequence.

"The second cost would be the loss of knowledge gained in the effects of low frequency sound on marine mammals. But, as the portion of the MMRP dependent on the ATOC source has very poor statistical power, its results will largely be inconsequential.

DR. WEBSTER: Thirty seconds.

MS. NOTHOFF: (Continuing Dr. Whitehead's statement.)

"Another major deficiency in the document is that there must be some discussion of potential extensions, that is, additional sources planned for the ATOC program."

And I think, also, that Dr. Whitehead points out that, due to the design of the MMRP, it would be almost impossible to detect the four criteria that would lead to the cessation of the ATOC project because of the design; and he details that here.

DR. WEBSTER: Thank you, Anne.

MS. NOTHOFF: Thank you.

DR. WEBSTER: Speaking for Lindy Weilgart, followed by Jack Wickham, and then Rod Fujita.

TESTIMONY OF JAMIE PROFFIT
PRESENTING FOR LINDA WEILGART

MR. PROFFIT: Hello, my name is Jamie Proffit (phonetic) am with the Surfrider Foundation and I'm reading Dr. Linda Weilgart's statement.

DR. WEBSTER: Closer to the microphone, please.

MR. PROFFIT: I'm not Linda; okay? "I'm a researcher associated with the Department of Biology at Dalhousie University; my graduate degrees are in the areas of whale bioacoustics and behavior and my present research is on sperm whale acoustic communication.

"My general impression of the DEIS is that it is unconsciously dismissive of likely adverse impacts on marine life. Moreover, it is sloppy, internally inconsistent, and shockingly inaccurate in places.

"The conclusion of minimal impacts are repeatedly made, even when these conclusions are based on completely unsubstantiated assumptions. There is certainly no attempt being made to err on the side of caution. Behavior disruptions and psychological stress are given very short shrift, if mentioned at all, even though this effect is likely to be dominant. Even at low duty cycles modest increases to ambient noise levels can cause serious rise in stress levels, thus potentially placing populations in jeopardy.

"The DEIS gives much greater emphasis to the impact of ATOC on the hearing capabilities of marine organisms, yet here the great gaps in knowledge often render the assumptions worthless. For instance, we are asked to assume that marine mammals hear the same noise that humans hear, which is clearly not the case. We are asked to assume that the same relationships by which noise trauma to the human ear is estimated can also be applied to the marine mammal ear, even though recent research in pinnipeds seems to cast doubt on this assumption.

"And furthermore, we are asked to accept complete guesses in the auditory sensitivity thresholds of the vast majority of species in the study area, particularly the endangered large whales. Diving abilities of many species are also uncertain. If any of these 'stabs in the dark' happen to be wrong, the radius within which animals could suffer potential hearing damage could increase from 178 meters to 40 kilometers or more."

That's quite a spread.

"ATOC's own independent scientific advisory board states that ATOC documents assume hearing damage will not occur if received levels of ATOC sounds are below 150 decibels. The advisory board notes that this assumption may or may not be true. But there are no supporting data for marine mammals."

DR. WEBSTER: Thirty seconds.

MR. PROFFIT: Okay. (Continuing presentation of Dr. Weilgart's testimony.)

"Ambient noise levels appear to be exaggerated to downplay the ATOC's relative contribution to underwater noise. Ambient noise levels are repeatedly listed as being around 90 decibels in the DEIS, yet these numbers do not reflect the noise levels in the sound channels which are most affected by the ATOC source.

"Studies on fish and shrimp conclude that sounds of only 20 to 30 decibels over ambient levels or levels of only 100 to 130 decibels can significantly decrease the growth and reproduction rates. If levels of 85 to 90 decibels in the quieter sound channel is harmful to fish or invertebrate reproduction, populations could suffer over a radius of about 350 kilometers depth..."

DR. WEBSTER: Thank you very much.

MR. PROFFIT: Thank you. That's all I can say.

DR. WEBSTER: Jack Wickham, followed by Rod Fujita, followed by Kelly Quirke.

TESTIMONY OF JACK WICKHAM

MR. WICKHAM: My name is Jack Wickham. I am a retired professor of oceanography and meteorology and, by my lights, a practicing environmentalist. I am speaking for myself.

This is a look at ATOC, a sanctuary, and an environmental view of their relations. It's a complicated process or problem and many matters remain to be – or have to be weighed in order to come to a decision.

In my view, the most responsible action for environmentalists is to work toward avoidance of a human-generated catastrophic outcome to the process of global warming. It's difficult to assign a probability to such an outcome because there is nothing in the historical record to show the consequences of such a rapid increase in the concentration of atmospheric CO2 as has occurred since the industrial revolution.

It does seem likely, however, that our analyses of the warming process will be in some respects deficient, possibly, for example, some unthought of, unstable process which could lead to unforeseen climatic changes.

It's our responsibility to the generations to come, land and sea creatures, to minimize the likelihood that there will be such deficiencies in our analyses and the associated possible unpleasant surprises in climate change.

This means that we must pursue assiduously research with the potential to reduce the uncertainties in our analysis.

It's very difficult for me to imagine any outcome of the ATOC experiment comparable in its potential for dire consequences to all life on the earth and in the sea as the outcome of an unmitigated global warming, the real threat. This is especially so because the fauna of the sanctuary and the ocean adjoining it have already been subject for decades, during which at least three important whale species have thrived, to shipping noise. The output of noise from shipping is as, compared to that of ATOC, is equally intense, of much greater aerial extent, and of much greater duration.

In this case, the influence of ATOC as compared to that of shipping noise seem possibly inconsequential.

DR. WEBSTER: Thirty seconds.

MR. WICKHAM: If the influence on marine life of low frequency noise is a concern, efforts toward mitigation of shipping noise is by far the more effective action for people with those concerns.

Thank you.

DR. WEBSTER: Thank you, Jack. Rod Fujita, Kelly Quirke, Anne Rowley.

TESTIMONY OF ROD FUJITA
ENVIRONMENTAL DEFENSE FUND

MR. FUJITA: Good evening, I'm Rod Fujita; I represent the Environmental Defense Fund, a leading national non-profit environmental group with over 250,000 members.

I hold a doctorate in marine ecology and, in addition to this expertise in marine ecology, I bring years of experience in climate change policy analysis and advocacy to the issue we're here to discuss tonight, the ATOC project. My experience includes participation in the Intergovernmental Panel on Climate Change.

While I have not been able to finish reviewing the Draft EIS, I offer these preliminary comments based on a partial analysis.

The Environmental Defense Fund strongly supports development of new scientific understanding about the pace and potential impacts of global climate change. However, none of us should be overly optimistic that data generated by ATOC, no matter how accurate or precise, will result in sweeping measures to address climate change. Powerful economic and political interests will continue to resist significant changes in the current patterns of fossil fuel use and deforestations that are driving climate change.

Before putting too much faith in the ability of climate models, even if they are improved substantially by ATOC data, to shape global warming policy, we should all remember that miles of complex systems have a rather poor track record. Because they are laden with assumptions and estimated parameters, they can be tortured into saying any number of things.

T-7 Furthermore, I'm unsure whether temperature trend data generated by ATOC will really provide a reliable measure of a global climate trend. ATOC has the potential to detect the temperature trend over ten years but it would take many decades to detect in the atmosphere. In fact, this is one of the primary benefits of ATOC. I-3d

However, what if the climate systems happens to be in a temporary stable, or even cooling, phase? For instance, if one considered only temperature data in the 1990s or the 1970s, one would falsely conclude that there was no global warming trend because the climate system was in a temporary cooling phase. In fact, a global warming trend has been documented over the last century or so.

I also wonder whether ATOC data can really be used as an early warning system for global warming. Deep ocean temperatures lag behind atmospheric temperatures considerably in response to increased warming due to greenhouse gases. And, in my opinion, this would limit greatly the usefulness of ATOC data as an early warning for climate change.

While I believe the benefits of ATOC with respect to improving global warming policy are highly uncertain, I do think that ATOC would be worth pursuing if the risk to marine organisms and ecosystems can be shown to be acceptable. If successful, ATOC could generate data that would greatly improve our understanding of the ocean and climate dynamics.

DR. WEBSTER: Thirty seconds.

MR. FUJITA: The key to good policy- making on this issue is to honestly acknowledge that great uncertainties surround the potential impact of ATOC and work to reduce them rather than attempting to paint a rosy picture that shows that the impacts are likely to be insignificant. Unfortunately, the Draft EIS appears to do just that.

Let me skip to the end here.

I believe that the ATOC project should be conducted only if the three following conditions are met: One, outside experts and community representatives must conclude that the pilot study shows that the potential impacts of ATOC will be acceptable; two, the criteria for determining when to shut off the ATOC transmissions must be defined more clearly; and finally, citizens at large and environmentalists must play a significant role in determining what termination criteria should be and when they are met.

And, in closing, we humans need to avoid hubris, we need to adopt a more humble attitude based on a deep respect for the complexity and mystery of the ocean and its inhabitants, particularly in the few sanctuaries left to them.

Thank you.

DR. WEBSTER: Thank you. Folks, we will take a 15-minute break in about 25 minutes. Kelly Quirke, followed by Anne Rowley, followed by Ellen Fourot-Daniels.

TESTIMONY OF KELLY QUIRKE
GREENPEACE

MR. QUIRKE: Good evening, my name is Kelly Quirke; I'm here tonight representing Greenpeace. And Greenpeace has 300,000 supporters in California and over 1.6 million supporters nationwide.

Our position has consistently been that we don't need to threaten the marine environment to know that it's time to take action against global climate change. We need action now, not decades more of study.

My comments tonight will focus primarily on the purpose and needs section of the Draft Environmental Impact Statement. The DEIS was supposed to answer the oceans of questions and concerns raised at the scoping hearing regarding this issue. Sadly, as usual, it does not do this. In fact, it raises even more questions.

This inquiry reminds us that science can always be inconclusive; and, if science is inconclusive -- in other words, if it doesn't provide us with sufficient data to drive policy, then policy- makers will be making choices based upon other values. And, the DEIS does show that the whole process is so variable and so indeterminent that nothing about global climate change is ever going to come of it. T-8 I-36

Therefore, as I stated at the scoping hearing, we must look to other factors to generate policy momentum on global climate change.

At the scoping hearing, I questioned how the DEIS would incorporate the plethora and variety of indicators already showing the early impacts of climate change. I quoted a variety of sources already calling for action on climate change ranging from Margaret Thatcher to the German Parliament; the directors of multi-national insurance associations are already losing billions of dollars as a result of the impacts of climate change. Yet, the DEIS ignored all of these.

So, to improve this document, please refer to the Intergovernmental Panel on Climate Change's third assessment which came out in September of this year, a panel of over 2500 experts from around the world who, in 1990 and 1992, and again in 1994, told us that, in order to stabilize carbon dioxide concentrations in the atmosphere, we must immediately cut carbon dioxide emissions by 60 to 80 percent.

The New York Times, in reporting on their third assessment, headlined their article on September 20th like this: "Emission must be cut to avert shift in climate." The first paragraph read, "Even if worldwide emissions of carbon dioxide were capped at present levels, atmospheric concentrations of heat- trapping gas would continue to increase for at least two centuries rising well beyond the point at which the earth climate would be disrupted."

DR. WEBSTER: Thirty seconds.

MR. QUIRKE: The chief of the IPCC, a British atmospheric physicist speaking on the issue of getting started on fighting climate change said, "If you want to stabilize eventually, you've got to consider what you do now." And he went on to conclude by saying, "In any case, we should start to do what we can do now and also begin to plan to do more and not wait ten or twenty years until things are more clear."

Not more study, action on climate change now.

Thank you very much.

DR. WEBSTER: Thank you, Kelly. Anne Rowley, followed by Ellen Fourot- Daniels, followed by Anne Nothoff.

TESTIMONY OF ANNE ROWLEY
SAVE OUR SHORES

MS. ROWLEY: Followed by your break;right? You need some rest.

DR. WEBSTER: A little longer than that.

MS. ROWLEY: A little longer? Good evening. My name is Anne Rowley and I chair the Board of Save our Shores. Vickie Nichols, our Executive Director presented policy position of our organization after a close study of the Draft EIS, and I believe her position to be both reasonable and scientifically sound.

Save Our Shores is an advocacy organization. However, we serve as the voice of our supporters, those people who have trusted SOS for a long time to stand for the ecological integrity of the Central Coast. And that these people are not all scientists makes them no less qualified to be heard on this issue. Without their love and dedication, there would be no sanctuary.

Save Our Shores supporters advocate strengthening the sanctuary protection. They call us every day to ask how they can get tankers out of the sanctuary altogether. So it's really no comfort to them when we compare ATOC to the sound of the super tanker.

Protection is important to our supporters on a rational, scientific level and on a level deeper than mere reason. And, on both levels, they seem opposed to ATOC. One of our supporters perhaps summed it up best when she said, "They just don't get it. We would never put a meteorological study station up on top of Half Dome, not because of the effect on the wildlife and the protected biology up there, not because of the viewshed, but because it's a protected place; and we just don't do that sort of thing in our few protected places."

Thank you very much.

DR. WEBSTER: Thank you Anne. Ellen Fourot-Daniels, Anne Nothoff, and Joseph Raymond.

TESTIMONY OF ELLEN FOUROT-DANIELS
FRIENDS OF THE SEA OTTER

MS. FOUROT-DANIELS: Good evening, I'm Ellen Fourot-Daniels, the Science and Education Director for Friends of the Sea Otter.

Friends of the Sea Otter has a 26-year history of science and advocacy involvement in marine protection issues. We have been involved with the ATOC issue since the project first became known to the public.

In our public testimony last May, we stated that, if the DEIS and the preliminary work focused on marine mammals could convincingly show that the technology of measuring global warming was appropriate and necessary and that there would be minimal or no harm to marine organisms, then we would be prepared to see the project go forward.

What I want to give you is our thoughts on how well our original concerns have been met by the Draft EIS.

Our comments tonight will only touch on our main concerns, detailed comments on the Draft EIS, particularly shortfalls that we see are still remaining in the Marine Mammal Research Program, will be submitted as written comments.

