9.2 UEWR SUPPLEMENT TO THE NMD DEPLOYMENT DRAFT EIS COMMENTS AND RESPONSES

The *Upgraded Early Warning Radar (UEWR) Supplement to the National Missile Defense (NMD) Deployment Draft Environmental Impact Statement* public review and comment period began on March 3, 2000 with publication of the Notice of Availability (NOA) in the *Federal Register*. The public comment period was originally to end on April 17, 2000; however, at the request of the public and because of the addition of a public hearing date, the public comment period was extended to May 12, 2000. Some comments were received after the ending date but were included in the review comments.

Copies of the UEWR Supplement to the NMD Deployment Draft Environmental Impact Statement (EIS) were made available for public review at several locations listed below within the region of influence of the proposed UEWR sites. In addition, a copy of the Supplement to the NMD Deployment Draft EIS was made available for public review on the Ballistic Missile Defense Organization's NMD web site.

Alaska

- Anderson School Library, Anderson
- Nenana Public Library, Nenana
- Tri-Valley Community Library, Healy
- University of Alaska, Fairbanks, Elmer E. Rasmuson Library, Fairbanks

California

- Barbo Branch Library, Live Oak
- Beale AFB Military Library, Marysville
- Sutter County Library, Yuba City
- Yuba City Library, Marysville
- Yuba College Library, Marysville

Massachusetts

- Jonathan Bourne Library, Bourne
- Cape Cod Community College Library, West Barnstable

- Coast Guard/MWR Library, Air Force Station Cape Cod
- Falmouth Public Library, Falmouth
- Mashpee Public Library, Mashpee
- Sandwich Public Library, Sandwich

The following methods were used to notify the public of availability of the documents for public comment and of the upcoming public hearing.

- NOA announcement in the *Federal Register*
- Paid advertisements placed in local newspapers
- Media releases to newspapers, radio, and television

A public hearing on the UEWR Supplement to the NMD Deployment Draft EIS was held on May 3, 2000. Table 9.2-1 lists the location and date of this meeting.

Table 9.2-1: Public Hearing Location, Date, and Actual Time

Meeting Location	Date	Time	Attendees
Holiday Inn, 291 Jones Road, Falmouth, Massachusetts	May 3	6:30–8:30 p.m.	30

During the first hour of the public hearing, an informal information session was held to enable the public to talk with project leaders and view exhibits. During this time, the public was encouraged to sign in at the registration desk, to complete a speaker's card if they wanted to make a statement at the public hearing, and to complete an address form if they wanted to receive a copy of the Final EIS or its Executive Summary. A log of public and agency attendees was maintained for the hearing, although registration was not required. Fact sheets summarizing the NMD program were made available to all attendees. Copies of the comparison of alternatives environmental impact table were also made available to the public. Other handouts included a public hearing brochure, which provided instructions on how to be heard and how to get more information, written comment forms, and cards for commentor registration and document requests.

Following the information hour, the public was invited to attend the Public Hearing. The moderator began the formal presentation by explaining the format of the meeting, which included:

- Ms. Sue Estes—Hearing Moderator, presented the introduction

- Mr. Thomas M. Devanney—National Missile Defense Program Office, described the NMD Program, proposed action and alternatives, and decision to be made
- Ms. Sharon Mitchell—U.S. Army Space and Missile Defense Command, presented the findings of the UEWR Supplement to the NMD Deployment Draft EIS
- Public Comment Session
- Ms. Estes—Closing Remarks

A transcript of the full text of the public hearing is included in section 9.2.3.

Public comments on the UEWR Supplement to the NMD Deployment Draft EIS were received in several different ways. Public hearing attendees were invited to make formal statements, which were recorded by a court reporter at each meeting. A total of nine individuals spoke at the public hearing, and their comments were documented in the recorded transcript. A list of the individuals who spoke at the public hearings, designated PS-T-001 through PS-T-009, and the transcript of the full text of the public hearing is included in section 9.2.3.1.

Written comments on the UEWR Supplement to the NMD Deployment Draft EIS were received in various formats over the course of the public comment period. Initially, some prepared information was submitted to the moderator by speakers during the public hearing. In addition, written comment forms that were made available during registration were either returned at the conclusion of the public hearing or forwarded by mail. Finally, some individuals and several Federal, state, and local agencies submitted letters of comment. In these three forms, 17 written comments were received from individuals representing themselves or private and public organizations. A list of the individuals, including their organization or agency affiliation where applicable, and copies of their transmittals are included in section 9.2.1.1. Written comments are designated PS-W-001 through PS-W-017.

In addition to transcript and written comments, the public was encouraged to e-mail comments to a mailbox designated for receipt of public comments: nmdeis@smdc.army.mil or through the Ballistic Missile Defense Organization's NMD web site. A total of 15 e-mails were received during the public comment period. A list of the individuals who sent e-mails and copies of the documents received are included in section 9.2.2.1. E-mail documents are designated PS-E-001 through PS-E-015.

Every transcript, written letter/comment, and e-mail was assigned a unique number and then was carefully reviewed to identify the

environmental resource area and specific topic of individual comments and issues that were presented. Each of these identified issues was highlighted and numbered sequentially. For example, if the ninth speaker presented in a transcript document (PS-T-009) provided comments on seven separate topics, those comments were numbered PS-T-009.1 through PS-T-009.7.

The process of responding to comments required reaching a thorough understanding of the issues being presented and then determining the appropriate action to be taken. However, the majority of comments received on the UEWR Supplement to the NMD Deployment Draft EIS were declarative statements not requiring a direct response, but which did need to be noted in the context of overall public review. Most of the comments received were related to program issues such as decommissioning of the PAVE PAWS radars, system cost, and system effectiveness. These general program-related comments are outside the scope of this EIS and required no revision to the EIS and no direct response, except to note the comments for the record (e.g., comment noted). Other comments identified corrections or new information that was directly included in the text of the Final EIS and noted below.

Some of the comments posed questions about the methodologies, analyses, and conclusions for various environmental resource impacts and mitigations presented in the UEWR Supplement to the NMD Deployment Draft EIS. For each of these comments, a specific response was prepared—occasionally requiring the acquisition of new data and the preparation of additional analyses. New information and analysis supporting or changing the conclusions of the UEWR Supplement to the NMD Deployment Draft EIS were incorporated into the text of the Final EIS.

Section 9.2 of the Final EIS presents reproductions of all the original documents that were received during the public hearing comment period for the UEWR Supplement to the NMD Deployment Draft EIS and provides direct responses to issues included in those documents. The organization of section 9.2 provides a separate comment/response section for each of the three types of comment documents:

- 9.2.1 Written Comment Documents
  - 9.2.1.1 Written Comments
  - 9.2.1.2 Response to Written Comments
- 9.2.2 E-Mail Comment Documents
  - 9.2.2.1 E-Mail Comments
  - 9.2.2.2 Response to E-Mail Comments
- 9.2.3 Transcript Comment Documents
  - 9.2.3.1 Transcript Comments
  - 9.2.3.2 Response to Transcript Comments

The first table in each section provides an index of the names and assigned identification numbers of individuals who submitted comments on the UEWR Supplement to the NMD Deployment Draft EIS. To follow comments and responses for a specific individual, find their commentor number (e.g., PS-W-005, PS-E-012, PS-T-009) in the appropriate document list; locate their document with sequentially numbered comments; and, use the comment numbers to identify corresponding responses in the response table.

All documents and comments that were received during the public review period for the UEWR Supplement to the NMD Deployment Draft EIS were treated equally regardless of the form or commentor. Each comment was carefully documented, thoroughly read and evaluated, and provided with a response. The National Environmental Policy Act requires the analysis of all reasonable alternatives to the Proposed Action. In accordance with Council on Environmental Quality guidelines, this EIS includes sufficient analysis to inform the public and decisionmakers of potential environmental impacts resulting from the preferred action and alternatives and to assist in the decisionmaking process.

9.2.1 WRITTEN COMMENT DOCUMENTS—UEWR SUPPLEMENT

Individuals who commented on the UEWR Supplement to the NMD Deployment Draft EIS in written form are listed in table 9.2.1-1 along with their respective commentor identification number. This number can be used to find the written document that was submitted and to locate the corresponding table on which responses to each comment are provided.

9.2.1.1 Written Comments

Exhibit 9.2.1-1 presents reproductions of the written comment documents that were received in response to the UEWR Supplement to the NMD Deployment Draft EIS. Comment documents are identified by commentor ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

9.2.1.2 Response to Written Comments

Table 9.2.1-2 presents the responses to comments to the UEWR Supplement to the NMD Deployment Draft EIS that were received in written form. Responses to specific comments can be found by locating the corresponding commentor ID number and sequential comment number identifiers.

Due to the nature and extent of the comments contained in written comment PS-W-010, these comments were consolidated and

summarized and their responses have been provided in attachment A to table 9.2.1-2. Many of the other written, e-mail, and transcript comments raised the same or similar points as raised in PS-W-010. For this reason, the responses to these comments refer to the responses in attachment A, which is located at the end of table 9.2.1-2.

Table 9.2.1–1: Public Comments on the UEWR Supplement (Written Documents)

Commentor and Affiliation	ID Number
Della and Peter Bye	PS-W-001
Elizabeth J. Shafer	PS-W-002
Della and Peter Bye	PS-W-003
Suzanne K. Condon—Massachusetts Department of Public Health	PS-W-004
Gary G. Hayward	PS-W-005
Judy Stetson	PS-W-006
David Dow	PS-W-007
Tony Verderese	PS-W-008
Paul D. Manoli	PS-W-009
Sharon Judge—Cape Cod Coalition to Decommission PAVE PAWS	PS-W-010
Gilbert K. Woolley	PS-W-011
Peter T. Klenert	PS-W-012
Minos Gordy—Patriots Advocating Camp Edwards Restoration & Survival	PS-W-013
Sue Walker—Action for Nuclear Disarmament: Cape Cod	PS-W-014
Stephen Seymour—GreenCAPE	PS-W-015
Richard B. Perry	PS-W-016
State Representative Ruth W. Provost	PS-W-017

COMMENT NUMBER
PS-W-001
1

January 13,2000

PS-W-001

U.S.Army Space and Missile Defense Command
Attention: SMDC-EA-V (Julia Hudson)
PO Box1500
Huntsville,Al 35807-3801

Re: DEIS for NMD comments

We would like to submit our comments on the Draft Environmental Impact Statement for the National Missile Defense deployment.

We oppose further upgrade or any more constructions of the Early Warning Radars (PAVEPAWS) as stated in ES.1.2 of the DEIS. The health and environmental assessment associated with the 20 years of operation of PAVEPAWS has not been issued in a report to the Massachusetts Department of Public Health since a public meeting was held in Feb. 16,1999 addressing these concerns. Enclosed are the comments we submitted to the Massachusetts Department of Public Health on the effects from living in a MCA area with the pulsed electromagnetic radiation emissions from PAVEPAWS radar at Beale AFB in California since its start 1980. Did PAVEPAWS at Beale AFB have an EIS? It didn't include the Executive Order 12898 of 1994 on Environmental Justice.

The NMD system is being pushed forward with false IEEE standards of 1982.

We hate living under the influence of the pulsed frequencies coming from the PAVEPAWS radar at Beale AFB. It has health and environmental effects greatly in our neighborhood 100 miles away! Non-nuclear--- nonionizing radiation kills over long term.

Please consider these comments and our enclosed papers to the Massachusetts Department of Public Health about PAVEPAWS health assessment meeting last year.

Thank you

Dalla and Peter Bye

Peter Bye

Dalla Bye

COMMENT NUMBER

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
BUREAU OF ENVIRONMENTAL HEALTH ASSESSMENT

PAVE PAWS RADAR FACILITY MEETING

Date: Tuesday, February 16th, 1999

Place: Sandwich High School Auditorium
365 Quaker Meetinghouse Road
East Sandwich, MA

Time: 6 PM to 9 PM

Purpose: On behalf of the Upper Cape Community, The Massachusetts Department of Public Health (MDPH) has convened a panel of experts to evaluate health and environmental concerns associated with the PAVE PAWS radar facility. The Department will host an informational meeting to present the panel members to the public, discuss the mission of the panel and provide the opportunity for citizens to express their concerns regarding PAVE PAWS directly to panel members. Following the meeting, MDPH staff will work with the panel members to prepare a document which outlines the concerns expressed by citizens. This document will be made available for a two-week public comment period. Following that the experts will work to consider citizen concerns in light of existing PAVE PAWS emissions data and the scientific literature regarding RF emissions and health. The panel's responses to citizen questions, and conclusions and recommendations concerning the feasibility of future investigations concerning PAVE PAWS will be presented in a final report to the MDPH. The final report will be made available to the public.