In our view, the Draft EIS still does not adequately answer the central question posed by others: Is the information hoped to be gained from ATOC superfluous to existing data documenting global warming? Could the huge dividends being spent on ATOC be better spent on addressing management and policy selections to a problem already recognized by T-9 I-36

most people and agencies? If more data are indeed necessary, then the follow-up question is: What will be done with these data to implement necessary policy changes to address solutions to global warming?

That very important and overriding concern notwithstanding, we want to make sure that, if the project does go forward, the Final EIS/EIR include the following: Number one, a discussion of the site in November for the acoustic engineering test as an alternative site for ATOC; number two, accurate reporting of site selection criteria.

In the beginning, sites were evaluated using acoustic logistical and economical considerations relative to the needs of the ATOC climate project needs. The sites were not evaluated or preferentially ranked as the DEIS/EIR reports based on presence of high numbers of marine mammals.

Number three, whatever agreement from the U.S. Fish and Wildlife Service that exempts the project from Section VII's consultation process for sea otters, if the Service agrees, the evidence in the EIS/EIR supports that conclusion.

Number four, an outline of the program to be used to document the collection, necropsy, and cause of death analyses for marine animals, mammals, birds, fish, and turtles found dead or moribund on water or on shore during the course of the pilot MMRP and during the ATOC climate phase. This would need to include more than what the marine mammal stranding network alone is able to provide.

A time line at the conclusion of the pilot study is needed to determine how much time will be devoted to statistical analyses, peer and oversight review of results, to discussion of problem modifications to the MMRP, a long-term monitoring program, and for assurance that these modifications will be made before the start of the ATOC climate phase research.

T-10 Number six, most important, we encourage the development of a small oversight group composed of at least two members from each of the following disciplines: Ocean acoustics specialists, marine mammal experts, and conservation scientists. DH. LB

It is imperative that the people nominated to and selected for inclusion on the oversight team be extremely knowledgeable in their fields, not already associated with the ATOC or MMRP projects, and work side by side with the ATOC and MMRP scientists as the data are collected, interpreted, and analyzed.

DR. WEBSTER: Thirty second, please.

MS. FOUROT-DANIELS: We feel very strongly that the project proponents should pay for the time and expenses of the oversight team members, though a departure from requirements made of most research projects, the storm of public and scientific controversy generated by the ATOC and MMRP projects requires incorporation of the measures to ensure the objectivity and integrity that the public perceives is missing from the project.

We feel, in closing, that significant progress has been made by the project proponents in addressing initial concerns. We look forward to the Final EIS/EIR in its ability to integrate solutions to the gaps still remaining, particularly in the area of the research oversight and long-term monitoring.

Thank you.

DR. WEBSTER: Thank you, Ellen. Anne Nothoff, Joseph Raymond, Elaine Sawyer.

TESTIMONY OF ANNE NOTHOFF
NATIONAL RESOURCES DEFENSE COUNCIL

MS. NOTHOFF: Hello again. My name is Anne Nothoff; I'm a Senior Planner with the National Resources Defense Council in San Francisco. I've worked on efforts to protect the California Coast for the past 15 years and NRDC was an early supporter of the drive to establish the Monterey Bay National Marine Sanctuary.

We coordinated the technical comments of scientific experts on the proposed Management Plan.

Tonight, NRDC's comments are necessarily preliminary due to the scheduling of the hearing but we will submit written comments by the deadline.

We certainly welcome the preparation of this document which attempts to eliminate the choices confronting the permitting agencies. Our comments tonight touch on three areas: First, the analysis of alternatives; second, the site selection analysis; and third, the permit process, and specifically the relationship of the Marine Mammal Research Program to the rest of the ATOC experiment.

First, the analysis of alternatives gives troubling little attention to alternatives that would avoid or drastically minimize impacts to marine mammals, especially given the admittedly speculative value of the information hoped to be gleaned from ATOC. More serious consideration of avoidance alternatives should be given.

Second, as Table 241 in the document reveals, from an acoustic thermometry point of view, all three alternative sites rank quite comparably high. It's only when the marine mammal criteria are factored in that the Sur Ridge site emerges as preferable. But that is not what ATOC has currently proposed it is all about. The MMRP should not be used to justify a site that is otherwise unremarkable, particularly when the MMRP will be less statistically powerful precisely because of the constraints of a fixed source at this proposed site.

There is a fundamental choice here and that is that a basic decision as to whether it is desirable to put the source in a biologically rich area so you can study its effects, or a biologically poor area so it harms as little as possible, must be made. You can't have it both ways.

NRDC recommends avoidance of harm as the best policy.

Third, the information produced by a properly constructed MMRP must be used to inform decision-makers as to how to proceed with the ATOC proposal.

DR. WEBSTER: Thirty seconds.

MS. NOTHOFF: As presented in the DEIS, there is not a clear decision-making point after the MMRP that asks decision-makers to use new information to decide what to do about ATOC. There are numerous blurs in the sequence of events described in this document that cause NRDC concern.

To correct this blurring, we recommend that NMFS consider issuing a permit for a legitimate MMRP first, then requiring a separate ATOC permit for ATOC.

We are also very concerned about the approach proposed to require an SRP rather than an incidental take permit. There is a strong argument the latter is required.

To sum up, at this point, we see that this DEIS fails to demonstrate why the ATOC experiment should be allowed in the Monterey Bay National Marine Sanctuary. A properly designed Marine Mammal Research Program makes sense in a sanctuary but it should be considered independently.

Thank you.

DR. WEBSTER: Thank you, Anne. Joseph Raymond, Elaine Sawyer, Mike Sherwood.

TESTIMONY OF JOSEPH RAYMOND

MR. RAYMOND: My name is Joseph Raymond.

DR. WEBSTER: Closer to the microphone, please, Joseph.

MR. RAYMOND: And I'm a citizen in a community in which all life is connected. I don't think we need more information about how our earth ecology is in trouble, at least not in the way this work is planned to be carried out.

. think the term "low level frequencies" is deceiving. The effect of the sound is not likely to be low level. I wonder who s going to do the research on the effects of this sound on dolphins and whales and what the parameters will be.

I also wonder if some of the researchers involved would be willing to be in the water for long periods with this sound.

My initial inquiries with local people who know about such things tell me that this level of sound is potentially dangerous to humans. This makes me wonder seriously about the effects on mammals equipped to be much more sensitive than we are under water. Maybe they could keep their heads out of the water for 20 minutes at a time every four hours.

Okay, sea life, we are going to send a sound signal through your home environment on a regular basis over long periods of time which is completely atypical to your natural sound levels. But don't worry, it has been determined that these sounds won't go above acceptable governmental standards.

DR. WEBSTER: Elaine Sawyer, Mike Sherwood, Amelia Slayton.

TESTIMONY OF ELAINE SAWYER
GREENPEACE

MS. SAWYER: I first heard about ATOC last winter and, out of my concern about ATOC, my desire to take action. I contacted Greenpeace in San Francisco and began volunteering for Greenpeace last spring. I have a lot to say; I'm going to have to rush through this.

There is a substantial lack of scientific evidence on the impacts of low frequency sound on marine mammals. Whales are critically dependent on sound for social communication and for food-finding. The adverse impacts of ATOC may be difficult to detect, for example, if marine mammals are gradually deafened over time. Also, additional stress to marine mammals could cause damage to their reproductive and immune systems.

If we allow ATOC and its associated Marine Mammal Research Project, we threaten the very species our laws are supposed to protect. These are the laws, the Marine Mammal Protection Act and Endangered Species Act.

According to the DEIS, the Marine Mammal Research Project has been created to "obtain much information." Is this how we go about protecting our endangered species in marine mammals by turning them into experimental guinea pigs, potentially stressed, disrupted, and violated in their own habitat?

While more research and a better understanding of marine mammals may be of some value, I'm not convinced of that; the process so far has taught me that the institutions, scientists, organizations, and agencies that support the ATOC have not yet shown that they have the best interests of marine mammals in mind. We all know the marine mammal component of this project only came about because of public concern and outcry.

The stated purpose of ATOC is to test for evidence of global warming. Scripps Institute of Oceanography has received $35 million from the Pentagon's ARPA to conduct initial experiments for two years. If successful, ATOC would last ten years. In other words, through ATOC, it would take ten years to gather sufficient data on global warming.

Many of the world's most renowned climate scientists now state that we cannot afford to wait to take action on global warming, for the impacts of climate change and global warming have already begun.

Clean energies are already available to begin the transition away from dependence on fossil fuels which cause global warming. We need to spend our money moving forward with these clean energy technologies.

Earlier I said that ATOC's stated purpose was to test for global warming. However, new information suggests that ATOC is actually a military experiment designed by the military, for the military, and not for an environmental purpose at all.

DR. WEBSTER: Thirty seconds.

MS. SAWYER: The military experiment is intended to improve submarine detection; ATOC is the excuse for millions of dollars to go to the Navy. I am outraged. I would like to see our money spent on clean energy and used to prevent global warming rather than see it go to the Navy in the guise of some bogus test called ATOC.

Thank you.

DR. WEBSTER: Mike Sherwood, Amelia Slayton, Mark Berman.

TESTIMONY OF TORRI ESTRADA
PRESENTING FOR MICHAEL SHERWOOD
SIERRA CLUB LEGAL DEFENSE FUND

MR. ESTRADA: My name is Torri Estrada; I'm a research associate for the Sierra Club Legal Defense Fund in San Francisco.

I've come here to read the testimony of Michael Sherwood who couldn't be present here tonight. Mike Sherwood is a staff attorney, also with the Sierra Club Legal Defense Fund in San Francisco. "I am making the following statement on behalf of a coalition of environment and animal protection organizations. Please include this statement in the public record.

"The Draft Environmental Impact Statement for California Acoustic Thermometry of Ocean Climate Project is dated November 28th, 1994. However, our office, and I assume the public in general, did not actually receive the Draft EIS until Friday, December 2nd, 1994.

"Given both the complex technical nature of this lengthy document and the intervening Christmas and New Year's holidays, we have had insufficient time to prepare detailed substantive comments on the Draft EIS in time for this public hearing.

"On December 5th, 1994, I wrote on behalf of the coalition to request both an extension of time for written comments to March 2nd, 1995 and also that a second public hearing be held on or after that date at which the public's detailed comments could be presented.

"The reply that I received from William W. Fox, Jr., Director, Office of Protected Resources, National Marine Fisheries Service did not respond to either request and I therefore repeat them here.

The timing of this public hearing and the short period of time given for public comments does not inspire confidence that either ARPA, NMFS, or the University of California at San Diego are truly interested in receiving informed public comment on ATOC and the Draft EIS.

"Although we have not yet had a reasonable opportunity to thoroughly study and evaluate the Draft EIS, a quick review of the document indicates that it is legally inadequate in a number of respects. For example, the law requires that the Environmental Impact Statement on ATOC be an objective pre-decision assessment of the need for ATOC at all, of the true environmental impacts of the proposed project, and of all the reasonable, less environmentally harmful alternatives to it. The Draft EIS appears to fail to meet this fundamental standard and seems instead to be the work of advocacy designed to justify the decision that the proponents and the agencies have already made a decision to proceed.

"Moreover, the issues that we had previously raised in our earlier comments on the various aspects of ATOC have not been satisfactorily resolved in the Draft EIS."

DR. WEBSTER: Thirty seconds.

MR. ESTRADA: (Continuing with the statement of Michael Sherwood.)

"For example, we have previously noted that NMFS and ARPA must prepare a programmatic EIS on the entire ATOC proposal which considers the cumulative impacts of all portions and phases of the project. Yet, this Draft EIS continues

the agency's approach of segmenting and isolating individual parts of the project, in this case the California segment of ATOC, thereby misleadingly minimizing ATOC's true overall impacts.

"We believe that the Draft EIS is seriously flawed in other ways as well, which we will discuss in our detailed comments that we intend to submit within the formal comment period."

Thank you.

DR. WEBSTER: Thank you. We will have two more speakers prior to the 15-minute break, Amelia Slayton and then Mark Berman.

TESTIMONY OF AMELIA SLAYTON
GREENPEACE

MS. SLAYTON: My name is Amelia Slayton. I work for the Public Outreach Division of Greenpeace in the Santa Cruz office.

I have direct contact with the people who live in the south Bay communities every day by going door to door. In the past six months, I have encountered many people who have expressed concern about the ATOC project. Many of these people feel intimidated by this public process because they have not heard enough about ATOC or they don't have a background in science or public speaking.

Of the millions of people living in the Bay area, only a small fraction have really been given the opportunity to voice their concerns about this project. If the agencies involved in ATOC really wanted the public's participation, this public hearing would be held at a much later date and more effort would have been made to educate the public and invite their attendance.

Today I'm here to express the views of members of the community who cannot be here, as well as the view of the local Greenpeace staff and myself.

In the world of science, the importance of ethics is often overlooked. There is a strong moral opposition to the proposed ATOC testing in our oceans. It is highly unethical to study marine mammals by subjecting them to noise harassment, especially considering there's already evidence that the sounds produced by ATOC causes disturbance in the normal routine of these creatures.

Furthermore, the time frame for this experiment is too short to truly analyze long-term impacts on marine mammals, especially impacts that are severe yet difficult to measure such as damage to the reproductive cycles. The human influence on the creatures of the ocean has already been devastating; let's not expound this crime by conducting experiments that have uncertain benefits.

According to the Draft Environmental Impact Report, "Whether the ATOC technique will provide useful climatic information depends on surmounting a number of technical and other potential barriers." By their own admission, the results of this experiment are uncertain yet the scientists of Scripps discredit other evidence of global warming that is already available.

The United States contributes more carbon dioxide to the atmosphere than any other country. The millions of dollars we propose to spend studying climate change should be spent on clean energy and energy efficiency and other responsible efforts to reduce the effects of global climate change.

Thank you.

DR. WEBSTER: Thank you. Mark Berman?

TESTIMONY OF MARK BERMAN
EARTH ISLAND INSTITUTE

MR. BERMAN: Yes, I represent Earth Island Institute, Marine Mammal Fund, David Brower, Dr. John Hall.

We object to ATOC for the following reasons: First, I would like to reiterate that the time allotted for the review of the DEIS is totally inadequate. It has been little more than a month since this paper came out and the hearing today at 5:30 is inadequate also in the fact that it didn't give the public enough time to review the document to make proper comments.

The experiment is far-reaching with potential harm to a large number of marine species and their impacts have not been adequately addressed in the DEIS. The attempt to create separate smaller projects relating to ATOC without adequate environmental impact reports is also of a concern.

A comprehensive EIS must be prepared on the entire environmental effects of ATOC as a project whole to any part of the project before any part of this project should go forward.

National Marine Fisheries Service, our understanding, has established and enforced monitoring requirements for sound in the ocean projects such as drilling. And we don't see, in the DEIS, the same type of standard for monitoring as required by other projects of this sort.

Many species of cetacean and pinniped, as well as other marine life, reside in the test areas. We believe that ATOC poses an unacceptable risk to these species and that the rationale for the project is poorly defined. The adequacy of the marine mammal research to determine adverse effects in the time frame is also questionable.

In addition, we reiterate that the project runs counter to the protections now in place in the Monterey Bay Sanctuary.

Also, the DEIS does not address the following concern: Is ATOC the most cost effective, least invasive, proven technology available with which to monitor the ocean temperatures? It is well known that existing technology using highly accurate thermistors which measure ocean temperatures from surface waters to the depths is available.

This could be another alternative if this project must indeed go forward, which we do not think it does.

Thanks.

DR. WEBSTER: Thank you, Mark. Ladies and gentlemen, it's a couple of minutes after 7:30; let's go till quarter of 8:00 or a little thereafter with a break.

We will reconvene then with Nicole Walthall, Jane Murray, and Karen Strasser Kauffman. (Whereupon, a brief recess was taken.)

DR. WEBSTER: We're ready to begin with Nicole Walthall, Jay Murray, and Karin Strasser Kauffmann. Nicole, are you ready to come forward? Nicole Walthall. Does anyone know Nicole? Okay. Mark Berman will speak for Nicole Walthall.

TESTIMONY OF MARK BERMAN
Presenting for NICOLE WALTHALL,
HELLER, EHRMAN, WHITE and McAULIFFE

MR. BERMAN: Nicole Walthall is an attorney with Heller, Ehrman, White and McAuliffe, representing Earth Island Institute and Marine Mammal Fund.

DR. WEBSTER: Mark, excuse me just a moment. Would someone close the doors back there, please? Okay, thanks.

MR. BERMAN: I'm going to read her statement verbatim. It's full of a lot of legal document type stuff here, so --

"The review and comment period must be extended and an additional public hearing scheduled.

"On December the 2nd, 1994, ARPA, NMFS, and the University of California, San Diego, submitted for public review and comment a Draft Environmental Impact Statement/Environmental Impact Report for ATOC. This document, including well over 300 pages of text and tables, was produced after over eight months of intense effort by Scripps,

ARPA, NMFS, and other cooperating agencies. Now, in an attempt to avoid meaningful public participation, today's hearing comes just 35 days after the document's release, and only four days after the New Year's holiday.

"It is clearly unreasonable to expect the public to review, digest, evaluate and comment on this complex scientific document in such a short period of time, especially where a significant portion of that period included the year end holiday season. Our comments submitted today, therefore, are incomplete as we have been given insufficient time to review this report. We take this opportunity to request that a second public hearing be scheduled after the close of the public comment period to properly allow the public to prepare meaningful and informed comments.

"Given the extraordinary public interest in ATOC and the significant scientific controversy that surrounds it, the small extension of the public comment period to January 31, '94, is equally insufficient. This deadline suffers the same deficiencies discussed above regarding this public hearing date.

"We, therefore, reiterate our request for an extension of the public comment period up to and including March 2nd of 1995. Such an extension will contribute to a greater level of public understanding of a project that, to date, has generated an almost unprecedented level of public concern."

DR. WEBSTER: Thirty seconds.

MR. BERMAN: Okay. (Continuing the statement of Nicole Walthall.)

"The draft is inadequate. NMFS and ARPA have already received numerous letters emphasizing the need to prepare a comprehensive programmatic Environmental Impact Statement evaluating the cumulative environmental impacts of the ATOC program as a whole. In particular, these letters have emphasized that the ATOC project lawfully cannot be parcelled into separate projects for purposes of evaluating the environmental impacts of each of these related projects in isolation."

DR. WEBSTER: Thank you, Mark.

MR. BERMAN: Okay.

DR. WEBSTER: Jay Murray, Karin Strasser Kauffmann, Jean Cheny.

TESTIMONY OF JAY MURRAY
PROFESSIONAL ASSOCIATION OF DIVE INSTRUCTORS

MR. MURRAY: Good evening. I come to you tonight as a PADI dive-master. PADI stands for Professional Association of Dive Instructors, not Professional Association of Divers International, as stated in the EIS.

I'm an independent contractor hired by one of our local dive stores in Monterey. My duties include taking divers from all over the world on underwater tours of Monterey Bay, and the surrounding National Marine Sanctuary. I also help certify new divers that are ranged in age from 16 to 68 years old.

Both of these activities involve diving with people who are unfamiliar with the surroundings. Some of these people exhibit marginal diving skills to say the least.

As some of you know, beginning on August 25, 1994, I've been involved in monitoring of very unusual low frequency sounds in the Monterey Bay National Marine Sanctuary. These sounds are in the range of 36 to 38 hertz, with a main harmonic at approximately 75 hertz.

These sounds are quite invasive when they are being heard, as they tend to cause your lungs to vibrate. This reaction of low frequency sound under water is addressed in Section Four, Page 120, of the ATOC EIS/EIR. The section is called Potential Resonants of Air Containing Cavities.

In Paragraph two, the EIS states that at different frequencies between 20 and 100 hertz, not only will divers experience resonance of air containing cavities, but these sound waves will increase the pressure inside the same air containing cavities.

This leads me to wonder if being subjected to this sound while diving may have some effect on the standard dive tables that both PADI and NOWI instructors teach their students. These tables tell us how long we can remain at any given depth. The calculations are based on how much nitrogen our bodies absorb while under water due to increased pressures.

If these increased intrathoracic pressures caused by ATOC are even a minor consideration, then this aspect of the project should be investigated, and all pertaining information should be released.

In paragraph three it states that the resonant frequency of air containing cavities of

divers will increase as a function of depth. Then in paragraph four it states that at the surface 20 and 100 hertz appear to be the critical frequencies.

In the acoustic engineering test, which was done off Baja California, Section B, Part Three, it stated that the amount of low frequency energy going to the HX 554 transducer had to be limited due to a "undesired resonance at 18 hertz". This is very close to the critical frequency of 20 hertz.

I would like to know if there was another harmonic at approximately 36 hertz. In my studies of underwater acoustics this appears likely. In my underwater encounters with the Monterey mystery noise, it seems that 36 to 38 hertz produces what I would call a significant response in humans. While I have no idea the location of the source of the transmissions, or the parties responsible, I can only say that if the ATOC experiment produces the same or similar responses in divers, that I will be opposed to the proposed transmissions.

DR. WEBSTER: Thirty seconds.

MR. MURRAY: On page 123, Section Four, there's a section called Potential Human Annoyance. In this section they state that almost all human diving activity takes place within two kilometers of the shore line. I can only say that there have been and there will continue to be what we call "blue water dives". This is when we go out and dive in deep blue water.
I'm quite sure that if the ATOC project is approved, there will be interest from divers in seeing if they can feel or hear the sounds being emitted by the transducer used by the ATOC scientists.

As a PADI dive master, I'm qualified to take up to four people at a time on dive tours. As such, I plan on taking certified divers on tours to experience any effects caused by the ATOC source. Be assured, there will be divers in the area of your transmissions. If there are any adverse reactions to the noise, they will be relayed immediately to all agencies involved with the project, and all organizations questioning the many controversial aspects of the project.

DR. WEBSTER: Thank you, Jay.

MR. MURRAY: I'd like you all to know that what you were hearing was data that I recorded underwater during the past four months in Monterey. Thank you very much for the opportunity to speak.

DR. WEBSTER: Jay, for clarification, the sounds you were referring to were the ones that were being played during the break, that's right?

MR. MURRAY: That's correct.

DR. WEBSTER: Thank you. Karin Strasser Kauffmann, followed by Jean Cheny, followed by Fred Walters (sic).

TESTIMONY OF KARIN STRASSER KAUFFMANN,
MONTEREY BAY SANCTUARY ADVISORY COUNCIL

MS. KAUFFMANN: Good evening. I'm Karin Strasser Kauffmann, Chair of the Monterey Bay Sanctuary Advisory Council, and several of our council members are present this evening as well.

Our council by definition is the front line of defense for the sanctuary program, and while you agencies have been in Washington working, and in San Diego, we have been bombarded with inquiries on the project and on the proposed

draft. We've had the item on our agenda. We have had Mr. Murray play his sound for us at our meetings, and we are very eager to see the matter resolved.

We see ourselves as being a potential common ground, such a common ground as was requested by an earlier speaker, I think the second or third speaker this evening, to deal with the issue.

But let me say first, we appreciate having the draft document in hand, and having an environmental process properly followed as the council requested earlier this year, and we appreciate having the focus be, finally, on marine mammal research, rather than the larger project, and putting appropriately the horse back before the cart.

The reading, we're all -- all council members are reading it furiously, and you've certainly given an added dimension to our holiday reading. We also appreciate having the written comment period extended somewhat so that we can more professionally deal with this.

We decried tonight's scheduling of having a public hearing so close to the holidays, and on a Friday evening, and I really have to say, really have to ask, would a public hearing on any item of significance be scheduled in Washington, D.C. on a Friday night at 5:30?

We want to do our job, as you want to do yours, and this doesn't make it particularly welcoming, but because of this scheduling I'm not prepared this evening to comment officially on behalf of our council in detail on the draft, which we would like to do. We are prepared to do that in the written comment period allocated to us. We have scheduled our meeting purposefully on the 20th of January, so we'll have enough time to get it in by the 31st.

Next week and the following week our three working groups, the Research Advisory Panel, our Conservation Group, and our Education Advisory Group, are going to be meeting each in turn to discuss their various aspects in the draft, and they will be reported to our full council on the 20th, as will, I assume, members of the public who have contacted us. We will attempt to make some order out of that, and forward it to you as part of the official comment period.

DR. WEBSTER: Thirty seconds, please.

MS. KAUFFMANN: Okay. We did have a briefing in December from Dr. Andrew Forbes, at which a number of questions arose very similar to the questions that have been raised here this evening.

I also have to say as the at-large representative on the Sanctuary Advisory Council that over the last three days, and only over the last three days, I have received a flurry of telephone calls and faxes raising all kinds of questions. I feel frustrated in not being able to convey those to you, but I don't think it's fair to our council to do that ahead of their meeting. I will pass all those comments on to our council on the 20th, and again we will ultimately forward them to you.

Let me say that we welcome research in the Sanctuary, but also as the most local representatives of the sanctuary program, we want to assure that any and all primitive activities are in full compliance with the protective policies that we all worked thousand-fold to establish for Monterey Bay, and the Central Coast waters. Thank you very much.

DR. WEBSTER: Thank you. Fred Walters (sic), R.S. Sherman, and Jean Wideman. Fred Walters?

MS. CHENY: You missed Jean Cheny.

DR. WEBSTER: I'm sorry, Jean. Jean Cheny, and then Fred Walters.

TESTIMONY OF JEAN CHENY

MS. CHENY: Good evening. Have you heard the law of the sea? Have you heard the Law of the Sea realty? Most Americans haven't. It has been submitted to Congress, and I have the document here, the Treaty document, 10339.

Here is a letter from Warren Christopher to the President of the United States.

"An agreement adopted by the United Nations General Assembly Resolution on July 28th, 1994, contains legally binding changes to that part of the convention dealing with the mining of the sea bed."

Deep sea bed mining, also military, are he reasons we are having these sonar experiments. I happen to live also on the island of Kauai, also Santa Cruz.

There is a gentleman that says there are no more Russian submarines. On the west side of Kauai we have the largest submarine base in the world. We have Russian submarines in training right now with all the other nations of the world. The Law of the Sea Treaty, if ratified by our Congress, because it is an agreement and not a treaty, will give our oceans to the United Nations. Sounds great, doesn't it?

I am very concerned that the personnel of UCSC, you might think this is wonderful, that you know how to control our lives. And also to the government employees, the one question I have: is this experiment with the sonar testing for the good of mankind, and the ocean mammals? Or have you sold your souls to the big corporate interests? Good evening.

DR. WEBSTER: Thank you. Fred Walters, R. S. Sherman, Jean Wideman.

TESTIMONY OF FRED WATTERS

MR. WATTERS: My name is Fred Watters. I've been a commercial fisherman for about 41 years now. I probably have as much sea time as everybody in this room.

Pt. Sur is probably one of the most prolific fishing grounds that we have on this coast. That's where I'm fishing here right now.

We know what the effects of sonar has on fish, their ability to detect it and elude us. We use that in our fishing techniques to try and catch them, so we know that sound has affects on the fish, and that they're able to detect them, and that we use certain techniques to go about catching them. That's our business.

And when this thing goes into effect I can guarantee you that Pt. Sur is going to be one of the deadest places on this coast, because right now it's one of the most prolific grounds. It's one of the most prolific spawning grounds on the coast. At this moment I doubt it's going to be that way very much longer.

I think that the people from National Marine Fisheries Service should look at Georges Bank. The information that I've had is that there's been an ATOC system on Georges Bank, or some system on Georges Bank, for about four years now. When you look at that Georges Bank has been closed down to fishing now, and you look at the time line that the fishing has dropped there, you go back to 1990, four years, and it's a straight line down.

I think the National Marine Fisheries should take a look at that project, and see if all the rumors that we hear are true. Fishing is a tough business. It's the way we make our living. We provide product from fish for people to eat. If we don't have a place to go fish, we won't have any.