If you have questions, feel free to contact Kevin Costas

psw001

Exhibit 9.2.1-1: Reproductions of Written Comment Documents

COMMENT NUMBER

To: Massachusetts Department of Public Health
Bureau of Environmental Health Assessment

PAVEPAWS Radar Facility Meeting

We have been residing twenty years in rural Northern California mountain forest terrain at 3,200 ft elevation. Long term health effects are being observed from living under the airspace labled Maxwell MCA (military operation area). This airspace is over Yollo Bolly Wilderness, Mendocino National Forest, Round Valley Indian Reservation, and most of Mendocino County. We are 100 miles in front of Beale Air Force Base, home of the west coast PAVEPAWS radar, sitting at 115ft elevation. WE have been unknowingly a case study living all these years under the influence of microwave/ELF pulsed emissions broadcast from PAVEPAWS.

Our family's health history is of special note; in the early 1980's two of our children were diagnoised and treated for leukemia at U.C.S.F. After the second child was diagnoised, environmental causes were questioned. WE became involed in numerous medical studies at different universities.

In the early 1990's an irritating, sleep disturbing, audibale sound was being heard on the west coast, mountains and valleys. Our neighborhood terrain is deciduous forested mountains with radiolarian rock. WE have no electrical power frequency influence, very remote. The airspace has military training routes over head. The tallest fir trees on the ridges have been dying at alarming rates. The black oak trees have not produced acorns for years. Brain cancers on this mountain ridge have increased with four new cases since 1991 among a population of few; our son a victim. Thyroid problems are more common.

COMMENT NUMBER

The pulsing ELF frequency from PAVEPAWS varys in intensity coinciding with military training activities, calendar dates, and international crises. Aggravated assaults, general unrest, and suicides have escalated the days PAVEPAWS radar is intensely humming. There is no denying the microwave signal from PAVEPAWS emanates our neighborhood. PAVEPAWS signal is also measured on the corridor of HW 101 (30 miles west of here) California Department of Health Services, Raymond Neutra MD, Chief Division of Environmental and Occupational Disease Control said he expectted the intensity of the PAVEPAWS signal one hundred miles away detectable but would be way below the intensity to be concerned with.

Non-ionizing radiation is as accumulative as ionizing radiation, long term exposure has effects. Many studies have been done on MW/ELF frequencies. Dr. Neil Cherry, Lincoln University, New Zealand, has published a compilation of reported studies entitled Actual or potential effects of ELF and RF/MW radiation on accelerating aging of human, animal or plant cells in June 1998. Dr. Cherry has concluded there is strong evidence that ELF and RF/MW is associated with accelerated aging (enhanced cell death and cancer) and moods, depression, suicide, anger, rage, and violence, primarily through alteration of cellular calcium ions andthe melatonin/serotonin balance. Professor Arthur Guy of U.of W. did a study funded by the Air Force in 1985 that led to recommendation that the US EPA classify RF/MW as a possible human carcinogen.

PAVEPAWS distance from San Francisco bay area (including Marin County and Hunter's Point) is the same hundred miles

psw001b

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

distance like us. Marin County has the highest breast and prostate cancer statistics in the world. PAVEPAWS broadcasts over a huge land mass on the west coast. Suicide rates are the highest in the western states, 71% higher than the Northeast. California, Florida, Texas, and Georgia all have the highest rates of suicide, they all have PAVEPAWS installations.

Ten years - twenty years have past since operation of PAVEPAWS has begun. The technology is continuing. Jan 2001 is the planned operational date for a PAVEPAWS radar site in Clear Air Station, Alaska. The California positioning of PAVEPAWS radar site and in Georgia, Texas, and Alaska subjects alot of land and all other living things to pulsed ELF and MW radiation.

Don't be fooled by " Experts agree everything is fine."

Which bush do we switch to, Pilgrim? Our neighborhood is being sacrificed for National Security, again.

Our bodies are electric. There is engugh evidence it can be influenced by electromagnetic fields. Exposure standards for PAVEPAWS radar is based on the carrier wave frequency which is in the microwave range, it doesn't consider long term chronic effects of low levels exposure to the pulsed ELF frequency. Dr. John Goldsmith MD, a leading World Health Organization Environmental Epidemiologist summarized in his report of 1998 The End of Innocence * Human Health and the Effects of RF Exposures from Cellular Phones, Cellular Phone Antennas, Television Broadcast Towers, and Radar * " A delay in protected measures is likely to lead to increases in cancers, as well as other unfavorable effects." The Cancer Regisrty statistics are based on the 1990 census report which has been found to be flawed because 4 million low income and minority people were not counted.

2

COMMENT NUMBER

Dr. Cletus Kanavy, late director of the biological effects research team at the US Air Force Electromagnetic Effects Division 1993 warned that " the issue of human inter action with EM radiation is pushing forward as a major national population health concern." Some international standards for electromagnetic fields is " prudent avoidance."

The Air Force should issue radar warnings to the public of operation hours, days, similar to sun UVI warnings. Where do we go? Is PAVEPAWS radar backshadow big enough for us all?

Do we want a nation dependent on Prozac(the drug that replaces depleted serotonin?)

Peter Bye
Della Bye

Della and Peter Bye

Febuary 1,1999

psw001c

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER
PS-W-002
1
2

PS-W-002

Elizabeth J. Shafer, J.D.

7 April 2000

United States Army
Space and Missile Defense Command
ATT'N: SMDC-EN-V
P.O. Box 1500
Huntsville, Ala. 35807-3801

Comments Re: Notice of Availability (NOA)
Supplement to National Missile Defense (NMD)
Draft Environmental Impact Statement (EIS)

I am writing as a citizen and as an attorney who has interned in the U.S. Environmental Agency (Region II) in 1990, concerning this Supplement .

According to the conclusions of this document, the proposed modifications (replacement of interior electronic hardware and computer software at existing early warning radar facilities at Clear Air Force Station, Alaska and two other sites) would have no impact on resource areas identified in the main volume of the NMD Deployment Draft EIS. 'Environmental justice' was one of the resource areas in which the NMD was analysed, as purportedly having no adverse environmental effects.

I would like to register my strong opposition, however, to this conclusion. The concept of 'environmental justice' comprises a broad spectrum of relevant issues such as the siting of potentially hazardous plants in minority neighborhoods, or the economic impacts of a government project with escalating costs over time.

Concerning the latter, on April 4, 2000 the Pentagon estimated that it would cost at least **$30.2 billion** to build a proposed anti-missile base, upgrade radars and deploy 100 interceptors from 1991 to 2026 . This cost is far higher than a previous estimate of $12.7 billion. In the words of Navy Rear Adm. Craig Quigley, a Defense Department spokesman, "I'm talking about maintenance, I'm talking about everything to do with that program...that is our best estimate of life-cycle cost today looking 26 years into the future".

Translate these costs into an equivalent amount of funds that could be spent on schools, hospitals, and other areas so desperately needed in our nation, and it will be evident that, far from having 'no effect on environmental justice', the proposed plan, as regards economic equities among other factors, will indeed have severly adverse cumulative effects.

Sincerely,
Elizabeth J. Shafer
Elizabeth J. Shafer, J.D.

psw002

COMMENT NUMBER
PS-W-003
1
2

Peter and Della Bye

March 10,2000

PS-W-003

U.S. Army Space and Missile Defense Command
ATTENTION: SMDC-EN-V
PO Box 1500
Huntsville, AL 35807-3801

RE: Comments on DEIS UEWR for NMD

We oppose further upgrade or any more constructions of the Early Warning Radars (PAVEPAWS) for the National Missile Defense (NMD).

We live 100 miles from Beale AFB and are physically affected by the noise produced from the pulsed ELF (18.5 Hz) and the microwave (435mgh) frequencies being emitted from PAVEPAWS. Changing the natural Schumann's resonces of the planet to an artificial pulsed frequency has actual or potential effects on age acceleration in humans, animals and plants. The PAVEPAWS radar is exposing the uncontrolled environments*(locations where there is exposure of indivuals who have no knowledge or control of their exposure ANSI/IEEE 1992) to an electromagnetic standing wave form over long term exposure.

The Latvian Skundra Radar and the Swiss Schwarzenburg Studies showed the effects on sleep disturbance and learning disabilities from electromagnetic radiation emissions. Cancer, anger and suicides are on the rise. Covelo,CA, located in Maxwell MCA airspace, has the lowest state school test scores. Recent studies by Dr. Henry Lai, Jan.2000 Bioelectromagnetics,finds brain impairment from microwave exposure.

We are in alliance with the Cape Cod Coalition to Decommission PAVEPAWS, all of them. No to the NMD. A former TRW worker claims in a $500,000 lawsuit the NMD doesn't work. That was proven. Vandenberg's launch Jan. 18,2000 was a failure.

Enclosed are our comments to the Massachusetts Department of Public Health about PAVEPAWS 20 year health assessment meeting last year.

Della Bye Peter B Bye

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

To: Massachusetts Department of Public Health
Bureau of Environmental Health Assessment

PAVEPAWS Radar Facility Meeting

We have been residing twenty years in rural Northern California mountain forest terrain at 3,200 ft elevation. Long term health effects are being observed from living under the airspace labled Maxwell MCA (military operation area). This airspace is over Yollo Bolly Wilderness, Mendocino National Forest, Round Valley Indian Reservation, and most of Mendocino County. We are 100 miles in front of Beale Air Force Base, home of the west coast PAVEPAWS radar, sitting at 115ft elevation. WE have been unknowingly a case study living all these years under the influence of microwave/ELF pulsed emissions broadcast from PAVEPAWS.

Our family's health history is of special note; in the early 1980's two of our children were diagnoised and treated for leukemia at U.C.S.F. After the second child was diagnoised, environmental causes were questioned. WE became involed in numerous medical studies at different universities.

In the early 1990's an irritating, sleep disturbing, audibale sound was being heard on the west coast, mountains and valleys. Our neighborhood terrain is deciduous forested mountains with radiolarian rock. WE have no electrical power frequency influence, very remote. The airspace has military training routes over head. The tallest fir trees on the ridges have been dying at alarming rates. The black oak trees have not produced acorns for years. Brain cancers on this mountain ridge have increased with four new cases since 1991 among a population of few; our son a victim. Thyroid problems are more common.

COMMENT NUMBER

The pulsing ELF frequency from PAVEPAWS varys in intensity coinciding with military training activities, calendar dates, and international crises. Aggravated assaults, general unrest, and suicides have escalated the days PAVEPAWS radar is intensely humming. There is no denying the microwave signal from PAVEPAWS emanates our neighborhood. PAVEPAWS signal is also measured on the corridor of HW 101 (30 miles west of here) California Department of Health Services, Raymond Neutra MD, Chief Division of Environmental and Occupational Disease Control said he expectted the intensity of the PAVEPAWS signal one hundred miles away detectable but would be way below the intensity to be concerned with.

Non-ionizing radiation is as accumulative as ionizing radiation, long term exposure has effects. Many studies have been done on MW/ELF frequencies. Dr. Neil Cherry, Lincoln University, New Zealand, has published a compilation of reported studies entitled Actual or potential effects of ELF and RF/MW radiation on accelerating aging of human, animal or plant cells in June 1998. Dr. Cherry has concluded there is strong evidence that ELF and RF/MW is associated with accelerated aging (enhanced cell death and cancer) and moods, depression, suicide, anger, rage, and violence, primarily through alteration of cellular calcium ions andthe melatonin/serotonin balance. Professor Arthur Guy of U.of W. did a study funded by the Air Force in 1985 that led to recommendation that the US EPA classify RF/MW as a possible human carcinogen.

PAVEPAWS distance from San Francisco bay area (including Marin County and Hunter's Point) is the same hundred miles

psw003c

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

distance like us. Marin County has the highest breast and prostate cancer statistics in the world. PAVEPAWS broadcasts over a huge land mass on the west coast. Suicide rates are the highest in the western states, 71% higher than the Northeast. California, Florida, Texas, and Georgia all have the highest rates of suicide, they all have PAVEPAWS installations.

Ten years - twenty years have past since operation of PAVEPAWS has begun. The technology is continuing. Jan 2001 is the planned operational date for a PAVEPAWS radar site in Clear Air Station, Alaska. The California positioning of PAVEPAWS radar site and in Georgia, Texas, and Alaska subjects alot of land and all other living things to pulsed ELF and MW radiation.

Don't be fooled by " Experts agree everything is fine."

Which bush do we switch to, Pilgrim? Our neighborhood is being sacrificed for National Security, again.

Our bodies are electric. There is engugh evidence it can be influenced by electromagnetic fields. Exposure standards for PAVEPAWS radar is based on the carrier wave frequency which is in the microwave range, it doesn't consider long term chronic effects of low levels exposure to the pulsed ELF frequency. Dr. John Goldsmith MD, a leading World Health Organization Environmental Epidemiologist summarized in his report of 1998 The End of Innocence * Human Health and the Effects of RF Exposures from Cellular Phones, Cellular Phone Antennas, Television Broadcast Towers, and Radar * " A delay in protected measures is likely to lead to increases in cancers, as well as other unfavorable effects." The Cancer Regisrty statistics are based on the 1990 census report which has been found to be flawed because 4 million low income and minority people were not counted.

3

COMMENT NUMBER

Dr. Cletus Kanavy, late director of the biological effects research team at the US Air Force Electromagnetic Effects Division 1993 warned that " the issue of human inter action with EM radiation is pushing forward as a major national population health concern." Some international standards for electromagnetic fields is " prudent avoidance."

The Air Force should issue radar warnings to the public of operation hours, days, similar to sun UVI warnings. Where do we go? Is PAVEPAWS radar backshadow big enough for us all?

Do we want a nation dependent on Prozac(the drug that replaces depleted serotonin?)

Peter Bye
Della Bye

Della and Peter Bye

Febuary 1,1999

4

psw003d

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER
PS-W-004
1

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
250 Washington Street, Boston, MA 02108-4619

ARGEO PAUL CELLUCCI
GOVERNOR

WILLIAM D. O'LEARY
SECRETARY

HOWARD K. KOH, MD, MPH
COMMISSIONER

PS-W-004

May 3, 2000

Donna L. Brock, Deputy Director
System Deployment and Site Activities Directorate
U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V
Box 1500
Huntsville, AL 35807-3801

Dear Ms. Brock,

The Massachusetts Department of Public Health (MDPH), Bureau of Environmental Health Assessment (BEHA) appreciates the opportunity to review and comment on the Supplement to the Draft Environmental Impact Statement (EIS) dated January 2000 for the National Missile Defense (NMD) deployment of Upgraded Early Warning Radar (UEWR). As you are aware, a PAVE PAWS radar facility which is being considered for UEWR is located in Massachusetts and has been operational at the Cape Cod Air Force Station since 1979.

Concerns among residents and scientists regarding health effects of non-ionizing radiation have come to the forefront of public health discussions over the past ten years. The MDPH, as well as other state and federal agencies have been called upon to address these concerns based on the level of scientific understanding that currently exists. These concerns continue to grow at a tremendous rate. The current MDPH response to the public health concerns related to non-ionizing radiofrequency radiation (RFR) includes an assessment of available scientific data on the Cape Cod PAVE PAWS facility and recommendations for follow-up environmental monitoring through an independent expert panel review as well as a review of this draft EIS.

Our comments relate to two aspects of the draft EIS. One is the EIS's conclusion regarding the expected exposure level to the community (chapter 4.2). The other is in regard to the review of the expert panel's report on PAVE PAWS (chapter 4.1) prepared for the MDPH.

An issue of concern to MDPH is whether actual exposure levels are accurately predicted by computer modeling. The draft EIS concluded that, based primarily on computer modeling data, with UEWR in place "the radiated peak and average power, radar antenna patterns, and the operating bands of the UEWR's would remain unchanged from current operations…radar outputs would be unchanged from current levels." According to the EIS modeling results indicate that predicted exposure values both in 1979 and today fall below the federal RFR standards and that the upgrade will not increase RFR exposure to humans based on your exposure modeling values.

COMMENT NUMBER
2

Since in theory, you contend that the upgrade will not affect exposure, sampling values collected prior to implementation of the upgrade and then following its implementation could serve to validate your exposure model. This recommendation is consistent with the recommendations of our own expert panel report on PAVE PAWS. The report recommended that better environmental data are needed to characterize opportunities for exposure and potential health impacts from the facility. Furthermore, it is not possible to comment on how the 1979 measured power densities compare with the current federal standard because as you note, the measurements were taken in a way that "may not be exactly comparable" to the federal RFR standard.

In chapter 4.1 of the draft EIS, research studies are reviewed that examine effects of low level long-term exposure to RFR. A portion of the review includes the 1999 MDPH expert panel report on the Cape Cod PAVE PAWS facility in which you quote the authors opinion regarding the state of the scientific literature of RFR and its possible health effects. The EIS states on page 4-12 that the overall conclusion reached was: "In our review of the available data on the biological effects of RFR, we conclude that there is no definitive scientific evidence to claim that the anticipated low RFR levels from PAVE PAWS could cause any harmful effect to the public." This quotation from the MDPH report is taken out of context and, as a result, the statement as presented in the EIS is incomplete and misleading. In their report the MDPH panel went on in the next sentence to qualify their statement by saying, "But at the same time, there is suggestive scientific evidence that RFR produces bioeffects at much lower intensities than previously known. The scientific evidence cannot answer the question conclusively whether the PAVE PAWS radar will or will not cause harmful effects to humans in the community." This qualification importantly supports the panel's actual overall conclusion for an independent characterization of RFR exposure in the community to be conducted.

Based on the recommendations of our own expert panel, we strongly recommend that the EIS include validation of the PAVE PAWS mathematical exposure models by the use of exposure sampling methods prior to a decision for deployment of the UEWR. Thank you for the opportunity to comment on the draft EIS.

Sincerely,

Suzanne K. Condon, Director
Bureau of Environmental
Health Assessment

psw004

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

Comment Sheet PS-W-005
For the
UPGRADED EARLY WARNING RADAR SUPPLEMENT TO THE NATIONAL MISSILE DEFENSE DEPLOYMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for attending this public hearing. Our purpose for hosting this meeting is to give you an opportunity to comment on issues analyzed in the Supplement. Please use this sheet to comment on any issues that you feel should be clarified. To ensure that your comments are addressed we must receive your comments by May 12, 2000.

Date: May 3, 2000

(see attached sheets)

Commentor:
Name: Gary G. Hayward
Street Address:
City, State:
Zip Code:

Please place form in the drop box or mail to:

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

psw005

COMMENT NUMBER
PS-W-005

May 3, 2000

To whom it may concern,

Having this evening attended the Pave Paws public hearing in Falmouth, MA, I would like to make the following comments as a concerned citizen who took the trouble to attend this meeting:

First, as a resident of Falmouth, I feel the presenters are owed an apology for the rudeness of the majority of the activists who spoke against the project, implying all manner of deceit on the part of the various government representatives present. One can certainly disagree with someone without such personal attack!

For example, it was repeatedly and loudly alleged that no or misleading information had been provided regarding the meeting time and location so as to minimize public involvement. Puzzled, I reviewed my own clipping from the local paper (the Falmouth Enterprise) which on April 25th contained a paid advertisement of the meeting, stating clearly and correctly the time, date, location, sources of background materials, and where to send ones written comments if one were unable to attend the hearing itself.

My own impression, both before and during the meeting, was that efforts were made to answer my various questions as fully as possible, and that the public was encouraged to speak freely with no argument or subsequent follow-up from any of the presenters.

I attended this meeting in an attempt to determine whether I should be concerned that the proposed updates of the system would in any way increase the ground level UHF radiation from facility (I have lived here since before the present system was installed in 1979 and followed closely the public discussions at that time) and came away convinced that they could in no way possibly do so.

It was stated by critics that the current safety arguments were based only on theoretical power levels, yet the displays and handouts include tables of actual 1986 measurements taken at numerous nearby schools, housing developments, roads, etc. - all such measurements showing these same extremely low power levels.

Much was made (by the activist critics) of the fact that the acceptable EM exposure limits have been reduced by a factor of ten over the years since the facility first became operational. Yet both the theoretical and measured levels are STILL below even the lowest new standard by at least 1000 times! One speaker went so far as to argue that the power output from two sides of the array should be added together to give the public's exposure - even though the two sides are facing in two different directions!

Hearing all this technical nonsense (and much more), I was reminded of the old lawyer saying to the effect that, "When the facts are on your side, argue the facts; when the facts are against you, pound on the table" - as a retired M.I.T. electrical engineer, I felt that a lot of "table pounding" was taking place.

COMMENT NUMBER
1

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Elevated Cape Cod cancer rates were mentioned as though this was proof that Pave Paws had to be "The Culprit". Yet I remember hearing of elevated Cape Cod cancer rates well **before** Pave Paws. Since we know that there are strong lifestyle and environmental factors in cancer risks, let's deal with THOSE and not be overly distracted by possible mechanisms which are tenuous at best. If low level UHF signals caused cancer, the whole world would by now be covered with cancer "hot spots" around commercial TV and FM stations (whose output levels are MANY times that of Pave Paws) - a correlation which cancer epidemiologists could not have missed.

This is not to say that I felt the proponents did the best possible job of presenting their case. To concentrate on Pave Paws as an essential contributor to a future Missile Defense System - one which may or may not be built - tends to change what should be an environmental debate to one of U.S. military policy.

I listened in vain for some mention of its more prosaic but invaluable everyday use in tracking "space junk", thus allowing safe launches of astronauts and the various satellites on which we all depend for so many of our daily communication, weather, navigation, and similar modern needs and conveniences.

In summary, I came away from this meeting convinced that 1) the present Pave Paws facility is useful and not harmful, 2) that this situation will in no way be changed by the minor updates proposed, and 3) that several of the more vocal critics, while no doubt sincere in their desire to improve life on Cape Cod, would be more effective if they devoted themselves to some of our **real** problems (water pollution, including excessive nitrogen input to our local waters comes immediately to mind), used engineering and better reasoning to consider the relative risks, and were **polite**!

Respectfully submitted,

Gary Hayward

COMMENT NUMBER

PS-W-006

Comment Sheet PS-W-006
For the
UPGRADED EARLY WARNING RADAR SUPPLEMENT TO THE NATIONAL MISSILE DEFENSE DEPLOYMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for attending this public hearing. Our purpose for hosting this meeting is to give you an opportunity to comment on issues analyzed in the Supplement. Please use this sheet to comment on any issues that you feel should be clarified. To ensure that your comments are addressed we must receive your comments by May 12, 2000.

Date: May 3, 2000

The three issues I would like addressed are:

1) Technical effectiveness. This system does not seem to be anywhere nearly ready for deployment. We have spent $60 Billion on it with another $26 Billion projected. If that money can't produce an effective defense, we should stop trying and find a better way to protect national security. 1

2) Strategic purpose. Why are "rogue states" suddenly so high on our national worry list? Why won't Mutual Assured Destruction work just as well against Iraq and North Korea as against the USSR? Aren't the nuclear weapons left over from the Cold War of far greater danger to our national security than rogue states and shouldn't we focus on defusing them instead? Won't our pursuit of NMD recklessly endanger all disarmament efforts?

3) Better alternatives. Our national security is far more threatened by environmental dangers than military dangers. Military dollars should be spent to clean up all U.S. bases worldwide and to monitor the health effects on residents of current and past military practices. Our expressed willingness to use landmines, chemical & biological toxins makes us seem like a Rogue State. 2

Commentor:
Name: Judy Stetson
Street Address:
City, State:
Zip Code:

Please place form in the drop box or mail to:

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

psw006

Comment Sheet PS-W-007
For the
UPGRADED EARLY WARNING RADAR SUPPLEMENT TO THE NATIONAL MISSILE DEFENSE DEPLOYMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for attending this public hearing. Our purpose for hosting this meeting is to give you an opportunity to comment on issues analyzed in the Supplement. Please use this sheet to comment on any issues that you feel should be clarified. To ensure that your comments are addressed we must receive your comments by May 12, 2000.