Thank you.

DR. WEBSTER: Thank you. R. S. Sherman, Jean Wideman, David Brown.

TESTIMONY OF R. S. SHERMAN

MR. SHERMAN: My name is R. S. Sherman, and I'm also a commercial fisherman, and I've fished for 20 some years.

My problem with this is that I fish out of Oregon and I fish down here. When we have an earthquake, which puts quite a large amount of sound into the water, it disturbs the fish immensely, and we don't know what's going on.

I fish right now at Pt. Sur in 3,000 feet of water. The biomass that's there, which are thorny heads, black cod, and Dover sole, which are the food fish. This sound, what is it going to do to them? The sound we know drives them away. I'd also like to know where they're going to get the permit to take these fish if they do kill them off.

Thank you.

DR. WEBSTER: Thank you. Jean Wideman, David Brown, Ken Johnson.

TESTIMONY OF JEAN WIDEMAN
CITIZENS OF BIG SUR

MS. WIDEMAN: My name is Jean Wideman. I'm a Big Sur resident. I drive past Pt. Sur, or "the rock" as we call it down the coast, many times each week. I am deeply concerned about the possible long- term cumulative impacts of the ATOC project.

Taken at face value, the DEIS under discussion tonight seems to reflect an enormous concern for the impact of ATOC sound transmissions on marine life. This is so much the case that it might appear to the casual reader of the document that the primary purpose of the program is to monitor the effects of noise pollution, rather than to add to it.

For instance, in a paragraph dealing with selecting a site for the acoustic source, we read that,

"Since the goal of these experiments is to evaluate the potential impacts of low frequency sound on marine mammals, sufficient populations must be present close enough to shore so that they can be studied."

I am not convinced that marine mammal studies were a primary consideration in site selection when ATOC planned to begin transmissions last April without any prior study of the impact on marine organisms.

In the introduction to the study, we read that,

"Transmissions would last for twenty minutes every four hours, which is necessary to study the potential effects on marine animals."

This would give the impression that marine mammal studies are the driving force behind the ATOC program. I don't think so.

T-11 According to another statement in the introduction, the goals of the ATOC program are to evaluate potential effects of the ATOC low frequency sound transmissions on nearby marine animals, and to prove the feasibility of the acoustic thermometry technique for future global ocean climate monitoring programs. It is curious that in this statement of purpose, the MMRP objective is stated before the ATOC objective, perhaps in order to project the impression that the program is extremely environmentally sensitive. I-17

In reading the DEIS, I am reminded of the common place that an investigator is likely to find what he or she expects to find. An environmentalist opposed to a proposal will expect to find adverse impact, where the initiating agency does not. A number of statements in the DEIS reflect the underlying assumption that the ATOC transmissions will have no significant impact.

DR. WEBSTER: Thirty seconds.

MS. WIDEMAN: This assumption does not always proceed logically from the immediate preceding material. I will skip over and go to the subject of the deep sound channel, my biggest question.

We read everywhere in this report that the deep sound channel sound travels at extremely long distances with very little resistance. I would like to ask, is it not possible that marine mammals are perhaps even more aware of the conductivity of the deep sound channels than the ATOC scientists who have just discovered them, that they have evolved to take advantage of the same acoustical phenomena?

DR. WEBSTER: Thank you. David Brown, Ken Johnson, Martha Van Dyke.

TESTIMONY OF DAVID J. BROWN
GREAT WHALE FOUNDATION

MR. BROWN: How's that? Good evening. My name is David J. Brown, and I represent the Great Whale Foundation, and we are opposed to ATOC Draft EIR for the following reasons.

Number one, significant alternatives are summarily dismissed. Under alternatives, the Draft EIR intentionally omits substantive consideration of the most obvious, appropriate and practical alternatives, thus, illogically arriving at the conclusion that there are no good alternatives to ATOC. Only the extremes of no action or trivial variations of the ATOC have been given real consideration as alternatives to the EIR.

We propose a meaningful alternative called ATUT as the best alternative. That's an acronym for Alternative Thermometry Using Thermometers. While ATUT may sound cute, it is actually serious, and we believe a statistical T-12 analysis will prove it really superior to ATOC in achieving the stated aims of ATOC with respect to global warming. I-52

ATUT, in addition to being actually an effective method of achieving the stated purpose, has the benefit of prospectively involving the public world-wide in necessarily a long-term endeavor that will focus attention on the issues and mysteries of climate change and other looming environmental hazards. Thus, instead of a sinister, invisible, undersea, high tech, acoustical nuisance, we can design a project with educational value in global media visibility.

The ATUT plan is to engage a large number of individuals, organizations, and governmental agencies in frequently sampling local water and air temperatures with the data flow directed to and organized by computer networks. Internet global positioning and communication satellites, Naval vessels on duty, and broadcast media will certainly have a role in this program. The successful designing and management of ATUT is assuredly within the capacity of the institutions currently proposing to run or fund ATOC.

While no doubt can seriously be related to the potential for thermometer-based measurements to provide temperature data sufficient to any stipulated level of significance over any desired time frame, and all without the least adverse impact on marine mammals.

Number two, ATOC is speculative, therefore, neither necessary nor sufficient. The Draft EIR discloses what was omitted from earlier proposals in favor of ATOC. The ATOC is not a known reliable method of detecting global ocean temperature changes, but rather is an open ended project.

Number three, the Marine Mammal Research Project, MMRP, is not rationally scoped. We agree with the National Research Council Committee Report that there is an abysmal lack of public knowledge about the hearing of marine mammals. However, we do not believe the MMRP of ATOC will be very contributory in this area of knowledge because it amounts to an ad hoc adaptation of equipment designed for other purposes.

DR. WEBSTER: Thirty seconds.

MR. BROWN: It would make more sense for the concerned institutions to rationally design and fund research focused on the basic questions at hand.

Thank you very much.

DR. WEBSTER: Thank you, David. Ken Johnson, Martha Van Dyke, Bonnie Stoehn.

TESTIMONY OF KEN JOHNSON
MOSS LANDING MARINE LABORATORIES

MR. JOHNSON: Good evening.

I'm Ken Johnson. I'm a professor of oceanography at Moss Landing Marine Laboratories. I'm also chair of UNOLS, the University National Oceanographic Laboratory System, a consortium of 58 universities ranging from Harvard down to Moss Landing, dedicated to providing the nation's scientists with access to the sea.

Today the greatest threat facing the Earth is, in fact, global warming. I think they'll find very little argument about that. We know about the threat of global warming because of the long-term measurements of carbon dioxide in the atmosphere that were made by Charles Keeling. Charles Keeling of Scripps Institute of Oceanography. It's only

through his long-term measurements of carbon dioxide in the atmosphere that we've been able to provide convincing evidence that, in fact, man is causing direct changes to the Earth's biogeospherical system.

It's only going to be through other convincing long-term measurements of other climate properties that we're going to demonstrate that these known changes in carbon dioxide are having a direct impact on the Earth's climate system.

Right as it's been stated right now that the connection now only a tenuous one through computer models. We need long-term measurements that demonstrate that there are changes in climate to provide convincing evidence to policy makers that we do need to act to regulate fossil fuels.

I can think of several avenues of doing that, but no one can tell me for sure which one is going to work, and ATOC is as excellent a potential approach to demonstrating global climate changes, one of the best avenues that we have today. It is an experiment that needs to be done. It's an experiment because it involves long-term measurements, and it's an experiment that needs to be started as soon as possible.

I think that in 1958 when Keeling started his atmospheric CO2 measurements that there were many people that suggested that was not a rational approach to monitoring the Earth's biogeochemical system.

Finally, I can think of no better place to perform this work than in the Marine Sanctuary, a place that can actually serve as a model to protect the rest of the planet.

And then finally, I just want to say my closest experience myself with marine mammals and large sound sources is that when you're on a ship with a large sound source they flock to it and ride the bow wave.

Thank you.

DR. WEBSTER: Thank you. Next will be Martha Van Dyke, Bonnie Steehn or Stoehn, and J. P. Novic.

TESTIMONY OF MARTHA VAN DYKE

MS. VAN DYKE: My name is Martha Van Dyke.

If this sound project is allowed to be put into effect any place in the ocean, then it should be required that every person involved have implanted in their bodies a device that will emit an equal amount of noise.

Thank you.

DR. WEBSTER: Thank you. Bonnie Steehn – Stoehn, Bonnie Stoehn, J. P. Novic, and San Lorenzo Valley High School.

TESTIMONY OF BONNIE STOEHN

MS. STOEHN: Thank you. First of all, I'd like to say that I'm just very impressed with the articulate, knowledgeable, eloquent presentations, and I certainly hope that they are listened to.

I'm here as a citizen, and a taxpayer, and I've read through the DEIS, and I've done a little research on my own. I have some concerns.

I read things like $20 billion sub-sea listening devices that have been previously installed by the military will be part of ATOC, that special receiving equipment will be installed at U.S. Navy facilities, and I try to figure out where that's going.

I've talked to a gentleman who coordinates research in the Monterey Bay National Marine Sanctuary. He gave me a lot of information. He told me he's talked to many of the scientists involved with the ATOC project, and I said to him, wait a minute. Where are we going with this? Bottom line, what are you going to do with this information? And he said, oh well, the data will be presented to leaders of third world countries to convince them to tighten laws in regards to the release of harmful emissions into the environment. Oh. So, there we go for the purpose.

T-13 I-36

What about the feasibility of the study? There's a lot of technical jargon in the report. And it's been like a few years since I've been in a physics class, but I'll tell you one thing that I learned that I remember, that heat rises.

And I hope it's not much of a stretch for you folks to understand that to me that means that if the surface of the Earth is warming up, that heat is probably going to go up, and not down 800 meters into the sea.

And then I also thought well maybe it's because I'm just sort of a lay person, and there's a lot more to it than that. But I had the good fortune today to get a hold of a copy of the commentary on the ATOC report put together by Norman Seaton, Ph.D., physicist, who has already given us his comments, and I'll just quote from that. And he says,

"It would require 2,600 years before one could detect even a temperature change of just one ten-thousandth centigrade at the deep sound channel depth of 900 meters."

That doesn't seem like a huge stretch to me. How is all that heat going to get down there, and what is that ten years that we're talking about? So I'm just wondering, is this really aimed at measuring global warming? Proving global warming? I tend to think, and again, just as an average citizen, that we're looking at something that's going in just the opposite direction.

DR. WEBSTER: Thirty seconds, please.

MS. STOEHN: That if we don't have any measurements of temperature changes after our ten years, or a few years, whatever it is, doesn't begin to approach the 2,600 years that I just mentioned. Where are we going with this? What is this? It doesn't make sense to me.

DR. WEBSTER: Thank you.

MS. STOEHN: Thank you very much.

DR. WEBSTER: J. P. Novic, San Lorenzo Valley High School, and Jane Podesta.

TESTIMONY OF J. P. NOVIC
CENTER FOR ANIMAL PROTECTION AND EDUCATION,
and IN DEFENSE OF ANIMALS

MS. NOVIC: Good evening. I'm J.P. Novic, and I'm the Executive Director of CAPE, the Center for Animal Protection and Education, with offices here in Santa Cruz County, and also in San Mateo. I'm also here tonight to represent the national organization In Defense of Animals, IDA, based in San Rafael, California.

Both IDA and CAPE would like to express opposition to the proposed ATOC project on the grounds that the provisions of the ATOC project represent undue and absolutely unnecessary harassment of marine life. IDA and CAPE assert that the Draft EIS/EIR for both the ATOC and MMRP projects fail to demonstrate that the invasive techniques proposed for collecting data would be safe for the abundant marine life now inhabiting the chosen test sites.

Furthermore, we feel that conducting such tests in a marine wildlife sanctuary is totally inappropriate, and runs contrary to the purpose of a sanctuary.

IDA and CAPE are concerned about the objectivity, and therefore the accuracy, of the data to be collected by those scientists involved with the Marine Mammal Research Program. Since the MMRP is essentially funded by ATOC, this represents a potential conflict of interest, and leads to doubt about the objectivity of data.

Furthermore, the criteria used to determine what constitutes a negative impact on marine mammals are neither sensitive enough, nor comprehensive enough, to present an accurate assessment of the effects of low level sound blasts on marine life.

While we acknowledge the need for research into the behavior and habitat of marine life for the purpose of protection, preservation, and advancing our understanding, we assert that this information can be obtained through non-invasive,

observational research, and that projects such as the MMRP constitute harassment of highly sensitive, and in some cases endangered marine life, and should simply not be undertaken.

For these reasons and others, IDA and CAPE find that the EIS/EIR for the ATOC and the MMRP projects simply does not justify proceeding with these projects as proposed. Thank you.

DR. WEBSTER: Thank you. San Lorenzo Valley High. I think they all probably managed to make their comments the first time up. That brings us to Jane Podesta, Jane Mio, and Teresa Lucques.

TESTIMONY OF JANE PODESTA

MS. PODESTA: Thank you. My name is Jane Podesta, and I'm a resident of Santa Cruz. I've lived here for about 20 years.

And in listening to the previous testimony, I have learned a great deal from both the scientists and the environmental groups. I am against ATOC, and they have presented reasonable testimony that confirms my feeling about it.

Personally, I feel that humans possess a certain arrogance to believe that we have the right to go into the habitats of other creatures, either for experiments, to dominate, and possibly to destroy their habitats. I think we should stop doing that.

Another thing that I was concerned about is the financing of this, coming from the Department of Defense, and I think that has been answered by some of the people also. I believe that it's connected with some sort of defense communication. There's evidence still of submarines and so forth, and I think in this day and age that's really tragic to go on with that sort of thing.

And I believe that global warming could certainly be taken care of much better, as has been suggested, by clean fuels and we certainly have enough statistics about how fossil fuels are causing global warming, and I just want to say I agree with the people who have expressed that better than I.

Another thing is, the Earth -- the planet has certain cyclical climates and changes all through history, and I think again that might be a little arrogant that we think that we can change such events that happen. I think if we just would sort of go with nature and not interfere with it quite as much.