Date: May 5, 2000

See attached sheets

Commentor:
Name: David Dow
Street Address:
City, State:
Zip Code:

Please place form in the drop box or mail to:

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

psw007

COMMENT NUMBER
PS-W-007

I attended the May 3, 2000 National Missle Defense (NMD) Deployment Draft Supplemental EIS Public Hearing which was held here in Falmouth, Ma. by the Ballistic Missle Defense Organization (BMDO). I was quite disappointed that the public information session was limited to a posterboard session prior to the hearing and that there was no time to assimilate this information in order to make an informed public comment. The description of the proposed project didnot allow anytime to ask questions before the public hearing began, which is not in keeping with standard, accepted practices on public outreach here on Cape Cod for the review of EIS/EIRs. I had to go ask one of the presenters from the BMDO whether they had any field data to validate their modelled exposure values (which provided the crux of your presentation that the upgrade would not prove hazardous to public health)and was referred to the poster boards. I was quite surprized to find out that the field measurements were made back in 1978 and 1986 and were not done at the same sites where they had calculated values for 2000 were estimated. There is also the issue that time averaged nonionizing radiation measurements in the field don't adequately characterize the PAVEPAWS exposure. This smacks of pseudoscience and it is a disgrace for a technical organization like the BMDO to foist this off on the public. There should have been a public information meeting to resolve this and other questions, prior to holding a public hearing. The procedure that the BMDO pursued is a charade. 1

A more basic issue is whether the nation should spend $60 billion to construct the NMD in order to protect us from rogue countries that have missles with atomic warheads. I personally find it hard to visualize that this is a real threat, compared to cyber-terrorism and the release of chemical/biological warfare agents in populated areas by these enemies of the United States. Certainly major nuclear powers (Russia and China) could develop offensive weapons systems to overcome a limited anti-ballistic missle (ABM) system, so that we could have less security than we do at the present with the ABM treaty in effect. Certainly if we have a spare $60 billion lying around it could be more productively applied to real environmental threats (global climate change and biodiversity loss) or social problems (lack of affordable housing and health care). 2

COMMENT NUMBER
1
2

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

	COMMENT NUMBER
There are a number of process issues that need to be more clearly defined. I gather that the PAVEPAWS EIS process is encompassed within the NMD EIS process. If the goal of the PAVEPAWS EIS is to help us understand whether the existing phased radar exposure has any effect on the high cancer rates on Cape Cod, how can one close public comment on the NMD EIS before the PAVEPAWS process is even underway ? The NMD proposes to upgrade the hardware and software at the existing PAVEPAWS site, before we know whether we suffer any negative consequences from the present mode of operation. I know that we have high cancer rates and all of the likely exposure sources (PAVEPAWS, Canal Electric Plant, past DDT spraying for gypsy moths, Massachusetts Military Reservation, etc.) are claimed by their supporters not to pose a health risk to the public. I don't know where the truth actually lies, even though electromagnetic radiation (EMF) is known to produce bioeffects such as effects on DNA transcription and translation, altering calcium balance in cells, and reducing pineal production of melatonin (Stevens, 1993). The BMDO appears to have mis-quoted the Massachusetts Department of Public Health's Experts Report on the Potential Health Impacts of PAVEPAWS EMF, as suggesting that the results support your claim of no known health impacts from exposure to pulsed radar signals. Certainly many epidemiological studies have come down on both sides of the emf/health impacts issue, but one needs to acknowledge both studies that support and refute your position.	3

	COMMENT NUMBER
A number of technical issues were raised at the public hearing, such as: * whether the IEEE standard based upon heating effects in tissues is the appropriate health reference point, since PAVEPAWS is not a microwave oven	4
* the fact the IEEE standard of 0.28 mW/sq.cm at 420 MHz today has been reduced an order of magnitude over that in 1979 which was deemed innocuous to public health by the Air Force when PAVEPAWS was originally built and local citizens were assured that a health study with "real" exposure measurements would be conducted (subject of PAVEPAWS EIS in 2000)	5
* the total peak power is greater than 1 MW or twice what is listed in the NMD EIS I am not an expert in this area, but many legitimate questions appear to have been raised which should be explicitly answered in the responsiveness summary and not lumped into generic responses to public concerns which have been lumped together (which is the strategy that the military often pursues locally). Reference: Stevens, Richard G. 1993. Biologically based epidemiological studies of electric power and cancer. Environ. Health Perspect. Suppl. 4: 93-100.	6

psw007b

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER
PS-W-008
1

PS-W-008

Comment Sheet
For the
UPGRADED EARLY WARNING RADAR SUPPLEMENT TO THE NATIONAL MISSILE DEFENSE DEPLOYMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for attending this public hearing. Our purpose for hosting this meeting is to give you an opportunity to comment on issues analyzed in the Supplement. Please use this sheet to comment on any issues that you feel should be clarified. To ensure that your comments are addressed we must receive your comments by May 12, 2000.

Date: 5/7/00

My main concern regarding the issue of PAVE PAWS is not just the safety and long-term hazards of the machine, but the issue that during the meeting and previous PAVE PAWS meetings, there was no plan or consideration to move the machine. No-one suggested alternative sites. There must be serious consideration to move the machine/apparatus. For 20+ years, this question has run, stating the issues and concerns of the people. It's got to be moved!!! The cape is a residential & resort community that needs to be protected, including the people!!

Commentor:
Name: Troy Verdone
Street Address:
City, State:
Zip Code:

Please place form in the drop box or mail to:

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

psw008

COMMENT NUMBER
PS-W-009
1

PS-W-009

TO: SMDC-EN-V, U.S. Army Space and Missile Defense Command

Re: PAVE PAWS (Cape Cod Massachusetts)

After reading newspaper accounts of PAVE PAWS and its primary function, I, as a non Cape Codder can understand the consternation and concerns of the opposition. But their fear is based on ignorance and not fact.

PAVE PAWS is definitely an advance in radar technology; further funding is needed to upgrade its computer system for future use. With communications heavily dependent on satellite technology, an instrument of this type is required to know the location of satellites at all times.

Cell phones and their required satellite technology for reliable usage is a definite target for enemy technology. The opposition should remember that just a few years ago, "phone pagers" became inoperative due to the disappearance of the respective satellite stationed over the state of Kansas.

Best of luck,

Paul D Manoli

Paul D. Manoli

8th May 2000

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER
PS-W-010
1

May 11, 2000

PS-W-010

Sharon Judge
Spokesperson.
Cape Cod Coalition to Decommission PAVE PAWS

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

RE: COMMENTS ON THE UPGRADED EARLY WARNING RADAR SUPPLEMENT TO THE NATIONAL MISSILE DEFENSE DEPLOYMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)

CHALLENGES WITH THE BMDO EIS PROCESS FOR UEWR/PAVE PAWS ON CAPE COD HAS RESULTED IN A SUPPLEMENT THAT IS DEFICIENT DUE TO INADEQUATE PUBLIC INVOLVEMENT; INADEQUATE PUBLIC NOTIFICATION; LIMITED SCOPE OF ANALYSIS; INADEQUATE CIRCULATION OF NECESSARY RELATED DOCUMENTATION; INADEQUATE EXPLORATION AND DOCUMENTATION OF FEASIBLE ALTERNATIVES

The Ballistic Missile Defense Organization (BMDO) has failed in their Environmental Impact Statement (EIS) process due to lack of adequate public involvement and poor public notification. It is appalling that the public hearing, held on May 3, 2000 for the Supplement to the Draft EIS for the National Missile Defense Deployment (NMD), was the only public meeting that the BMDO held on Cape Cod, despite the high level of controversy regarding the PAVE PAWS Installation here and the public's desire for information regarding the BMDO's proposed upgrades to PAVE PAWS. The BMDO intentionally subverted the public involvement process on Cape Cod in their EIS process and the Air Force as a cooperating agency failed in their responsibilities in this role. The following analysis supports this conclusion.

When the BMDO decided to conduct an EIS for the NMD Deployment, they should have begun a full EIS analysis for the PAVE PAWS on Cape Cod, right from the start, with formal public scoping meetings on Cape Cod. Although we realize that the BMDO is on a deadline to get a "Deployment Readiness Review" for the NMD system on President Clinton's desk in June, the BMDO should have begun a full EIS for the PAVE PAWS facility long ago. Because of their failure to do so, the BMDO is now in a hurry to fulfill their NEPA requirements, pointing to their deadlines as a reason for going about the EIS process in the flawed way that they have. This is no excuse and is not acceptable.

The BMDO has indicated that the "Upgraded Early Warning Radar" (UEWR) portion of the proposed NMD system was analyzed separately from the original NMD Deployment EIS because there were changes in the UEWR program which prompted analysis after the original NMD Deployment EIS draft. The BMDO should not have done a Supplement in order to avoid doing a full EIS for PAVE PAWS. The BMDO was well aware of the controversy regarding the PAVE PAWS on Cape Cod when they began the process of preparing the NMD Draft EIS. The Massachusetts Department of Public Health (MDPH) began the process of assembling a panel of scientists to look into the health effects of PAVE PAWS before the BMDO posted their Notice of Intent to Prepare an EIS for the deployment of an NMD system on November, 1998. It is apparent the BMDO did not want the public on Cape Cod to be involved early on in the BMDO EIS process. (* Note: Linda Erdreich, Chairman of the MDPH PAVE PAWS Panel and her boss William Bailey, both of Bailey Research Associates, Madison Ave. New York, were approached by the BMDO in September, 1999 and were subsequently hired by the BMDO as "Contractor Preparers" for the Supplement to the Draft EIS).

According to Jan Larkin of the Joint Program Office (JPO) at the MMR, there were at least three meetings at the Pentagon around the summer of 1999 regarding PAVE PAWS and community issues. The JPO at MMR was well aware of the long-standing controversy regarding the continued operation of PAVE PAWS on Cape Cod. There was a great deal of media coverage over the past two years. The meeting on February 16, 1999 at Sandwich High School at which time the MDPH convened the panel of scientists, was heavily attended by representatives of the Air Force, JPO and industry.

COMMENT NUMBER

Instead of gathering and documenting current information, the BMDO prepared their Supplement by incorporating information from the original 1979 EIS for PAVE PAWS. The 1979 EIS is outdated and contains incorrect information. It is based on a 10-20 year PAVE PAWS life-span and the Cape Cod area has changed dramatically, in our exploding population and known rates of disease, water issues, etc. Also, the PAVE PAWS facility has gone through upgrades and additions over the years which were not addressed in the 1979 EIS and must be addressed in a new EIS. These issues include the addition of the GWEN tower and 1996 "major modification" to PAVE PAWS. The Supplement must document all radiation characteristics of the GWEN tower, the context in which the facility was upgraded in 1996 and the changes that were made in the configuration and power distribution. Why was it modified? How did this effect the beam configuration, waveforms, radar patterns, modulation, etc.? Was modification in anyway part of the BMDO TMD or NMD programs? Who funded this modification? How much did it cost? What type of environmental review did it undergo and by who? Has there ever been any change or upgrade to the cooling system for PAVE PAWS? What is the effective radiated power of each of the two main beams. Has the ERP ever changed in 21 years? Have you ever increased the gain of the antenna? When and by how much? As we understand it, the military personnel at PAVE PAWS are the "operators" of the system and do the tracking and cataloging. Who operates the electronic components of the radar itself? Are the operators aware of these changes?

The BMDO ignored in the Supplement, the community and environmental issues and concerns that were raised at a meeting at Sandwich High School on February 16, 1999 (Audio Tapes #1) at which time the MDPH had convened its panel of four scientists. This is relevant because the BMDO cited the MDPH PAVE PAWS Panel Reports in the Supplement. The BMDO must list the names of the four scientists that MDPH contracted in the Final EIS. They are Linda Erdreich, Om Gandhi, Marvin Ziskin and Henry Lai. The Final EIS should also note that Linda Erdreich was the Chairman of the MDPH PAVE PAWS Panel and is also listed as a "Contractor Preparer" for the Supplement.

The Final EIS should note that there was great opposition to Linda Erdreich, Marvin Ziskin and Om Gandhi and that citizens asked for their removal from the panel. Linda Erdreich had recently testified on behalf of the telecommunications industry. Om Gandhi and Marvin Ziskin were on the IEEE balloting committee that voted in the existing safety standard for RF/MW radiation. Both men cast a yes ballot without comments despite the fact that EPA, NIOSH, OSHA and FDA all had concerns with that standard. The concern was that these individuals would be more apt to defend the standard that be critical of it since they voted in the standard. This was an issue since the IEEE standard was being used to judge the safety of PAVE PAWS. The Final EIS should note the controversy regarding the perception of impropriety on the part of Linda Erdreich which led citizens to call on the MDPH to withdraw the Panel Reports.

The BMDO mislead the public in their use of these Reports. The Supplement gives the impression that PAVE PAWS radiation is "safe" as long as it is below national safety standards for RF/MW radiation. It's what the Supplement does not say that is misleading. The MDPH Panel Reports also say that biological effects occur at much lower levels than previously known and little if anything is known about long-term exposure to PAVE PAWS unique radiation, however these and other statements did not make it into the Supplement. The PAVE PAWS Panel Reports are totally inadequate and the BMDO must supplement the Reports by addressing all the issues and concerns raised at the February 16th meeting and in the written submission that the Coalition submitted to the panel (Attachment A). The BMDO must provide answers in the Final EIS to the specific questions that were not answered by the panel and to address the studies that were ignored in the MDPH reports. A few examples include the following:

The whole series of studies of the Skrudra Latvia radar station and the Chiang study of stations in China were completely ignored. There were adverse effects from the Skudra Latvia study on school children reaction time, short term memory, attention level, etc. Also, the cows grazing near the radar station had 6 fold higher chromosome breaks. Since this study dealt with radar signals and since we referenced it – it seems grossly negligent to have ignored it. There are also reports from this study showing impacts to pine trees and other plants.

The Belekrosky paper was ignored. This shows adverse impacts on nerve cell myelin sheaths at 10 microwatts per sq cm. This is an IEEE Final List paper that showed adverse effects at an extremely low level.

The comment about 7,000 to 10,000 studies is completely misleading. It is acknowledged in Chapter 14 of the NCRP report that 1000's of studies were done, but at high RF levels and for short periods of time, thus not relevant to concerns about low level chronic exposure. The IEEE rationale for the existing safety standard mentioned the inadequacy of animal studies (mainly acute/short-term studies).

The MDPH Panel suggested in their reports that there is data supporting frequency effects, however, they demonstrated their unwillingness to disagree with the IEEE rationale that there is no data supporting frequency or modulation dependent effects. The citizens stated that a minority report should be included. Yet there is no mention of whether all parties agreed on all points or not. It is surprising that Henry Lai's radial arm maze studies were not included. The Coalition requests a minority report, where each panel member may give a comment different from that in any section of the report. If all are in agreement, then this should be stated. We are including a copy of a letter Henry Lai sent to Suzanne Condon of the MDPH following the March 13, 1999 meeting in Sandwich (Audio tapes #2)at which time the panel was reconvened to discuss the Panel Reports. The letter was to clarify the point he made regarding the difference between a biological effect and a health effect. (Attachment B).

Instead of preparing a full-blown Environmental Analysis as promised by Lt. Col. Rick Lehner of BMDO at the September 21, 1999 "invitation only" meeting on MMR, the BMDO kept the public on Cape Cod out of the process. Scoping did not begin in November, 1999 as indicated by Lt. Col. Lehner and public hearings were not held in February as he had said. (Audio Tapes #3). In November, 1999, the Upper Cape Codder ran a story in which Captain Barbara Sacra, Community Liason for BMDO at the time, discouraged the public on Cape Cod from commenting on the NMD Draft EIS, despite the fact that there was some program-specific information regarding PAVE PAWS that was not included in the Supplement. Capt. Sacra assured the public that there would be plenty of updates at public meetings and that the EIS for the PAVE PAWS on Cape Cod had not been written yet. She said when the Supplement was completed, that representatives from BMDO would come to Cape Cod to present the information and answer the public's questions. (Attachment C).

As it turned out, the May 3, 1999 public hearing for the Supplement was the only public meeting held on Cape Cod for the NMD Supplement for PAVE PAWS. It was held in Falmouth, MA, more than 20+ miles from Sandwich and Bourne, the communities closest to the PAVE PAWS facility. The public and elected officials were not properly notified of this hearing. The only opportunity for question and answers was during a poster board session prior to the hearing. There was no question and answer period on the public record. One meeting on the NMD Supplement was not adequate. It did not allow the public and elected officials to become familiar enough with the program and document make well-informed comments. There were no copies of the Supplements or Draft EIS for the NMD deployment at the hearing. There were no hearings on the Draft EIS. I had to travel to Arlington Virginia at my own expense to comment on the Draft EIS for the NMD Deployment

We understand that the room at the Holiday Inn was booked for the public hearing for the Supplement (originally scheduled for April 27th) the first week in April. It is disturbing that the BMDO withheld information regarding the public hearing in a press release dated April 13, 2000 (Attachment D). The press release announced the date, but said the location and time was to-be-determined. Yet, a paid advertisement, appeared the day after the press release went out with the meeting location and time (Attachment E). It appeared in the "Lifestyles and Arts" Section which is not a "prominent" section of the public and elected officials did not see it. Also, the ad did not contain the words PAVE PAWS which is how the radar is referred to here on Cape Cod. The public was not familiar with the term Upgraded Early Warning Radar. Several public officials asked for the public hearing to be rescheduled for late May to allow for proper public notification (Attachment F). Their requests were denied however, and a date of May 3rd was set instead. This date did not allow for adequate public notification.

Furthermore, it was just five days before the first public scoping meeting for the Air Force's EIS. A public hearing should have been announced in the Notice of Availability (NOA) for the Supplement and should have contained the date, time and location. A cover letter should have been included with the Supplement when it was distributed to individuals and agencies noted in the distribution list announcing the details of a public hearing. Many elected officials and agencies (i.e. MDPH, etc.) do not receive local Cape Cod newspapers and were therefore unaware of the public hearing, first scheduled for April 27th and then rescheduled for May 3rd. What policies, procedures and directives is the BMDO following in order to implement the National Environmental Policy Act? What policies, procedures and directives is the Air Force following in order to implement the National Environmental Policy Act?

There were many opportunities for the BMDO to "diligently" inform and involve the public, officials, and agencies in the NMD EIS process, i.e. the IRP mailing list for MMR, the press release of April 13, 1999, the Consensus Building Institute's mailing list of Stakeholders contacted for the proposed PAVE PAWS Stakeholders Working Group. On several occasions, the Coalition requested that the BMDO attend and provide information about the NMD program and EIS process at several public meetings. Top BMDO officials flew in for the March 28th public meeting at the Sandwich library regarding the proposed "PAVE PAWS Stakeholders Working Group," however these BMDO officials monitored

COMMENT NUMBER

the meeting only. They did not identify themselves to the public, and did not present any information on their plans to upgrade PAVE PAWS or their EIS process. They did not provide the public the opportunity to ask questions and receive answers. We are including the Meeting Summary for the public record. (Attachment G).

In preparing a Supplement only, the BMDO did not have any formal scoping meetings, nor did they consult members of the public, agencies or elected officials. Section 5 of the Supplement entitled "Consultation and Coordination" is misleading. It implies that the BMDO consulted and coordinated with all the individuals and organizations that are listed in this Section. However, Coalition as well as many individuals noted on the list, were not contacted during the preparation of the NMD Deployment Draft EIS and Supplement. As a matter of fact, no one on the list in Section 5 was on the distribution list for the NMD Draft EIS.

The fact that BMDO has a deadline for putting a report on the President's desk is no excuse for an inadequate and illegal NEPA analysis. It is stated in the 1999 Draft EIS for the NMD Deployment (1999 Draft EIS) that, **"A total of seven public scoping meetings in December, 1998 were held in communities perceived to be affected by the NMD program."** The failure of BMDO to "perceive" Cape Cod as an affected community, despite the well-documented controversy, clearly lies on the shoulders of the Air Force and BMDO. As a result of this failure, no formal scoping meetings were held on Cape Cod regarding the proposed upgrades to PAVE PAWS and its proposed role in the NMD architecture. Thus, PAVE PAWS was not included in the 1999 Draft EIS. Instead, the BMDO prepared an "addendum" to the 1999 Draft EIS, also referred to as a "Supplement," which addresses the environmental impacts of the upgrades only to PAVE PAWS. The BMDO limited the scope of the Supplement however, to "their perception" of the Cape Cod community's concerns. This is unacceptable.

The Air Force and BMDO are manipulating the NEPA process in such a way as to further their objectives (the upgrades to PAVE PAWS and its continued operation on Cape Cod). In preparing two EISs, BMDO has put the cart before the horse and has sufficiently confused the public and elected officials on Cape Cod. The Supplement is deficient and falls far short of what the people of Cape Cod expect and deserve. The process is so tainted that it must begin all over from scratch, beginning with formal scoping meetings on Cape Cod. Immediate steps should be taken to combine the BMDO and Air Force proposals into one EIS process. BMDO and the Air Force should hold joint scoping meetings. The BMDO and Air Force must determine their roles in the EIS process (i.e. leading vs. cooperating agency). It is interesting to note that BMDO officials were present at the PAVE PAWS scoping meeting on May 8, 2000. Again, these officials monitored the meeting only and did not identify themselves to the public. We are providing the tapes of this scoping meeting. (Video tapes #4 ~~audio portion only~~).

The BMDO has been considering the use of PAVE PAWS in the NMD architecture at least as far back as 1994 when the 1994 Programmatic EIS (1994 PEIS) for the BMDO was released. Page 1-5, Section 1.6.1 of the Draft EIS for the NMD Deployment states, **"This NMD Deployment EIS is tiered from the Ballistic Missile Defense Final Programmatic EIS (Department of Defense, 1994)."** This document, therefore, should have been circulated along with the Supplement to the Draft EIS for the NMD Deployment to the individuals and agencies on the distribution list for the Supplement and made available to the public. It provides an important perspective such as the history and evolution of the BMDO and NMD program. It contains a section regarding alternatives to using the UEWRs. The 1994 PEIS did not assume that the Air Force PAVE PAWS would be available for inclusion in the NMD system. This was just one type of Ground Based Sensor that was under consideration. According to the 1994 PEIS, the BMD system would only incorporate the UEWR if the Air Force pursued this capability. What was the BMDO's rationale for choosing to upgrade the EWRs? Why were the alternatives noted in the 1994 PEIS including construction of a new X-Band Radar and Ground Launched Sensors not addressed in the NMD Deployment EIS or Supplement? The alternative of building a new X-Band Radar at an appropriate East Coast location away from population centers, i.e. Maine, island off Maine, ocean platform, must be documented in the Supplement. According to the 1994 PEIS, the mission of the X-Band Radar is similar to the UEWR

Over the years, the BMDO has had numerous opportunities to present information to the public on Cape Cod regarding the proposed NMD program and the BMDO's proposed plans to upgrade PAVE PAWS. No mention of these plans were ever made to the public and elected officials during the Master Planning process and completion of the Master Plan document for the future use of the Massachusetts Military Reservation, 1998, despite requests for information made by the public and elected officials.

COMMENT NUMBER

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

The BMDO has not provided the proper "context" in the Supplement for which the proposed NMD "upgrades" to PAVE PAWS would occur. The 1979 EIS should have been circulated along with the Supplement to the individuals and agencies on the distribution list along with the National Research Council's (NRC) document entitled; "Potential Biologic Effects of the PAVE PAWS Radar System." Instead, the BMDO picked out portions of these documents that served their own objectives without providing the proper context for individuals and agencies reviewing the Supplement. The Supplement omits covering many important areas that should have been analyzed by saying that they had been analyzed in previous NEPA analysis. Please see the "Table of Contents" in the 1979 EIS (Attachment H) as a partial list of areas that need to be discussed in the Supplement. The "Summary and Conclusions" section from the NRC document should be included in the Supplement. (Attachment I)

The Air Force recognized these challenges and has begun an EIS process for the aging PAVE PAWS facility. Either the Air Force, since they are a "cooperating agency" in the BMDO EIS should have folded their EIS process into the BMDO process or, as soon as the Air Force announced their plans to prepare an EIS on December 13, 1999, or the BMDO, who is a "cooperating agency" in the Air Force EIS, should have folded their process into the Air Force's, resulting in **one EIS for PAVE PAWS**. Instead, The BMDO has gone ahead with their flawed process which is not legal or ethical. The Air Force, in turn, announced in a press in April (Attachment J), to be included in the Final EIS) that they will incorporate the findings of the NMD Final EIS in their EIS. This kind of "playing off" **of the BMDO's flawed EIS document will in turn result in a flawed EIS process for the Air Force and it is not legal or ethical. There should be only one EIS for this facility and the process must begin again**. The BMDO should have to go through the same full EIS process that the Air Force is beginning.