Thank you very much.

DR. WEBSTER: Thank you. Jane Mio, Teresa Lucques, and Gary Quinn.

TESTIMONY OF JANE MIO

MS. MIO: Hi, I'm Jane Mio, and you wouldn't believe how many speeches I have written since I knew this hearing was coming up, and they just all didn't make it, and so today I will just speak the best that I can.

I'm not a scientist. I'm not an expert. I pay my taxes, and you intend to do a research project that is going to cost quite a bit of money, yet I don't see really the benefit to us humans. I could see the tax money go much more to education, and I would be definitely sure what that benefit would be.

I also today stand in front of you as a mother, and as a mother I do not need a degree to know what intrusive sound does to my children or to their learning habits. My children, when they have been exposed to a lot of sounds, too much activity would show that they would get fidgety. They would get stressed, and when you touch their body, their muscles were stressed and tight. With that assumption I also assume other living creatures respond similar, and considering that, I'm deeply opposed to the ATOC project.

And today also I stand in front of you as somebody who has watched science become a business, and I know that it is very, very difficult for many, many scientists to get the research money that they need to find out what they want to find out. Yet I do ask all of you scientists, you have gone to your science because you had that spark, and you had that

love for that field. I ask you to really go back to that spark that you had, that love for that field, and not to sell your soul and your opinions for that money that will guarantee your research.

Thank you very much. Good night.

DR. WEBSTER: Thank you. Teresa Lucques, Gary Quinn, Cat Peterson. Teresa? Gary Quinn? Cat Peterson, followed by Steve Whale, followed by Lee Otter.

TESTIMONY OF CAT PETERSON

MS. PETERSON: Good evening everyone. My heart is warmed to see so many people who are against ATOC. I feel it is an atrocity.

The Jacques Cousteau Society came out with a comment that it wouldn't work, that there are many micro-climates in the ocean at different levels, and they change. Surely we've all been swimming and noticed hot areas and cold areas.

First of all, it won't work. Secondly, we're doing the wrong thing. We're throwing the baby whale out with the ocean water here, because if you have a baby that has a fever, what do you do, stick in the thermometer every half hour? Or do you fix the fever? We're just sticking in a thermometer, and we need to stop creating the problem, and start spending some of that millions of dollars in solar energy and alternative energies.

I play the piano sometimes at home, and I have an aquarium, and there's a beautiful angel fish who loves it when I play the piano. She just comes and swims by the piano, and sits still and listens with all her might, and I know she hears me, and I know that she's very sensitive to it.

I'd like to close with a poem. It's called Noise.

Good vibes, bad vibes, air currents swaying to the rhythm and the rhyme,
Amplitude increasing, the music hard to find,
The interest decreasing, good vibes are
left behind,
Stronger, louder, faster, harder, tension
builds within,
The psyche starts to wander for relief
above the din,
Very loud, consumptive force, all other
systems down,
Abandon flight, abandon to the sound.
Who could, who would? Who knows when it
will end?
And then, at last, dead silence.
Noise.

DR. WEBSTER: Thank you. Steve Whale, Lee Otter, Gary Hillman.

TESTIMONY OF STEVE WHALE

MR. WHALE: I'm presenting my testimony tonight against ATOC, like the majority of people here today. This study is obviously flawed, inadequate and inaccurate for so many reasons that, of course, I don't have time to say all I have to say to you gentlemen.

To the rest of you I want to say that I used to live on Maui, and I used to dive under the water and listen to the whales sing, and they would groan, and screech and just have all kinds of fun talking to each other, and on any day when the waves weren't too loud you could dive down only 10 or 12 feet and hear them. Their language is -- it's intricate, it's complicated, it's wonderful, it's inspiring.

To think that you can blast some 195 decibels at them, and that they won't notice is something only some really stupid sold out scientists could even try and convince you of.

Okay, on the inadequate part of the DEIS, the alternatives to the study for global warming were not adequately addressed. There are many non-invasive techniques. There's a new satellite laser technique that's determining the precise level of water around the world. There's atmospheric CO2 studies, and many other ways to tell that there's global warming. Of course, we already know there's global warming.

According to the numbers that I've seen, at 39 miles away this sound will be 10,000 times louder than on the side of a freeway. That's pretty loud. Non-invasive and minimal impact is what these people would have you think of something 10,000 times louder than the side of a freeway. Have you ever been on the side of a freeway?

This is going to be projected not into the whales' homes, but into their sanctuaries. How would you feel if this was done in your home by your neighbors? Or, how about in your church? Would you like us to come and spend two percent of your church time with noises so jarring that you couldn't speak to your children, you couldn't even hear yourself think? Well, apparently you don't care if the whales do it. Anthropomorphism, I think, or is it anthrocenturism?

One of those big words. It looks like the scientists have said to themselves here is this one place on Earth, this deep channel that's absolutely silent. The deepest, quietest place on the entire Earth. Well, let's blast it full of noise.

The inverse square law has been mentioned here many times. If the inverse square law applied to a wave forming tunnel like this, of course the experiment wouldn't work. The waves would never get to New Zealand.

DR. WEBSTER: Thirty seconds.

MR. WHALE: That's a real easy thing. Well, I just I better jump to something more fun. Let's see, the purpose of this study is to test global warming. No, no, wait a minute. The purpose of the study is to study the whales, those gentle creatures. That's why we're doing it. The purpose of the study is the Department of Defense study in communication with under water submarines, and the detection of enemy submarines. Don't be bullshitted by these guys.

These scientists who approve this study as no problem are the same ones who said that, for nstance, Chernobyl would have minimal impact. Boy --

DR. WEBSTER: Thank you.

MR. WHALE: Why don't you spend your 34 million on solar energy, or something that will stop global warming? And I really think you guys should be ashamed of yourselves for --

DR. WEBSTER: Thank you.

MR. WHALE: -- considering this. Mr. Whale. The otter's coming.

DR. WEBSTER: Lee Otter, Gary Hillman, Torri Estrada.

TESTIMONY OF LEE OTTER
CALIFORNIA COASTAL COMMISSION

MR. OTTER: Well, you just heard from a whale, now you're going to hear from otter, and my name is Lee Otter, and I am a Coastal Program Analyst representing the staff at the California Coastal Commission.

The primary focus of our concern is the projects conformance with the Coastal Act Policy, Section 30240, and that's the section that is what I think is one of the cornerstones of the California Coastal Management Program, and this section requires that all new developments, and this includes undersea structures, must be designed and located so as to avoid any significant degradation of environmentally sensitive habitats.

In terms of its function as habitat for blue whales, humpback whales, and other migratory cetaceans, I believe that we have to consider the entire North Pacific basin as an environmentally sensitive habitat area for Coastal Act purposes.

Therefore, we strongly support the concept of a Marine Mammal Research Program as a biologic benchmark, not just for the acoustic thermometry phase of the project, but for many other concerns that we have to deal with, not only in the Monterey Bay National Marine Sanctuary, but along the entire California coast.

I believe that the Marine Mammal Research Phase will help to remove some of the rampant speculation about the degree of impacts, both pro and con, on this transoceanic environmentally sensitive habitat area.

I also reviewed the Draft EIS/EIR in terms of its acoustic science. I have gained some experience in this area, because I suppose I presume I'm one of the few people in this room who has actually used the existing horizontal ray system at Pt. Sur, and after reviewing the acoustic science parts of the Draft EIS/EIR, I concluded that the information that is presented there in terms of the physical oceanography is credible, and represents a sound basis for going on from here.

Finally, the information presented in the EIS/EIR document seems to support a hypothesis that's at least implicit in the document that there will be no significant degradation of the marine habitat. The proposed Marine Mammal Research Program is essential for testing this hypothesis, and for making informed decisions about continuing the acoustic research.

Now that sounds like good science, and I believe it is good scientific method, however I also agree with Anne Nothoff that we need a clearly stated commitment, and criteria for cessation or modification of the project in the event adverse impacts on marine life are detected. That's the good use of science.

In the -- excuse me, in conclusion, theCoastal Commission asserts that this project is subject to its review authority under the Federal Coastal Zone Management Act. We anticipate receiving a consistency statement from the project's proponents, after which our staff will formulate a recommendation for our commission. After public hearing, which has not been scheduled at this time, the Coastal Commission will then vote to concur or object pursuant to this federal consistency process.

DR. WEBSTER: Fifteen seconds, Lee.

MR. OTTER: I would ask that members of the audience who are interested in this process please contact our office in Santa Cruz if they wish to be on the notice mailing list for this future hearing.

Thank you.

DR. WEBSTER: Thank you. Gary Hillman, Torri Estrada, Dorian Hauser. Gary Hillman? Torri Estrada? Dorian Hauser, Dorris Welch, Debby Molina.

Torri Estrada?

MR. HAUSER: Dorian Hauser.

DR. WEBSTER: Dorian?

MR. HAUSER: Yes.

TESTIMONY OF DORIAN HAUSER

MR. HAUSER: I'd like to thank everybody for coming tonight. My name is Dorian Hauser, and I'm a graduate student in the Marine Mammal Physiology Program at UC Santa Cruz.

I'd like to say that I have spent numerous hours and suffered a multitude of headaches and sunburns studying the behavior and physiology of various marine mammals, all in the hopes of elucidating any effects that the ATOC project may possibly have upon these majestic creatures.

However, the process of gaining this knowledge is slow. Any of you that have taken on a complex task know that things never go as planned. This is more so in the sciences, and even more so in the field sciences where your subjects have as much to say about when you see them as you do.

In this instance, progress and the gaining knowledge about the ATOC project is as much controlled by the presence of the marine mammals as it is the presence of the researchers. If the saying patience is a virtue has ever held true, it should be applied in this instance.

There is a beacon of information ahead though. We now have the technology to track animals for long distances, even around the world. In fact, for some marine mammals we can observe their physiological parameters and behaviors both under water and over great distances.

The point being there is now the means to actually see if marine mammals are affected by low frequency sound. If they are startled by a blast of sound then we can look at their heart rates and assess this effect. If they are annoyed and try to move away from the sound source then we can look at their routes and their dive patterns and compare them to what we know to be their normal or typical patterns. We can find out. To quote the six million dollar man, we have the technology.

To abandon the project now would be to abandon a possible tool in measuring global climate changes. To abandon the ATOC project due to its controversial nature is absurd. If it is to be abandoned, then do so after its practicality and possible consequences are fully assessed. We now have the capability to answer some of the questions we have about the effects of low frequency sound upon marine mammals. The gaining of knowledge is a slow process. Be patient. Let the information come. Find out if the sound source will have an effect, and then make your judgements.

I also beg that each of you that are interested in finding out what we do know about the marine mammals, stay and listen to Dr. Daniel Costa's talk during the project information.

Thank you.

DR. WEBSTER: Thank you. Dorris Welch, Debby Molina, Anne Nothoff. Anne, are you requesting an additional three minutes? Anne, are you still here?

Okay. Dorris Welch?

Debby?

TESTIMONY OF DEBBY MOLINA

MS. MOLINA: My name is Debby Molina, and I am strongly opposed to the proposed ATOC project for the following reasons. I'm not saying anything new, but --

First, the rationale. We already have plenty of studies and data showing that there is global warming. We do not need another experiment that proposes to tell us what we already know. What we need is global action.

I see this project as spending millions and millions of dollars which -- peace dividend money, by the way, to re-invent the wheel. Investigate solutions, and put them into practice instead.

Second, the project itself has a poor experimental design, which we've heard from other people. It has far too many variables.

Third, the proposed site is within the Monterey Bay National Marine Sanctuary, and the two alternate sites are adjacent to the Sanctuary. Under the laws governing the sanctuary it is illegal to harass and/or injure marine mammals, which transmitting 195 decibel sound waves would surely do.

On page C-4 of the EIS, it mentions that previous studies of marine mammal response to human- made noise, and these were shorter term and quieter than the proposed 195 decibels, they are showing a 50 percent avoidance response, and a detectible change in the swim direction of these mammals.

Four, the present permit application to the Monterey Bay National Marine Sanctuary required that all installation activities be completed before July, 1994. A new request to extend the installation permit should be denied due to the proposed activity harassing and harming animals in the area.

Five, 195 decibels is loud enough to permanently injure hearing. Many marine mammals and fish use their acute acoustic abilities to migrate, hunt, communicate, et cetera.

I am a teacher of deaf and hard of hearing students, and I know the long-term effects of exposure to loud sounds. It's a T-14 gradual process which will be very difficult to ascertain in marine mammals until it is too late, and the mammals are deafened, their behavior altered, and their abilities to communicate, migrate, reproduce and locate sound are I-122 destroyed.

Let's see. There is sparse research regarding the effects. This report extrapolates about the sounds of super tankers. The EIS is trying to equate apples and oranges here. 120 decibels versus 195 decibels, moving versus stationary, --

DR. WEBSTER: Thirty seconds.

MS. MOLINA: -- surface of the water versus depth in the water, sporadic versus continuous. It's just not a good equation there.

And it does not make sense to me to damage one aspect of nature to try to determine if another has been damaged. I support alternative number two, no action.

Thank you.

DR. WEBSTER: Thank you. Anne, are you requesting three additional minutes? Okay.

Jeanne Morris, William Morris, Bernie Tershy.

Jeanne or William Morris?

Bernie Tershy?

Kelly Allman, Danielle Waples.

TESTIMONY OF KELLY ALLMAN

MS. ALLMAN: Good evening. My name is Kelly Allman, and I am a graduate student at San Francisco State studying echolocation of killer whales.

I worked on another Navy project. I was an observer representing NRDC last summer on the Ship Shock Project (phonetic). I have a lot of experience working with boats, with marine mammals and behavior, and acoustics. I have just a few comments to make on the Draft EIS, and I will submit written comments later.

Number one, 1993 proceedings of the General Acoustical Society of America indicate that there is an impact from low frequency sound on several species of marine mammals. Also the reason for the paucity for limited information on low frequency impacts is that it's not possible to detect significant or subtle nuances in behaviors on these animals. We don't live down there. With the tracking methods proposed, the only one that's measuring heart rates is on the elephant seals. We will not be able to detect subtle behaviors of the larger marine mammals.