According to NEPA regulations, the BMDO must "rigorously explore" alternatives to the Proposed Action and document them in the EIS Supplement. The BMDO has failed in this aspect of the NEPA process and it appears to be intentional because the only alternatives that BMDO has considered in Section 2.0 **ALTERNATIVES INCLUDING THE PROPOSED ACTION**, are not feasible.

Page2-6 of the Supplement states. **"This Supplement assumes that the Clear AFS, Beale AFB, and Cape Cod AFS EWRs will continue to remain in operation in support of the U.S. Air Force's ongoing early warning and space-tracking missions, and it does not address the construction of new radar facilities elsewhere in the United States. As previously noted, these three existing EWRs are geographically located in areas of the nation suitable for performance of their proposed NMD mission and they are readily adaptable to this mission through replacement of interior computer equipment and associated hardware."** This statement is in direct conflict with the following statement that appears just below it on the same page of the Supplement:

"The U.S. Air Force, which operates and has real property accountability over the PAVE PAWS EWR facilities, has begun the process for an National Environmental Policy Act (NEPA) analysis. This analysis will culminate in a full EIS addressing maintenance and sustainment of EWR operations at Clear AFS, Alaska, Beale AFB, California, and Cape Cod AFS, Massachusetts. For this reason, if the Proposed Action in this Supplement is selected, its implementation is contingent upon the outcome of the Air Force EIS. The Ballistic Missile Defense Organization would reassess its proposed usage of the EWR facilities in light of the results of the Air Force EIS prior to installation of the NMD modifications." Since the BMDO must put the "Deployment Readiness Review" on the President's desk this summer, and the Air Force's EIS is estimated to take at least 18-24 months to complete, it follows that the BMDO must have alternatives to the UEWR on Cape Cod documented in the final NMD EIS.

The BMDO has not been forthcoming with information about the Missile Defense Act of 1999 and how this Act relates to the two EIS processes (BMDO's and the Air Force). The National Missile Defense Act of 1999 and related issues must be documented in the Supplement. The public must be informed that it is the policy of the United States to deploy a National Missile Defense as soon as "technologically possible" and that the BMDO is planning to implement this technology in 2005. What is the timeline for the deployment of the NMD system if the President's decision this summer is to deploy? The Draft EIS says if the decision made is not to deploy, the time will be used to upgrade the existing NMD elements. Does this mean PAVE PAWS? Will you upgrade PAVE PAWS prior to the completion of the Air Force's EIS?

Short-term cost and convenience cannot be the main criteria in decision-making at the expense of human health and the environment. According to the Air Force, the National Environmental Policy Act was set up to encourage excellence in decision making. Lack of adequate public involvement is the main reason that PAVE PAWS ended up in its current

COMMENT NUMBER

location in the first place. The public was kept out of the process and did not find out about PAVE PAWS the facility was built. Once PAVE PAWS was built, the option of moving it, or building an ocean platform, although technologically possible was eliminated because of cost and convenience. The residents brought a lawsuit against the Air Force forcing them to do an EIS, but because the facility was already built, the Air Force said they could not justify the expense of moving it since the issue of long-term health effects from PAVE PAWS radiation was unresolved at that time. BMDO is repeating the same tactics the Air Force used twenty-one years ago to achieve their objective and it is unacceptable.

The Air Force has said their EIS will take 18-24 months to complete. If the BMDO waits two years for the outcome of the Air Force's EIS, (and the decision made is to discontinue operation of PAVE PAWS in the current location), the BMDO would have no alternatives ready to bring online in time to be able to comply with the NMD Act of 1999. By not documenting technologically possible alternatives in the Supplement, the BMDO is not conducting the long-lead planning necessary to ensure that they do not leave themselves open to an "emergency" situation down the road if they need to meet a certain deadline for deployment of a national missile defense system.

This information is critical in understanding the agenda and arrogance of BMDO officials, the BMDO's hurried and flawed EIS process, and its relationship to the Air Force's EIS process. This may explain the BMDO's failure in providing technologically possible alternatives in their Supplement. It is technologically possible to move PAVE PAWS (as demonstrated by the recent move of the PAVE PAWS in Texas up to Alaska). It is also technologically possible to construct a new facility in an appropriate location (either an Upgraded Early Warning Radar or a new X-Band radar).

The 1979 EIS included a section on "Unresolved Issues" concerning the long-term effects of exposure to PAVE PAWS unique pulse-modulated microwave radiation. The NMD Supplement must document all of the unresolved issues documented in 1979, as they remain unresolved today. To date, there has never been a study of the effects (short-term or long-term) on humans or animals of exposure to PAVE PAWS unique radiation (24-frequencies constantly changing with each pulse, waveform, radar patterns and modulation.) This was confirmed by Mr. John Leonovitch, consultant to the Air Force Space Command at the May 8, 1999 scoping meeting for the Air Force's EIS for PAVE PAWS. Instead, the BMDO is using the IEEE standard for PAVE PAWS radiation. This standard, which is a heating standard, is based on short-term acute exposures to radio frequency/microwave radiation, and is not relevant or applicable to the PAVE PAWS exposure situation on Cape Cod. This fact must be discussed in greater detail in the Supplement.

It is important to note that there has never been a retrospective "health outcome" study of the Cape Cod population in relation to exposure to PAVE PAWS radiation, despite the fact that the MDPH has stated that the Capes significantly elevated rates of cancer correlate to length of residency here. There have also been no studies of the synergistic effects of exposure to PAVE PAWS unique radiation in conjunction with other environmental exposures in the region. This is relevant because PAVE PAWS is located on the Massachusetts Military Reservation (MMR), the largest EPA Superfund site and largest pollution containment project in the world. The Supplement must document the current state of the environment of MMR and Cape Cod and the multiplicity of exposures here. The Supplement must document Cape Cod health statistics, i.e. cancer, neurological issues, etc. All of the studies that have been done on Cape Cod should have been circulated with the Supplement to the individuals and agencies on the distribution list for the Supplement along with proper maps. Elevation is a factor in assessing exposure because of the proximity to the first sidelobe. The 60-degree "overlap sector" where exposure to both beams occurs, must be addressed in the Supplement in order to do an exposure assessment. Adequate maps must be included.

Neither the Air Force or BMDO has ever adequately assessed the cumulative effects that the facility may have had/is having/will have on the health of Cape Codders or the environment. The operation of the PAVE PAWS radar has significantly altered the electromagnetic environment on Cape Cod. Page 1-12 of the 1979 EIS "ambient field measurements indicate that all other sources (of EMR) are far weaker than the PAVE PAWS radar." The Supplement focuses on the fact that people on the ground are never exposed to the main beams. The Supplement must address the impacts to pilots and birds who fly in the main beam. The issue of potential hazard to birds is noted in the 1994 PEIS for the BMDO. What are the levels of exposure to pilots and birds? Are the sidelobes used, in any way, to perform any type of mission? Is some information classified? Is withholding information from the public ever justified by the Air Force because of classified information, missions, etc. For instance, has the beam ever, in twenty-one years, ever gone below 3-degrees? If it has, is the Air Force required to answer truthfully? It has been documented that the topography of the land determines the beam elevation. It has also been documented that it is beneficial to go down to 2-degrees or below for earlier warning time. Wouldn't it make sense to move PAVE PAWS to a location on the ocean where it can go below 3-degrees?

COMMENT NUMBER

psw010c

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

The Supplement did not address the cumulative effects of PAVE PAWS radiation on migratory birds. How many dead birds have been collected or "bagged" in the PAVE PAWS vicinity over the past 21 years? This is relevant because individuals who have worked at PAVE PAWS have said they've seen birds die in front of the screen. Has there ever been a follow-up study as to the effects on birds here as Cape Cod is part of the Atlantic flyway and it has been reported that there has been a significant reduction of many species of birds on Cape Cod. There is evidence that RF/MW radiation can have cumulative effects over time on trees. There is some evidence of tree damage on the ridge lines here on Cape Cod. Has there ever been any studies of the effects of PAVE PAWS unique radiation on trees? This must be addressed in the Supplement. There are many endangered animal species and flora and fauna on the MMR. Has there ever been any follow-up as to the cumulative effects over time of PAVE PAWS unique radiation on endangered species, or flora and fauna? This is relevant because PAVE PAWS sits on top of the sole-source aquifer for the Upper Cape. These issues must be addressed in the Supplement.

Any upgrades of PAVE PAWS must be suspended until the appropriate studies are completed to properly assess the risk of exposure (of all members of the population of various ages and states of health) and the environment. According to the 1979 EIS section on Assessment of Scientific Information on page 3-26, **"The most conclusive information would come from studies involving well controlled and carefully specified exposures of people of a variety of ages and states of health to RFR identical to that of PAVE PAWS. Such studies should ideally be carried out by experts and should include full understanding of the physical and biological mechanisms underlying any identifiable effects. This kind of information is not available. The information available comes from a variety of studies, none designed specifically to assess the effects of PAVE PAWS."** If these studies were to begin today, they would take years to complete. The Cape Cod community does not have that kind of time. We have high cancer rates and other health issues now. Therefore, the logical decision is to Move PAVE PAWS now. The question is, how much money is the Air Force and BMDO willing to spend to find conclusive evidence of a hazard from PAVE PAWS? it has been scientifically established that biological effects occur due to factors other than intensity; i.e. frequency and modulation-specific effects. There was experimental evidence twenty-one years ago, that frequency, modulation specific effects occurred. The Air Force and BMDO have had twenty-one years to prove that exposure to PAVE PAWS unique radiation does not cause a hazard, but they did not follow-up on the urgent requests of citizens and officials twenty one years ago. The $4 million Air Force funded Chou and Guy study was supposed to study the long term effects of exposure to microwave radiation similar to that of PAVE PAWS. When the results were not favorable for the Air Force, however, the study was buried in a 9000 page Air Force document. Du e to the extreme scientific uncertainty and the existence of some evidence of a problem, the Coalition is calling on the BMDO and Air Force to invoke the precautionary principle and move PAVE PAWS to an unpopulated site, or decommission and disassemble it at it at its present site and build a new X-band radar at an unpopulated site. The Supplement must include a discussion of the precautionary principle (Attachment A). The burden must lie on the Air Force and BMDO twenty-one years later to prove that PAVE PAWS is not causing adverse health effects on Cape Cod.

The Supplement gave no history or background for the Cape Cod PAVE PAWS site. This information is important in decision making and must be documented in the Supplement. It is important to understand how Cape Cod has changed dramatically since the 1979 EIS was completed and PAVE PAWS went online. Given the history of the twenty-one year old PAVE PAWS Installation on Cape Cod and the fact that Cape Cod has changed dramatically in this time, it is "reasonable" to consider the alternative of moving PAVE PAWS to an unpopulated area. The Air Force demonstrated this was possible when they moved the PAVE PAWS in Eldorado, TX this past year to Clear Air Station, Alaska. This move is noted in section 2.3 of the Supplement under **ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD**.