The difference between this sound proposed and the euphemism like a shopping mall, or maybe a tanker, is that a tanker might be a loud, invasive sound, but it provides relief. It is harmonic. This is a pure tone sound, and there is no relief, and there's a big difference, I think, I don't know though. We will not find that out with the proposed pilot study, especially in the amount of time allotted.

We need a longer pilot study, number one. How do they expect to find out reproductive information in this allotted amount of time? That's kind of ridiculous. Personal feedback on the Heard Island experiment from people who participated in it also indicate that it was a ridiculous pilot experiment.

We need to consider alternatives to the ATOC project, as it is designed. And my question as a citizen is, is this project really justified? If there is a measurable effect on marine mammals, is the aim to reduce noise pollution? Shipping traffic has just been approved to increase 73 percent in Alaskan water, sensitive areas. Okay. I think the world is not going to get any quieter. It's going to get noisier, okay?

Another point, Naval funding is nothing new in marine mammal research. It does a lot of good research. I think there's a lot of generosity, great scientists -- oh, by the way, the scientists working on this project are excellent, and they deserve respect from the citizens.

DR. WEBSTER: Thirty seconds, please.

MS. ALLMAN: The Naval funding is nothing new. People should read old studies from 30 years ago. Scientists are realists. We probably think the world is not going to get any noisier, fossil fuel emissions are not going to decrease, so it's up to the scientific community, and the non-scientific, non- published public to work together without demonizing one another's view point.

DR. WEBSTER: Thank you very much. Danielle Waples, followed by Derik Eselius, and David Briggs.

TESTIMONY OF DANIELLE WAPLES
MARINE MAMMAL RESEARCH PROGRAM

MS. WAPLES: My name is Danielle Waples. I am a member of the Marine Mammal Research Program behavior team, a student at UC Santa Cruz, --

DR. WEBSTER: A little closer to the mike, please.

MS. WAPLES: -- and I've been studying behavior of dolphins for the past eight years.

In the last six months I've been going out on a 25-foot boat in all kinds of weather conditions with an incredibly dedicated group of volunteers for the sole purpose of studying whale and dolphin behavior.

I would like to just make two points tonight. I think there's common ground between the environmental groups, the concerned citizens, and the research community, and that is that we all care deeply about marine mammals. That's why I, and the doctors, and the volunteers are working in the field that we're working in, because that's where our interests lie.

The other point I'd like to make is that I would like to see, I guess, perhaps a little more confidence in scientists. I would like to think that we have the experience to do this research, and we have the concern, and interest, and love for marine mammals to do this research well.

Thank you.

DR. WEBSTER: Thank you. Derik Eselius, David Briggs, Galen Erin.

Derik?

TESTIMONY OF DERIK ESELIUS

MR. ESELIUS: Yes. I would ask that you be careful. This is something real, and that these creatures are alive, just as you are alive, I am alive, children are alive. And we all value having a home, whatever form that may take, whether it be deep in the ocean, or in church, as this man said.

We must take these things into consideration, wisely. We are all here for a finite time, just a heartbeat. A heartbeat in the world, and we're gone. We must take others into consideration in that heartbeat. We must consider future generations, and species that are not the same though connected.

So be careful.

DR. WEBSTER: Thank you, Derik.

David Briggs.

TESTIMONY OF DAVID BRIGGS

MR. BRIGGS: Hello, my name is David Briggs, and I've been involved in research on killer whales for over ten years now. Most of this work has been up in British Columbia, and very little of it here in California, but I think some things that I've learned from my work in Canada apply here in California.

Over the ten years of the work that we've been doing -- I should also add that my work first began as a student here at the University of California at Santa Cruz, and I agree with what Kelly Allman has said, that the scientists that are working on this project do deserve respect from the community. They are very well-qualified, knowledgeable, and much respected in their field by their peers, and some of the best scientists that we have today.

At the same time, I do believe that the project has some flaws in it. My experience has been up in Canada. I've been Project Director for the Ecological Reserve Program for Ministry of Parks in British Columbia. We have been doing work on the investigation of the effects of human activities on killer whales that have used the ecological reserve, Abuson Bite (phonetic), up there.

Over the ten years we have produced many government publications, university theses, conference presentations, journal articles, et cetera, but there hasn't been any conclusive evidence that we really can say -- well, I can say conclusively that we have no conclusive evidence on the effects of vessel traffic on the whales up in British Columbia. A lot of the papers that have been produced are being debated, and we're trying to put it together.

Every year we look at the methodology of the work that we have done, and we're trying to improve upon the work that we have done, but as of yet we have not come up with any definite conclusions on the effects of noise on the whales. This is not to say that I don't believe these effects -- that these effects do not exist. I do believe the effects do exist.

I believe there's a lot of variance from different sources of noise on the whales. We have heard whales stop vocalizing. People were referring to earlier of a speedboat approaching within 100 meters of a hydrophone. We have noticed killer whales stop vocalizing as speedboats have approached by that distance. We've also noticed killer whales stop vocalizing when we've had freighters that have been as far as ten miles away. You could barely hear the first murmurs of these freighters show up. We've had killer whales that have been vocalizing pretty regularly over hours suddenly go completely silent, and apparently trying to orient and find out where these vessels are coming from.

So I do believe that there are effects out there, and I cannot support the ATOC project at this point. Having a six month time period to try to determine the effects on marine mammals, I believe, is totally inadequate.

We have been looking at this issue, like I say, in Canada for ten years, and there's still much debate. There's much to be learned, and I do not see how anything can be determined over a six-month time period.

DR. WEBSTER: Thirty seconds, David.

MR. BRIGGS: I would just like to say in conclusion that I cannot support ATOC as it stands, and I definitely would have to see an improvement on the marine mammal research part of the project. And if we're going to be looking at any long-term effects from noise on these whales, Kelly alluded to the fact of looking at reproductive issues, and we can't determine what's going to be happening in six months. There's no animal that has a gestation period of six months. We need to look at this over a much longer time period, and so I do not support ATOC as it stands.

Thank you.

DR. WEBSTER: Thank you.

Galen Erin?

TESTIMONY OF GALEN ERIN

ERIN BUILDERS

MS. ERIN: Members of the panel, and members of the public, thank you for being here. It was hard coming over Santa Cruz Mountain, I'll tell you.

My name is Galen Erin. I am a general building contractor, and I'm authorized to speak on behalf of two other individuals whose names are at the bottom of this document, which I'm going to give to you when I'm done here.

T-16 Okay. At the first public hearing held in Santa Cruz on May 16, 1994, we informed the public that the ATOC project is not for the purpose of conducting acoustic thermometry of ocean climate, but that the Department of Defense under cover of the Scripps Institute UCSD wants to set up ATOC for military purposes. We believe that Dr. Walter Munk, the I-1 individual heading this project, is aware that the project is for military purposes, and if he wasn't before, he is now.

The Department of Defense, because the oceans are the last frontier on our Earth, there is a race among nations, the United States included, to claim territory for possessive purposes. The Department of Defense wants to observe, to spy on, to monitor other nations in the sea. They intend to utilize the sound generated from the proposed ATOC locations in Monterey and Kauai to determine the size, the shape, the speed, and the movement of ocean going vessels, and activities of other nations. The data gathered by ATOC will show up on highly sophisticated devices utilized by the Department of Defense. Now everybody knows that in this room.

NASA has already confirmed the rise in sea levels through the use of the joint U.S.-French TOPEX-Poseidon satellite which shows a rise in average sea levels of three millimeters, or about .12 of an inch per year, which confirms what tide gauges have recorded throughout the world that the sea is, in fact, rising. We don't know if it's temporary or permanent yet.

I have enclosed a copy of an AP wire printed in a local newspaper as part of this document.

There is a delicate balance of life in the sea, and humans are consistently creating imbalance in the ecosystems, including the ocean. There is already too much pollution in the oceans. Those individual humans with less intelligence do not understand that the ATOC project will have dire effects on all life, including humankind.

What will happen to marine life if this project is allowed to proceed? The immune systems of marine life will be negatively impacted, and over a period of time will lead to premature death of cetaceans such as whales and dolphins. Micro- organisms and plankton will be destroyed. The ability of marine mammals to navigate will be adversely affected. Their hearing organs consist of very sensitive tissues, and very sensitive elements, which will be damaged.

DR. WEBSTER: Thirty seconds.

MS. ERIN: All life in the ocean will be negatively impacted. We respectfully ask that you deny the Scripps Institute, UCSD, Research Permit Application P557 and P557A.

Thank you.

DR. WEBSTER: Thank you. Ladies and gentlemen, that brings us to the close of the public testimony. We will now take a very short break while we prepare to go into the project information section, in which the ATOC project team will make presentations.

We will then close the official public hearing, but I'll remind you that the project team has offered to remain to answer any questions that anyone would like to pose to them following the hearing.

Why don't we take about a three-minute break, and we'll then begin the project information. (Whereupon, a brief recess was taken.)

DR. WEBSTER: This project information section, if I may have quiet, please. The project information section will be presentations by Dr. Forbes, Daniel Costa, and Dr. Munk. The total time for this will be in the neighborhood of 20 to 25 minutes. We will then close the public hearing, and at that point the project team will be available for your questions. There will not be a question and answer period during the project information. This will be presentations by these three project members, beginning with Andrew Forbes.

PROJECT INFORMATION
Presentation by
ANDREW FORBES

DR. FORBES: My name is Andrew Forbes. I'm Project Manager of the Acoustic Thermometry of Ocean Climate Program. I've listened with interest tonight to your many comments and concerns.

There is one concern that I have that I'd like to share with you, and perhaps just elucidate just a couple of points in the EIS itself. That is that many of you who are residents in this area hold the sanctuary very close to your hearts and your minds, and it was not a decision taken lightly by the program to propose the Pt. Sur area as a site for an acoustic source, and for those of you who haven't had the opportunity, or the time, or made the time to read this document I'd like to run through briefly the site selection criteria that we applied to a number of alternate sites which left, I must say, Pt. Sur as standing head and shoulders above the others in its suitability for this experiment.

A suitable source site must, as the EIS says among other factors, be at or near the deep sound channel depth. The sound channel in this area is at about 800 meters depth, and the site that I've put up on the board here shows as the asterisk just inside the sanctuary boundary due west of Pt. Sur. That asterisk shows you that the proposed source site is at the depth of the sound channel at approximately 800 meters, or 3,000 feet.

The site must also have a downward slope in directions of both the North Pacific receiving stations, and towards the southern ocean, or New Zealand, where we plan to place the receiver. Obviously it must be without significant acoustic obstructions like nearby seamounts, and so on, and underwater features, and most importantly, and of most concern to many people here tonight, it must have just sufficient populations of marine mammals and sea turtles, for example, present close enough to shore that they can be observed and studied.

Now in just a wee bit more detail, if we take the marine mammal question first, a whole range of potential source sites were examined in the Pacific Ocean. And in the East Pacific a number of these source sites were initially assessed for their ability to meet or achieve the Marine Mammal Research Program objectives. As well as a sufficient population of marine mammals that would allow adequate data to produce statistically meaningful results, there had to be some baseline data or estimates of marine mammal populations, and it's over the last year that Dr. Dan Costa, from UCSC who will speak next, has been doing this very fundamental baseline work. He is able to do that because the proposed site is close enough to shore that it can be serviced by light aircraft, and surface boats and vessels.

And it's also desirable for any of the site locations that we considered that it be within the vicinity of other noise sources, so that ours is not the only source of sound, underwater sound, to which the reactions of marine mammals can be studied or observed. It also, from a purely practical point of view, all of these source sites must be in an area that is conducive to making observations from the perspective of weather, and wave swell, and currents and so on.

From a physical oceanography point of view for the acoustic thermometry, I have mentioned the deep sound channel access, and the clear acoustic view. It's also necessary to find a place that is locally flat so that you can land your sound source when it's deployed from a ship without it rolling or tumbling down a canyon, or off the steep slope of a seamount, for example.

Another constraint or reason for selecting this particular site is that we needed to be able to make the connection to shore. This sound source requires a modest amount of power, therefore we need a power cable to connect it to shore, and at this particular site, not the only one, but it certainly fits this criteria well, there's an old Naval facility which can serve as the socket into which you plug your power point and the cable. And that the source site is also close enough to

shore that this length of power cable doesn't become prohibitively expensive or technically difficult to supply the correct voltage and current.

So out of a number of these potential sites, all of which are detailed and assessed in the EIS, Pt. Sur proved the best in all respects, and although there are other sites outside the sanctuary, within say a 100-kilometer radius or 100-mile radius of this best site, they involve technical or observational difficulties that are very difficult to overcome.

The second point I'd like to make is about the conditions of suspending the transmissions of sound once this project gets under way if any acute or chronic responses are observed from marine mammals.

I have heard some concerns raised that we haven't spelled this out clearly enough, and I'd just like to read to you the one or two sentences which relate to that in the Appendix C of the EIS, and if at the end of this it's still not clear to you exactly who is going to raise the red flag to suspend the transmissions while the source of the acute or chronic response is being investigated, I can assure you that your comments on the detail of how this protocol should be constructed will be taken on board, and we'll try and make that clearer in the final version of the EIS.

"Under the present arrangement the National Marine Fisheries Service and the Marine Mammal Commission will be consulted by the ATOC Marine Mammal Research Program Director to help evaluate the biological significance of any observations of acute or chronic response, and to determine whether the experiment should be modified or terminated. Termination will be considered appropriate if the observations indicate that animals are being injured or harmed by, or as a consequence of, the sound transmissions, or the sound transmissions are interfering with calving, nursing, calf rearing, breeding, or other biologically important functions."

I think that states it clearly. As I mentioned, it doesn't say by name who is the responsible individual, but we will take input and comments on that particular issue, along with many others that have been expressed here tonight.

Thank you.

DR. WEBSTER: Thank you, Dr. Forbes. Dr. Costa?