For all intents and purposes, the other alternatives considered but not carried forward, are not feasible alternatives. According to the Air Force, the decommissioned PAVE PAWS at Robins AFB, Georgia and the prototype PAVE PAWS radar at Eglin AFB, Florida, are not alternatives in their present location because they cannot provide complete coverage of approaches to the Eastern United States. Page 2-1 **ALTERNATIVES INCLUDING THE PROPOSED ACTION**, Section 2.1 Proposed Action states, **"The EWRs were sited at their current locations to maximize their ability to perform critical defense missions..."** It is important to note that Flatrock Hill on MMR was not the Air Force's first choice. According to NEPA documentation, Westover AFB was the Air Force's first choice for the East coast PAVE PAWS but was eliminated from consideration due to proximity to a population center. When the Cape was considered, Truro was the first choice. This site was eliminated due to its proximity to the Cape Cod National Seashore. Otis AFB was an afterthought. Pine Hill was the Air Force's preferred choice at Otis since it was a higher elevation and more remote from population centers than Flatrock Hill. The National Guard vehemently opposed this site since it would interfere with an artillery training area. PAVE PAWS "ended up" on Flatrock Hill due to other factors other than what was in the best interest of Cape Codders. This information must be documented in the Final EIS. The original siting issues must be addressed when considering alternatives in the decision making process. According to the Supplement the only criteria for siting the UEWR is that it be on the East coast. A technologically possible alternative would be to move the decommissioned PAVE PAWS in Georgia to a site on the East coast that provides complete coverage of approaches to the Eastern United States. Another option would be to move the existing PAVE PAWS on Cape Cod to an appropriate location. An appropriate location would be one not in a densely populated area by the ocean. Another alternative to be considered would be moving either the GA PAVE PAWS or PAVE PAWS on Cape Cod to an island off the coast of Maine or to US government owned lands in Nova Scotia, Canada, (especially in light of the fact that the US has a cooperative agreement with Canada in the operation of PAVE PAWS. An ocean platform must also be considered as this alternative was considered in the 1979 EIS. Cost and convenience must not be the only consideration in making a decision whether or not to upgrade PAVE PAWS in its present location or to move it.

psw010d

COMMENT NUMBER

A cost/benefit analysis must be done for each alternative. For instance, the cost of moving PAVE PAWS now, before it is an integral part of the proposed NMD system, must be documented. We know that it cost $106 million to move the PAVE PAWS from Texas up to Alaska. (Attachment A). The Final EIS must also document the cost of moving PAVE PAWS at a later date if it were an integral part of the proposed NMD system. It is important to note that according to BMDO officials, **the Cape Cod PAVE PAWS is the only element of the proposed NMD system that is located in a densely populated area. It is the only radar installation of its kind located in a densely populated area.** Since the BMDO is using a substantial amount of data from the 1979 EIS, this document should have been circulated to the individuals and agencies on the Supplement distribution list. Also, there is program-specific information regarding PAVE PAWS in the NMD Draft EIS that is not included in the Supplement. This document should also have been circulated to the individuals and agencies on the Supplement distribution list. The Section on **UPGRADED EARLY WARNING RADARS** on page 1-5 of the NMD Draft EIS states:

"Hardware and software modifications are planned for these existing radars in conjunction with the NMD system The hardware modifications would consist of new displays and processors and certain other interior changes. The exterior footprint and maximum power output of each radar would remain unchanged. The software modifications may change the radar bandwidth and beam motion effects (i.e., the amount of time the radar transmits into the same region of space). These changes, however, would occur only during the limited periods of time when the radars are performing an NMD mission. At all other times, the radars would continue to perform their current missions, and radar outputs would be unchanged from current levels. The specific modifications to the radars are still under development. Once the details of the radar upgrades are defined, separate site-specific environmental analysis, as required, would be performed."

It is not clear in the Supplement what the BMDO's long-term plans for the PAVE PAWS site on Cape Cod is. This must be documented in the Final EIS. According to the NMD Draft EIS, even if the decision made is not to deploy a national missile defense, the time would be used to upgrade existing NMD elements. Does this mean PAVE PAWS? The NMD Draft EIS discusses the IFICS and X-Band Radars. Could these facilities be sited at the PAVE PAWS site in the future if mission needs change, etc? What site-specific analysis would be required and who would determine if site-specific analysis would be required. This is relevant because there have been upgrades to PAVE PAWS (1996) and additions to PAVE PAWS (i.e. GWEN, 1986) that the public was not notified of.

Page 1-3, Section 1.2 under **NMD PROGRAM OVERVIEW** states, **"The NMD Program was originally a technology development effort. In 1996, at the direction of the Secretary of Defense, NMD was designated a Major Defense Acquisition Program and transitioned to an acquisition effort. "** Did the major modification to PAVE PAWS in 1996 have anything to do with this action? Please explain in detail what the major modification to PAVE PAWS involved including, but not limited change in waveform, pulse repetition rates and radar patterns. According to a Radio-Frequency Survey, it allows PAVE PAWS to operate in a more powerful configuration. Explain how this changed the radars exposure parameters, such as where the sidelobes intersect the ground. Will the SBIRS satellites currently being developed by the U.S. Air Force, replace or duplicate the PAVE PAWS mission? Is PAVE PAWS part of Theater Missile Defense?

Page 2-1 states that, **"During NMD operations and training, radiated peak and average power are identical to current EWR operations... During NMD operations a different radar pattern would be used and different algorithms used to interpret the raw data from the radar returns... It is anticipated that training for NMD would be less than 1 percent of the total usage.** Anticipated by who? Could the amount of time the NMD operations are used

COMMENT NUMBER

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

change? and if so, why? What would the radar pattern be and how does it differ from the radar patterns of the other missions PAVE PAWS performs? Will the modulation change? Is it still 18.5 Hz as it was in 1979. Has it always been 18.5Hz? How does the electronic hardware and computer software replacements provide enhanced detection and discrimination capabilities? How does the pulse repetition rate and pulse patterns change? How does this effect the wave forms?

PAVE PAWS creates a complex electromagnetic environment and the NMD system would be further complicating the environment. Under what conditions is the antenna gain increased and by how much? The Supplement must document the phenomenon of propagation, reflections and hotspots as this is important in assessing exposures. When the measurements were taken in 1979 and 1986, most were time-averaged thus very diluted (in terms of intensity) due to PAVE PAWS low duty cycle. Since these were not independent measurements, how do we know the correct instrumentation was used, that there was proper calibration and the beam was present? According to the B.U Upper Cape Cancer Incidence Study, 1991, there was a margin of error of + or- 60 percent for the radiation measurements. The B.U. team strongly recommended systematic monitoring of the entire area scanned by PAVE PAWS so that useful data would be available for future evaluations. Why was this never done? The Supplement must provide more information on the beam motion effects. How would the radar patterns, waveforms, pulse repetition rate, etc. change? Would there ever be the need to go below the 3-degree limit, i.e. a splashdown, etc?)

Page 2-1 states, **"One of the requirements of the NMD program is to protect the system from the high altitude electromagnetic pulse that could occur during a nuclear blast and cause components of the system to fail. All new components of the system would be built with high altitude electromagnetic pulse protection; however, some of the existing early warning system is not protected. The exact requirements for upgrading the existing system have not been developed but could include shielding the radar equipment, modernizing power plants and internal electronic components at the existing UEWR sites, and possible upgrading of some fiber optic cable terminals. It is likely that power plant modernization would include replacing the existing facility with a more efficient, cleaner burning power plant. Once specific details of the modifications are defined, separate, site-specific analysis, as required, would be performed."** Why weren't these details documented in the Supplement? When will details of the modifications be defined? What site-specific analysis will be required and by who? These modifications must be addressed in the Supplement.

The BMDO is rationalizing that because **"there would be no change to the exterior of the building…there would be no change to either peak or average power levels emitted by the radar."** The challenge we have is with the existing levels as well as the effects of PAVE PAWS unique frequencies, waveform and modulation, etc. The fact that BMDO is emphasizing that the peak or average power levels won't change is not sufficient to dismiss the concerns of the affected communities. The fact that these levels won't change is irrelevant. We believe the facility is having an adverse impact on our health and the environment in its current state.

Page 1-7, Table 1-1 is misleading because it gives the power for one face only. Is this information taken from the 1979 EIS? Has there ever been any changes to not only the power levels but the pulse repetition rate, waveform, etc. in twenty-one years? The Supplement must include more detailed pictures of all radiation patterns including all sidelobe patterns. The Supplement focuses on power densities only. The surrounding population is exposed to gigantic bursts of energy. These high peak pulses must be measured by independent consultants. The measurement protocol must be defined with input from the public and documented in the Final EIS.

Page 1-8 discusses the beam parameters. PAVE PAWS radiation is a very unique form of radiation. **"The radar beam consists of a series of electromagnetic pulses, the characteristics of which (pulse length, frequency) would vary depending on mission requirements.** Section 1.3.3 **PAVE PAWS OPERATIONAL MISSION ENVIRONMENT** indicates PAVE PAWS has high peak pulses, and a low duty cycle (18 percent for tracking and 11percent for surveillance activities). This is a type of radiation which the MDPH PAVE PAWS Panel said, "little if anything is known about." An Interagency Group made up of representatives from several government agencies including EPA and FDA, has stated concerns about this type of high peak pulse, low duty cycle radiation. (Attachment K). Did the major modification to PAVE PAWS in 1996 change beam motion characteristics, radar patterns, modulation, pulse repetition rate, waveforms, etc.?

Page 1-9 Section 1.5 SCOPE OF THIS SUPPLEMENT states, **"The No-action Alternative, which is the continued operation of the EWRs without the NMD modifications has been previously analyzed in existing NEPA documentation for each EWR."** Is this referring to the 1979 EIS? If so, this EIS did not give PAVE PAWS a clean bill of health (Unresolved Issues). Senator Kennedy, Senator Brooke and Representative Studds expressed their concerns about PAVE PAWS radiation in a joint statement released in 1979 (Attachment A). As a result of their concerns, the National Research Council of the National Academy of Sciences prepared a document titled, "Potential Biologic Effects of the PAVE PAWS Radar System." This document did not give PAVE PAWS a clean bill of health, yet the Air Force pulled a few statements from it indicating that PAVE PAWS radiation was "safe." This NRC document should have been circulated to the distribution list in the Supplement. Most all of the things that Senators Kennedy, Brooke and Rep. Studds called for have not been done twenty-one years later.

COMMENT NUMBER

The Final EIS must include a section on Unresolved Issues. One of the primary points in the PAVE PAWS controversy, is the inadequacy of the IEEE standards and the fact that they are not directly applicable to PAVE PAWS unique radiation characteristics. Section 1.5 states, **"The scope of this document was defined by the range of potential impacts reasonably associated with the proposed UEWR modifications. "** Define the term "reasonably" in this context. The Supplement is biased. Many studies were omitted from the document that point toward a problem. The Final EIS must document all studies the BMDO used to justify PAVE PAWS safety. The Final EIS must document the fact that no studies of any kind, have ever been done of the effects of the unique exposures that PAVE PAWS creates (multiple and changing frequencies, waveforms and modulation, etc. Instead, the BMDO is just focusing on the intensity of PAVE PAWS radiation in relation to effects. Again, it is noted in the Supplement that the standards referenced including the IEEE standard, are based on effects from short-term acute exposures to RF/MW radiation. Many leading scientists acknowledge that biologic effects occur due to factors other than the thermal factor and signed the Vienna Resolution. (Attachment L).

The BMDO limited the scope of the Supplement without conducting scoping meetings. Page 1-10 states, **"…the radar would perform NMD missions only for extremely brief periods of time (approximately 17 minutes per NMD event, with a total NMD usage of just several hours per year). Based on the these considerations, this document focuses on the human health and safety environmental resources area-specifically on the RF fields associated with the modified EWRs… the proposed modifications would have no impact on the following resource areas: air quality, airspace, biological resources, environmental justice, geology and soils, hazardous materials and hazardous waste, land use and aesthetics, noise, socioeconomics, transportation, utilities and water resources.**

The Final EIS must document how the environment surrounding PAVE PAWS has changed. The MMR is now the EPA's worst Superfund site and is the largest pollution containment project in the world. When the 1979 EIS was prepared, it was reported that the water quality at Otis was good. This situation has changed. The northern 15,000 acres of MMR on top of which PAVE PAWS sits, is a sole source aquifer for the Upper Cape. The northern 15, 000 acres of MMR has been designated as a source of future water supplies. Recent legislation identified this land as the Upper Cape Water Supply Cooperative and there is legislation pending that would turn the control of the land over to the State of MA to be managed by the DEM. Although the 15,000 acres has tremendous potential to meet the water supply needs of the Upper Cape, we recently learned that there is extensive pollution eminating from the Impact Area where the National Guard performed live artillery exercises for decades. The extent of the pollution from the Impact Area is unknown at this time.

According to the 1979 EIS, the potential for a fuel spill at PAVE PAWS was extremely low; however in 1991, a significant diesel fuel spill occurred at the PAVE PAWS site. Diesel fuel is stored onsite to power the diesel locomotive engines that provide power to PAVE PAWS when it is not receiving power from the nearby power grid. According to Air Force documents, 11,000 gallons of fuel was spilled. We believe the spill was underestimated, was not properly remediated and needs further investigation. There were recent detections of hydrocarbons and pesticides in the PAVE PAWS monitoring wells that indicate the diesel fuel has migrated into the water table. The Supplement must document this situation.