Presentation by
DANIEL COSTA

MR. COSTA: Thank you. I just wanted to make a few quick comments about the Marine Mammal Research Program, and a few points to hopefully clarify.

Some people have questioned the inception of the Marine Mammal Research Program. I have only been involved with being the Research Director for the California Marine Mammal Program for a year. However, I was familiar with the development of this project from the beginning of this project at the end of the Heard Island project, which was an initial pilot study which has nothing to do with the funding or any other sources. Many of the players are the same. From the inception of ATOC, the marine mammal effort was an integral part.

Now, I wasn't a part of it. I had heard of the project. It wasn't until a little over a year ago that Chris Clark invited by in board in association with Walter Munk, and I made it clear, as did Chris Clark, that our role in this was to ensure that marine mammals were protected, and the reason we're involved in this project is our concern for marine mammals, and our concern to understand whether or not low frequency sound, and all forms of human produced low frequency sound, are a problem with marine mammals.

We've heard today the question that there's a paucity of information. Let's ask the question why there is a paucity of information. There's very little resources, i.e. money, to study these issues. Two, there is very little awareness of this issue. The one very positive thing that came out of ATOC is there is tremendous awareness now of this issue of low frequency sound and potential impact on marine mammals, so hopefully, whether ATOC goes forward or not, hopefully this awareness will carry on, and something positive will come out of this for all of us.

Now I will also say that in response to the public concern, although there was a Marine Mammal Research Program planned, the program was modified to make the Marine Mammal Program a forefront, that is the first major program would be a preliminary pilot phase before the source was operated in a way that was optimal for climate studies. The

Marine Mammal Research team, Chris Clark, and myself, were given the opportunity to design a program that was most optimal for marine mammal studies.

Now this phasing can be shown in this figure, which shows -- unfortunately I'm not sure how many of you can read it. Phase One, which is preliminary studies, and that's the phase we're currently in right now. Many of you think we've been sitting on our laurels. No. We've been out there looking at the behavioral protocols, seeing if we can tag these animals, seeing what information we can actually learn.

I listened today quite intently to listen to my colleagues and students in the field making suggestions about what we can and cannot do with marine mammals in the wild. I've spent my career, the last twenty years, studying these animals, and developing state of the art, being involved with people who develop state of the art, applying state of the art technology so we can actually learn something about these animals, because they do spend 80 to 90 percent of their time under water. Simply sitting on the surface of the water in a boat is not sufficient to understand how these animals work.

So the last six months we've been looking at the distribution and abundance of marine mammals. We've been looking at their behavior patterns to find out how we can really tease apart, whether these animals change their behavior in response to the operation of the source. We've also been doing aerial surveys, and boat surveys, to look at the abundance and distribution of animals in the site.

Now if and when ATOC is able to put a sound source out there, and if and when we can actually go forward and determine whether these animals are responding to the source, we will do an experimental protocol.

Now there's a lot of ways to approach this problem, and we've felt that the only way you can deal with seeing if animals change their behavior, and seeing if animals avoid the source, is to do it in an experimental way where you turn the source on for a period of time and see if animals leave the area and stay out of the area, and then turn it off and see if the animals swim back into the area and re-occupy the area. This is a program where we'd have four days on, seven days off. We're replicating that 11 times. That's where the six months comes from.

At the end of six months we will re- evaluate the situation and see if we have enough information to make any conclusions, and then decide at that point where we go from there.

Now we will also be looking at specific individual animals, blue whales, elephant seals, and sea lions, using state of the art technology to monitor the acoustic behavior, and the actual tracking and diving behavior of these individuals. If we find under that experimental phase that things seem okay, that is, that there's no significant deleterious effects or significant alterations in behavior, in consultation with the appropriate agencies, and if it isn't spelled out enough, it will have to be done in the final EIS, the program would then go to Phase Three.

Now we've heard that there's only a six- month Marine Mammal Program. That's not true. The Marine Mammal Program is part of the entire ATOC effort. I agree, you cannot look at reproductive behavior in a six-month period of time. That's not what the Phase Two, the experimental phase of the program, is all about. That is looking at acute behavioral responses of animals to the operation of the sound source.

Phase Three, when the source operation duty cycle is much more in line with climate studies, that's when we would go into studying chronic long- term effects, and that's when we can actually start to look at longer term deviations if there's a chronic change in response to the source.

As I said, we've been using a research vessel, making four days a month for the last six months going out and doing surveys throughout the study area; every two months for the last six months we've been doing aerial surveys of the entire ATOC study site, and I want to give you a quick rundown of what we've been able to do using these technologies.

Unfortunately I'm sure you probably can't see it in the back of the room, but we've seen a lot of animals. Before I came up here and said here's the animals we think are out there, I can now tell you what animals are out there, at least over the last six months from June to December. And the animals that are in yellow are animals that are actually seen in the immediate vicinity of the proposed operation site. Animals in white are animals that are seen on the outside or general area, but not in the immediate vicinity of the proposed source location.

Now what are we doing? These are the tracks of the plane going over the ATOC study site, and what I'd like to point out is that this isn't a study, it's just looking. Here's the source site. We're looking at aerial survey and distribution abundance of animals from well south of Pt. Sur. This is an 80 kilometer by 80 kilometer square area of the ocean with some of the most fine grained survey data that's ever been done in the Central California region. We've been doing this complete grid every two months starting in June, and we just finished a survey in December, and those data will be following in the presentation.

I'll remind you that the ATOC source is here, and the question becomes we're not talking about Monterey Bay as such. We already know that most of the marine mammal hot spots are associated with this complex bathometry, and so the question becomes is this an important area to these animals, and what do we know about this area.

It's 25 miles off-shore. This is a different oceanographic regime than the Monterey Bay itself, and that's something important to include, that it's not necessarily better or worse, it's different.

The other thing that we have to consider is that these animals are diving, and that the sound source is quite deep, and that we have to assess how animals both are swimming through this area in the two-dimensional realm, as well as how they're using the water column. So it's important to include dive profiles of animals, as well as where animals are in two-dimensional space.

These are data based from Jim Harvey's work on Moss Landing Marine Lab doing the boat-based surveys. Here is the proposed site of the sound source. These are small cetaceans, dolphins and porpoises. What we do find is that the majority of the small cetaceans we see out here are things called the northern right whale dolphin, but most of the action as I said earlier, and this really doesn't come as a surprise, but most of the action is up here closer to Monterey Bay, and that there is a very striking sort of habitat selection with some species predominantly.

The northern right whale dolphin being off -shore, and then the other species like common dolphin, bottlenose dolphins, being sort of much more in-shore, so we're learning a lot about the distribution abundance of the small cetaceans.

If we look now at baleen whales, these are like blue whales and fin whales, we have yet to see whether we're looking at aerial surveys or boat- based surveys. We're not seeing any blue whales in the vicinity of the source site. The only blue whales we're seeing are up in the Monterey Bay region, up in the north Monterey Bay region, and most of the large densities seem to be up around the Farallon Islands.

We are seeing numbers of humpback whales. They are the only large baleen whales that we're actually seeing in the immediate vicinity of the sound source.

We have seen things like minkie (phonetic) whales, and a few finback whales. I must point out that these are whale sightings based over a six-month period of time. These are very preliminary data. There is no assessment of effort, or any of those things, and these data were just processed. One of the cruises was just over a week ago, as well as the aerial survey work.

This is the aerial survey data. Again, the proposed site of the sound source. We have seen things like sperm whales, a few beaked whales, and we also see here the things like dols and harbor porpoise are also close in shore.

The point is, is that we're beginning to be able to get a handle on where the animals are. The last group that I'll talk about here are the seals and sea lions. There is a pattern here. The things like harbor seals and California sea lions are tending to be closer in shore. Things like northern elephant seals and northern fur seals are further off shore.

Again, I apologize for going through this so fast, but I really want to just sort of give you the flavor of what we're able to do with these studies.

Now if we focus on the three species that I said are important animals, that we think are important animals to study. Things like the first, the blue whale. I'll talk to you about our tagging studies, and what we've found to date there.

Here is a blue whale track that we put a number of satellite tags. This is work that Bruce Mate (phonetic) of Oregon State University has been doing. Because of the low numbers of blue whales in the Monterey Bay region, he had to go to

the Channel Islands where there were reports of over 50 large aggregations of blue whales. He went there, put a time depth recording tag, and in this case we're just reporting the track of the animal, but this is a two- week period of time, an animal tagged off the Channel Islands, making its way off the middle of Baja California.

These sorts of wide-ranging movements over short periods of time are quite typical of blue whales, and the other important point here is that before we picked the blue whale because it's the largest baleen whale, we suspected it would be the deepest diving baleen whale. What we found, at least through the couple of individuals that Bruce Mate has been able to tag to date, is that here is the depth range – most of the dives, most of the time, 80 percent of the animal's time is spent in water shallower than 53 feet.

The deepest that the animals were seen to go was something on the order of 500 feet. Remember now that the source is in 2,500 feet or deeper of water, so these animals are diving very shallow in the water column.

I'd like to really quickly show you what we've been able to do with northern elephant seals using time depth recorders, and this is the part I'm probably most excited about, because of all the animals that both have the capacity to dive deeply, and hear well at low frequencies, it's the elephant seal. This is an animal we can really determine whether there is a response to low frequency sounds.

We have two protocols we're doing here. One is where we trans-locate or pick up animals at Año Nuevo, give them a satellite tag, transfer them south to the Big Creek area. Here is the proposed source site.

These animals swim back to Año Nuevo, we're able to look at their track as they swim back to this site. These are four different individuals, and now I'll show you that each of those four individuals – this is the dive pattern of each four of those individuals as they swim over the ATOC source cite.

Now what you might say is what happens if we were to actually turn on the source. To find out that the animal was diving along like this, and then all of a sudden the source went on. If the animal stopped diving and the dive pattern stayed at the surface, we could say there was an obvious change in behavior. If the dive pattern continued or the animals started and then turned back to the surface, we could say there has been a change behavior. The point is that we have significant technology and capability to really look and see what these animals are doing.

In addition, you might say that moving animals from their home area is a little bit problematical. We've also tagged animals at Piedras Blancas (phonetic), which is a natural rookery of the elephant seal south of the source site. Here is the source site here. And we're doing the same thing except the animals are going on their own volition when they choose, on their northward migrations. This is a much larger scale. This is here where we are, and this is British Columbia up the coast of Canada.

The point is is that we have the ability to not only look at the diving patterns of these animals, but look at where these animals are in the ocean, and see if their paths are deviated in response to the source operation.

And lastly, we will be monitoring the heart rate of these animals, and this is just showing you that we have the capability of looking at heart rate in this case, and the diving pattern of the animal, so that if they startle when the source gets turned on and off we can actually determine that.

We also will have acoustic data loggers on these animals, which will actually measure the sound field, and tell us – we know when the source goes on and off, but we'll actually be able to have an instrument which will record the sound pressure levels that actually reach the animal's body.

I'd just like to close by saying that what have we learned so far? We've found that as we expected the diversity of marine mammals in the study area is high, but the absolute numbers appear to be lower than we might have predicted. That most cetaceans are in shore. There is some certainly niche separation or habitat segregation, but that most of the action is in the north-east corridor, the area off the immediate Monterey Peninsula.

We've established our behavioral protocols, shown that we can make considerable measurements with these animals. We found that blue whales are shallow divers, that they spend most of their time in the upper portion of the water column, that they range widely up and down the entire California coastline. And then lastly that elephant seals – we knew that they dive deeply. We now know that in their migrations, and when we move them around, that they pass

over the ATOC site, and that we have established a protocol that can actually look at how these animals respond to the operation of the ATOC source, if we're given permission to do these experiments.

And I'll leave it at that. Thank you.

DR. WEBSTER: Thank you.

Dr. Munk, please.

Presentation by
WALTER MUNK

DR. MUNK: I'm Walter Munk. I'm Principal Investigator of ATOC. I will confine my comments to the primary purpose of ATOC.

The primary purpose of ATOC is to make a contribution towards meaningful climate predictions. There are just a few places in the world where deep and intermediary waters form. One is in the Greenland Sea. The others are on the Antarctic continent. And water that sinks there reaches the interior ocean in tens of years, not 2,700 years, as has been said.

One of the climate models at Princeton, Monaby's (phonetic) model, predicts that if there is business as usual in the production of CO2, that this deep water and intermediary water formation will stop for a period of several hundred years. That's an enormously important prediction, an enormously powerful event, one that would affect not only creatures in continent, but also marine mammals, and other creatures in the oceans themselves. Is it a credible prediction? It's a very worrisome prediction.

You may not know that, in the early '60s when people first used computer modeling to predict weather, that for the first ten years of numerical prediction, clamp model predictions of weather, the quality of weather predictions actually went down, and it was learned that the reason the predictability went down was that the computers did a poor job of assimilating observations taken at several thousand weather stations around the world into the computer model to keep the model up to date. If you don't do that, the prediction becomes useless.

But climate modeling is different from weather modeling. In weather modeling the ocean plays a very minor role. It's considered a swamp with no dynamics, no memory. In climate modeling the ocean becomes the important part of the atmosphere/ocean system. If you don't get the ocean right, you will not get the atmosphere right.

In analogy with what happened to weather prediction, it will be said that unless you take significant and meaningful observations that are assimilated back into the model, those climate models do not have credibility. You will have to do the appropriate types of observations over a period of some years in the ocean as well as in the atmosphere in order to have confidence in climate predictions, and it's very important that people should have confidence in these climate predictions.

ATOC proposes to use two methods, not the only methods, we've never said so, but two methods which we think are uniquely powerful in helping the climate modelers to produce credible and good models. One of them is acoustic thermometry.

We've spent the last 12 years doing acoustic thermometry in the oceans to scales up to 1,000 kilometers, and we have succeeded in producing measurements of the temperature field in the ocean on the 1,000 kilometer scale. Now the scale of climate variability is larger than 1,000 kilometers. It's more like 5,000, possibly 10,000 kilometers. The aim of the ATOC experiment was to find out whether the methods which have been successfully developed for distances up to and scales up to 1,000 kilometers can be extended to 3,000, 5,000, possibly 10,000 kilometers. That is our aim. We do not know the answer. We've never pretended to know the answer. We think it's worth finding the answer.

The second method which we are pursuing was mentioned by a previous speaker. It's satellite altimetry, measuring the level of the sea, which as of this year has reached the astounding precision of two centimeters. You can measure changes in sea level of two centimeters relative to the center of the Earth.

That work has already produced a rather astounding result, which is not yet generally known. The prediction of the climate models of the seasonal change in the world of the upper ocean heat content, which is the cause of sea level change. That prediction for the last year, 1994, is unacceptably poor. It differs by almost a factor of two from what has been observed.

It's in this same spirit that we want to measure from year to year over a few years to see whether the climate predictions, not those dealing with greenhouse, but those dealing with natural ambient variability, like El Niño, like seasonal change, have any merit. And if they do work well it will lend credibility to the climate models. If they work poorly, we will find out why they work poorly, and we will help to develop climate models that are accurate and credible.

We will not, as has been said here, have to wait 10 or 20 years to do anything. Just as this seasonal study has already paid some very significant dividends, we will by comparing our measurements with the climate predictions be able to test and possibly improve those climate models. If those climate models are no good for ambient variability, they will be no good for greenhouse variability.

We can start doing something towards this aim immediately, and not in tens of years as has been said this evening. And it is necessary, I believe, no matter what has been said, that if we want a decent and meaningful policy about the greenhouse change, which has some very, very significant connotations, we have to have some testing and some believability in the models that are being used to establish this policy.

Now let me make one or two sentences in closing, somewhat personal in nature. It has been said that we are driven by a wish for power, or for money, I am not driven to try and do the ATOC work because of a personal need for power, or for money, or for developing a better method of submarine detection. I am genuinely driven because I believe that the greenhouse problem is a severe problem which will plague the next generations, and I sincerely believe that we have something to contribute to make the prediction and the administration of this problem more effective. Thank you.

DR. WEBSTER: Thank you, Dr. Munk.

This brings to a close the official section of the public hearing this evening. I'd like to thank you all for your patience, and for your constructive input. Any of you who would like to stay to ask questions of the project team, they are available, and you see them sitting right over there. So please feel free, and please drive safely going home. I think it's kind of stormy out there. Good evening.

(Whereupon, at 9:44 p.m., the hearing in the above-entitled matter was closed.)

CERTIFICATE

This is to certify that the attached proceedings before the:

NATIONAL MARINE FISHERIES SERVICE
IN THE MATTER OF: PUBLIC HEARING
SCRIPPS INSTITUTION OF OCEANOGRAPHY, ATOC

DOCKET NO: PERMIT APPLICATION NO. P557B
DATE: FRIDAY, JANUARY 6, 1994
PLACE: SANTA CRUZ, CALIFORNIA
were had as therein appears, and that this is the original transcript thereof for the files of the Service .

MARGARET DEVERS
Official Reporter

APPENDIX G

Mitigation Monitoring Program

TABLE MM - 1
CALIFORNIA ACOUSTIC THERMOMETRY OF OCEAN CLIMATE
AND ASSOCIATED MARINE MAMMAL RESEARCH PROGRAM
MITIGATION MONITORING PROGRAM

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
1. MM A-1: A dedicated MMRP Pilot Study will precede ATOC feasibility operations as described in detail in Section 2.2.1.1 and Appendix C.	Forbes/Costa	Upon completion of the Pilot Study, a Preliminary Report of the results will be prepared and filed with the UCSD Campus Planning Office. This report shall be filed within 60 days of completion of the Pilot Study.
2. MM A-2: ATOC sound sources would utilize frequencies anticipated to have minimal adverse impacts on species that may be exposed to their acoustic output (i. e., based on available information, either a higher or lower frequency might be expected to result in increased potential adverse impacts).	Munk/Forbes	The protocols included in Appendix C of this EIR/EIS call for the use of sound frequencies anticipated to minimize adverse effects. Upon completion of the Pilot Study and initial MMRP research phase, a Final Report of the Pilot Study results will be prepared and filed with the UCSD Campus Planning Office within 90 days. Both the Pilot Study Preliminary Report and the Pilot Study Final Report will include an evaluation of the compliance of the ATOC facilities with mitigation measures A-2, A-3, A-4, A-5 and 2-1, and shall evaluate the ATOC sound source characteristics and operational protocols to ensure compliance with those measures. The Pilot Study Preliminary and Final Reports will also address the pertinent mitigation measures described below. Copies of the Pilot study Preliminary and Final Reports will be kept on file at the UCSD Campus Planning Office.

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
3. MM A-3: ATOC sound sources would operate at the minimum power level necessary to support MMRP objectives and feasibility operations.	Munk/Forbes	The research protocols call for the sound source to be operated at the minimum power level necessary to support MMRP objectives and feasibility operations. See item 2, above.
4. MM A - 4: The ATOC project would continue to study source waveforms and transmission lengths that may facilitate long-range detection of the source sounds which, in turn, may permit lower source intensities than would otherwise be required.	Munk/Forbes	Based on the MMRP Pilot Study Final Report, configuration of the ATOC will be evaluated to determine whether lower source intensities may be utilized. See item 2, above.
5. MM A - 5: ATOC sound sources would operate at the minimum duty cycle necessary to support MMRP and feasibility objectives.	Munk/Forbes	The research protocols call for the sound source to be operated at the minimum duty cycle necessary to support MMRP and ATOC feasibility objectives. See item 2, above.
6. MM 1-1: The portions of the ATOC cable and any protective casing in the nearshore area, surf zone, and bluff area are designed to minimize the potential for adverse impacts, including the potential for bluff erosion.	Forbes	Design drawings of the cable installation shall be filed with the UCSD Campus Planning Office with 60 days of completion, and as-built drawings, photographs, or other appropriate documentation of the cable installation shall be filed with the UCSD Campus Planning Office within 60 days of the completion of construction.
7. MM 1-2: ATOC facilities would be removed at the end of the experiment, to the extent economically and practicably feasible.	Forbes	Within 180 days of the completion of the experiment, the Executive Director of the California ATOC program will submit a memorandum to the Campus Planning Office stating the final disposition of all ATOC facilities.

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
8. MM 2-1: The duty cycle and power levels of the ATOC source would be adjusted to the minimum necessary to support research objectives, and the source would be shut down if any of the acute or short-term responses in Table C-1 are observed in relation to source transmissions.	Munk/Forbes	The Pilot Study Preliminary and Final Reports described above will include information necessary to determine the minimum power levels required to support research objectives.
9. MM 2-2: The ATOC project would coordinate with other ocean-ographic and acoustic research efforts, U.S. Navy activities, and the commercial fishing industry, to ensure that scheduling and operational conflicts are avoided.	Munk/Forbes	The Pilot Study Preliminary and Final Reports filed with the Campus Planning Office will document that coordination with other oceanographic and acoustic research activities, and U.S. Navy activities has occurred.
10. MM 3-1: A Marine Mammal Research Program (MMRP) will be carried out in connection with the ATOC project in accordance with the protocols set forth in Appendix C to this EIS/EIR. With regard to potential physical auditory impacts on mysticetes, a goal of the MMRP will be to validate the assumptions regarding population distribution and abundance and diving behavior, which form the basis for predicting the potential for effects from the ATOC sound source.	Forbes/Costa	The Pilot Study Preliminary and Final Reports will evaluate the validity of the assumptions regarding mysticete population distribution and diving behavior.

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
11. MM 4-1: As provided in mitigation measure 2-1, the duty cycle and power levels of the ATOC source would be adjusted to the minimum necessary to support research objectives, so that potential impacts to mysticetes would be minimized.	Munk/Forbes	Refer to item 8 above.
12. MM 4-2: As provided in mitigation measure 3-1, a MMRP will be carried out in connection with the ATOC project in accordance with the protocols set forth in Appendix C to this EIS/EIR. With regard to potential impacts on mysticetes, a goal of the MMRP will be to identify the nature, frequency, and significance of any responses to ATOC source transmissions.	Forbes/Costa	The Pilot Study Preliminary and Final Reports will report on any behavioral responses by mysticetes to ATOC source transmissions.
13. MM 5-1: As provided in mitigation measure 2-1, the duty cycle and power levels of the ATOC source would be adjusted to the minimum necessary to support research objectives, so that potential long-term impacts to mysticetes would be minimized.	Munk/Forbes	Refer to item 8 above.

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
14. MM 5-2: As provided in mitigation measure 3-1, a MMRP will be carried out in connection with the ATOC project in accordance with the protocols set forth in Appendix C to this EIS/EIR. With regard to potential long-term impacts on mysticetes, a goal of the MMRP will be to identify the nature, frequency, and significance of any long-term changes due to ATOC source transmissions (via comparison of animal distribution data before, during, and after source transmission periods over a two-year period).	Forbes/Costa	The Pilot Study Preliminary and Final Reports will evaluate the nature, frequency, and significance of any long-term impacts to mysticetes, resulting from the ATOC source transmissions.
15. MM 6-1: A MMRP will be carried out in connection with the ATOC project in accordance with the protocols set forth in Appendix C to this EIS/EIR. With regard to potential physical auditory and behavioral impacts on odontocetes, a goal of the MMRP will be to validate the assumptions regarding population distribution, abundance and diving behavior of sperm whales, which form the basis for predicting the potential for effects from the ATOC sound source.	Forbes/Costa	The Pilot Study Preliminary and Final Reports will evaluate the validity of the assumptions regarding sperm whale population distribution and diving behavior.

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
16. MM 7-1: A MMRP will be carried out in connection with the ATOC project in accordance with the protocols set forth in Appendix C to this EIS/EIR. With regard to potential physical auditory and behavioral impacts on pinnipeds, particularly northern elephant seals, a goal of the MMRP will be to validate the assumptions regarding population distribution, abundance and diving behavior of northern elephant seals, which form the basis for predicting the likelihood of potential impacts due to the ATOC source transmissions.	Forbes/Costa	The Pilot Study Preliminary and Final Reports will evaluate the validity of the assumptions regarding pinniped population distribution and diving behavior of northern elephant seals.
17. MM 8-1: The MMRP would support field research to attempt the collection of auditory and/or behavioral observations on leather-back sea turtles.	Forbes/Costa	The Pilot Study Preliminary and Final Reports, to be kept on file at the UCSD Campus Planning Office, will describe the status of research activities pertaining to leather-back sea turtles and report any results of these activities.
18. MM 9-1: The MMRP would incorporate into its research protocol the goal of assessing whether acoustic transmissions could potentially cause sea turtles to spend more time than normal at the sea surface.	Forbes/Costa	The Pilot Study Preliminary and final Reports, to be kept on file at the UCSD Campus Planning Office, will describe the status of research activities pertaining to sea turtles and report any results of these activities.

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
19. MM 9-2: The MMRP would incorporate into its research protocol the goal of assessing whether acoustic transmissions could potentially cause leatherbacks to avoid the ATOC source area.	Forbes/Costa	The Pilot Study Preliminary and Final Reports, to be kept on file at the UCSD Campus Planning Office, will describe the status of research activities pertaining to leatherbacks and report any results of these activities.
20. MM 10-1: The MMRP would monitor fish stock assessments (via CDFG catch-block landing data; LTPY, CPY, and RAY data from NMFS; and interaction with the PCFFA) to attempt evaluation of the potential for increased mortality and predation on fish, in relation to ATOC source sounds.	Forbes/Costa	The Pilot Study Preliminary and Final Reports will include fish stock monitoring assessments, and will attempt to evaluate the potential for increased predation on fish, in relation to ATOC source sounds. Copies of these reports will be kept on file at the UCSD Campus Planning Office.
21. MM 11-1: The MMRP would monitor fish stock assessments (via CDFG catch-block landing data; LTPY, CPY, and RAY data from NMFS; and interaction with the PCFFA, PRBO, Bodega Marine Laboratory and Steinhart Aquarium) to attempt evaluation of the potential for impacts to fish, particularly sharks, in relation to ATOC source sounds.	Forbes/Costa	The Pilot Study Preliminary and Final Reports will include fish stock monitoring assessments, and will attempt to evaluate the potential for impacts to the behavior of fish, particularly sharks, in relation to ATOC source sounds. Copies of these reports will be kept on file at the UCSD Campus Planning Office.

MITIGATION MEASURE	RESPONSIBLE PARTY	MONITORING PROGRAM AND SCHEDULE
22. MM 12-1: Vessel and aircraft traffic would be kept to a minimum, consistent with the requirements of the MMRP protocols and ATOC program requirements. Where possible, trips would be consolidated or other measures taken to reduce the aircraft and vessel traffic levels resulting from the project.	Forbes/Costa	The Pilot Study Preliminary and Final Reports will include a summary of vessel and aircraft trips, and a discussion of how trips were consolidated where possible to minimize traffic. Copies of these reports will be kept on file at the UCSD Campus Planning Office.
23. MM 13-1: A qualified archaeologist would be retained to visit the ATOC activity site and determine whether monitoring of the cable installation is required. If required, he/she would monitor installation activities and specific measures recommended would be implemented to avoid any significant impacts to cultural resource materials.	Forbes/Campus Planning	A copy of the summary report of the site assessment has been prepared by the archaeologist and filed with the UCSD Campus Planning Office. The site assessment indicated that no potentially adverse impacts to cultural resources were anticipated to result from the proposed cable installation and that no monitoring or other mitigation would be required. This mitigation measure has therefore been completed and no further monitoring or reporting is required.
24. MM 14-1: If shipwrecks or other resources are identified, they would be avoided during installation of ATOC facilities.	Forbes	A post-construction report, to be filed with the UCSD Campus Planning Office, will report on the presence of any shipwrecks encountered during installation of ATOC facilities and the measures taken to avoid them.
25. MM 15-1: All ATOC/MMRP vessels and aircraft would be equipped with required air pollution controls.	Forbes/Costa	The MMRP Pilot Study Preliminary and Final Reports will document that all ATOC/MMRP vessels and aircraft are equipped with required air and pollution controls.