Page 3-1 AFFECTED ENVIRONMENT Section 3.1 states, **"Descriptions of the existing environment in which the three PAVE PAWS radars are located are provided in environmental anlayses that were prepared to evaluate potential impacts of the construction and operation of the radars."** We want to re-emphasize that since the 1979 EIS is referenced in this Supplement, it should have been circulated along with the Supplement to the individuals and agencies on the distribution list. Cape Cod has changed dramatically. In 1979, the EIS said there was no-one living in a one-mile radius of PAVE PAWS. There are now many people living within one mile. There is a public campground less than a mile from PAVE PAWS. The Final EIS must address the psychological effects of exposure to PAVE PAWS radiation

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

	COMMENT NUMBER
of which so little is known about. The public has found it difficult and extremely frustrating that so many questions about PAVE PAWS remain unanswered despite many requests for follow-up. There must be better maps of the region to depict the proximity of the radar to homes. An aeriel view would be effective. Elevations are important and must be documented. The current population of the local area and Cape Cod region must be documented. For instance the population on Cape Cod has quadrupled in twenty-one years. The population of the town of Sandwich, one of the closest to PAVE PAWS has grown from 5000 people in 1979 to over 20,000 today. Page 3-3 states, "It is only in the far field where the intensity of the RF generated by the radar is much lower, that the members of the public could potentially be exposed to RF fields from the PAVE PAWS radar." The issue of public exposure during public tours must be addressed. In the 1996 Radiofrequency Survey, the Commander at that time was concerned about public tours. What are the levels of peak pulses that people are exposed to on the grounds of the radar? When I went on my tour, there was not proper warning signage and I was not briefed on the exposure to microwave radiation. Pregnant women, children and people with heart conditions and cardiac pacemakers should be going near the PAVE PAWS Installation. According to Table 4-7 on page 4-22, the IEEE safety standard is exceeded near the radar. No peak pulse measurements are given in any of these tables. People taking tours are exposed to levels above the safety standards. When I took my tour we spent at least a half-hour on the grounds of PAVE PAWS and stood very close to the face. People should not be taken into the room where the radiating elements are. Have the radiation levels been measured in there? There are high EMF fields as well that should be measured. These issues must be addressed in the Final EIS. The Final EIS should have a table showing how the IEEE standards have come down by orders of magnitude, from 10,000 microwatts twenty-one years ago, to 280 microwatts today. Page 4-25, Section 4.2.1.4 **Summary of Health and** Safety Analysis states, "**The purpose of an EIS is to identify what changes will occur in the existing environment, and to assess the health impact of such changes, if any, by comparison to assessment criteria. The Supplement concludes that "the proposed upgrade would be in compliance with the applicable standards.**" The ANSI/IEEE standard is not applicable to PAVE PAWS unique radiation. Please provide me with all studies in existence, Air Force and otherwise, where subjects are exposed to the same "exact radiation characteristics" that PAVE PAWS emits. This would mean exposure to pulsed radiation that is constantly changing frequencies with each pulse as it scans between 420-450Mhz, with PAVE PAWS unique wave-form, changing pulse patterns and pulse repetition rates, etc. It would be an exposure to high peak pulses modulated at the very low frequency of 18.5Hz. The Supplement must address the cumulative impacts that the facility may have had or is having on the health of humans and the environment The Air Force's idea of "cumulative effects" is adding up the radiation intensity levels only and assuming that if they fall below the existing safety standard, then it is not a hazard. Page 4-29, Section 4.2.1.5 **Cumulative Impacts** states, "**No other projects, in the frequency range between 420 and 450 MHz, have been identified that could contribute to cumulative health and safety impacts at the locations proposed for use by the NMD program. The Air Force has proposed a maintenance and sustainment project that would only sustain (not change) current operations. Therefore, there would not be any cumulative impact above what has been previously analyzed.**" This interpretation of assessing cumulative effects is absurd. The IEEE standard is based on the effects of short-term , acute exposures. It does not take into account long-term chronic exposures to complex electromagnetic environments such as the environment PAVE PAWS radiation creates. According to MDPH, the Cape Cod cancer statistics correlate with length of residency here. We are concerned about the long-term cumulative impacts of exposure to PAVE PAWS unique radiation. We live in an area with a multiplicity of potential exposures. Rates of cancer are significantly elevated across Cape Cod. What are the cumulative and synergistic effects of exposure to PAVE PAWS unique radiation in an environment with other pollutants?This must be discussed in the Final EIS. Page 4-27 states that, "**RF energy from any source decreases with distance from the source.**" This is not always the case. Elevation is a factor as well. For instance, according to measurements in the 1979 EIS, the measured levels at Shawme/Shaker House Roads were the same as at measurements taken near residences on Telegraph Hill more than two miles away. Telegraph Hill is at a higher elevation and therefore closer to PAVE PAWS main beams. Sections on Consideration of the Research Reporting Effects Below the Threshold for Body Heating and Relevant Research to Assess Potential Health Impacts from Long-term Exposures to RF are very biased. They left out many relevant studies. Many studies were glossed over. The Supplement gave little information on the specifics of studies	

	COMMENT NUMBER
cited. Page 4-29 states, "**The Proposed Action presents no change to the impact analyze in the previous environmental analysis.**" The 1979 EIS stated that the issues were unresolved that there was experimental evidence of frequency window effects, that the risks had not been adequately assessed. Page 4-1 Section 4.0 **ENVIRONMENTAL CONSEQUENCES** Applicable and Relevant Standards: This section lists different standards for RF/MW radiation. It notes however that, "**Each of these standards is based on limiting exposure to prevent an effect that can occur upon acute (short-term) exposures.**" This is a biased, subjective review of the scientific literature. The rationale for the standard is flawed (see Coalition's submission to expert panel, Attachment A). The majority of people who set the standard are engineers and users of RF/MW technology (Attachment). The Final EIS should include a discussion of the challenges with standard setting and the assessment of scientific literature. Page 4-31 Section 4.5 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY states that, "**All UEWR modification activities would occur on existing military facilities that are dedicated to supporting the DOD. No impacts to the long-term productivity of the environment would be anticipated.**" The MMR has gone through tremendous changes in the last twenty-one years. We now understand the importance of the northern 15,000 acres for water supply protection. PAVE PAWS sits on top of former Shawme-Crowell State Forest Land on the northern 15,000 acres of the MMR. The Governor of Massachusetts signed an Executive Order designating this as conservation land. Recent legislation, established an Upper Cape Water Supply Cooperative and there is pending legislation to turn the land over to the state to be managed by the Upper Cape Water Supply Commission, a state-appointed Commission. The license for PAVE PAWS expires in 2006. The State should not grant a new lease or modify the existing lease/permit to accommodate PAVE PAWS operations. **1.3.2 PAVE PAWS RADAR; A SOURCE OF RADIOFREQUENCY FIELDS** It is stated that,"**The equipment that generates the RF signals and then analyzes the reflected signals is housed inside the radar building.**" Are these the radiating elements? The Draft EIS also notes that there will be "certain interior changes" to PAVE PAWS. Why isn't this stated in the Supplement? What is meant by "certain interior changes? Does it mean the equipment that generates the RF signals? Does this mean the radiating elements? It is stated in the Supplement that, "**The active portion of the array resides in a circle 22.1 meters (72.5 feet).**" Is this the antennae aperture? Has the aperture of PAVE PAWS ever changed in 21 years? Will it change with the proposed upgrades?" It is stated that, "**Each radiating element is connected to a solid state transmit/receive module that provides 325 watts of power?** What is the effective radiated power (ERP) of each transmit module? What is the ERP of each of PAVE PAWS two beams? Did the Air Force increase the power around 1986 as they were planning? Did they ever increase the power in twenty one years? Did they ever increase the strength of the beam without the input of more power? If so how? Does the beam width change from the 2.2 degree width as it leaves the face of the radar? For instance, what is the width of the beam at points in the town of Harwich on Cape Cod? DoD documents indicate that it is beneficial to be able to lower the beam to 2-degrees or lower to have earlier warning time. Does PAVE PAWS track "splashdowns?" Has PAVE PAWS ever gone below the 3-degree limit in the last twenty one years? If so, why? The Supplement does not provide adequate maps of radiation pattern, sidelobes, backlobes. Why did it take so long for me to get my Freedom of Information Act Requests? Why can't the local Air Force representatives such as Commander Hutto answer my technical questions regarding the radar system? This section talks a lot about the main beam never hitting the ground? What about the many pilots who fly in the vicinity of PAVE PAWS on a daily basis? What are they exposed to? FAA Flight Facilities Directory, only restrictions of its kind in the US. (see attached) The Supplement "glosses over" the issue of the uniqueness of the PAVE PAWS radiation patterns. Page 1-9 Section 1.3.2 **PAVE PAWS RADAR: A SOURCE OF RADIOFREQUENCY RADIATION** states, "**The proportion of time that the radar is allocated to each activity varies considerably. Each activity demands that different patterns of pulsed signals be transmitted by the radar that are afected by the size, trajectory, and distance of objects. Thus, as part of the existing PAVE PAWS mission, there are differences between the number of pulses, their duration, and repetition frequency. While such differences affect the distribution of power density in the space scanned by the main beam, over time they have a much smaller effect on the intensity and distribution of RF energy at ground level from the second sidelobe and higher numbered sidelobes, which are the main source of exposure to RF at ground level.**" The Final EIS must explain this in greater detail. How can you apply the IEEE standard to this unique and complex radiation? What about high peak pulses?	

psw010f

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

When you look at the Draft EIS and Supplement together, it appears that after the BMDO and Air Force upgrades, the only thing that will not have changed is the exterior footprint of the PAVE PAWS building. One of the Air Force's definitions of decommissioning, is replacing an existing facility with an upgraded system. For all intents and purposes it appears the PAVE PAWS at Flatrock Hill will be decommissioned and replaced with a completely new system. This is the opportune time to move PAVE PAWS or, build a new facility in an appropriate area. The Final EIS should address this definition of decommissioning.

The Final EIS should address the issue of electronic interference. Many people in the surrounding towns note marked TV interference from PAVE PAWS pulses.

The Final EIS should address the issue of PAVE PAWS increased value as a military target. This is relevant because PAVE PAWS would be an integral part in the multi-part NMD system. Would it's strategic value increase? This is an issue as it is located in a densely populated area.

Note: The included tapes are official documentation of the public meetings that took place. Please have these tapes transcribed and entered into the Final EIS in written form. Thank you.

Please include all attachments & supporting material in the Final EIS.

COMMENT NUMBER

ATTACHMENT A

CONTENTS

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

February 25, 1999

Sharon Judge

Kevin S. Costas, M.P.H.
Bureau of Environmental Health Assessment
Massachusetts Department of Public Health

Dear Mr. Costas:

I am submitting the enclosed materials on behalf of the Cape Cod Coalition to Decommission PAVE PAWS ("Coalition"). Please forward these materials to the PAVE PAWS "expert panel" convened by the Massachusetts Department of Public Health ("MDPH"). The Coalition was surprised and disappointed to learn that you did not provide the panel with the PAVE PAWS Environmental Impact Statement (EIS). The EIS is the most important document regarding the PAVE PAWS installation. It is a legal document and part of a legal process. The Cape Cod community brought a lawsuit against the Airforce 20 years ago forcing them to produce this document.

At the PAVE PAWS Radar Facility Meeting held on February 16, 1999, you asked me to provide you with information on how to obtain this document. As I noted at the meeting, the EIS is available at the Sandwich Public Library. You can obtain copies for the panel from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA, 22161. The telephone number is (703) 605-6000. They are open 8AM-8PM Monday-Friday. The turnaround time is 3-5 business days Cite accession numbers. AD-AO69200 for Part 1 and AD-A069201 for Part 2. Part 1 contains the basic EIS and it's technical appendices. Part 2 (the attachment to the EIS) contains the public hearing transcript of January 22, 1979, the public and agency questions and comments, and the Airforce responses.

Another critical document that was not provided to the panel is the "Radiation Intensity of the PAVE PAWS Radar System." This is a report by the Engineering Panel on the PAVE PAWS Radar System of the National Research Council. Copies of this publication are available from: The Assembly of Engineering, National Research Council, 2101 Constitution Avenue, N.W. Washington, D.C. 20418. This document as well as the EIS contain critical information on the technicalities of the PAVE PAWS system that the panel will require in order to perform their charge.

As you are aware, the Coalition believes panel chair Linda Erdreich, and panel members Dr. Om Gandhi and Dr. Marvin Ziskin are inappropriate choices for the PAVE PAWS panel due to their associations with the telecommunications industry and their actions on the1996 IEEE balloting committee that reaffirmed the existing safety standard for public exposure to non-ionizing radiation. A joint statement released on March 31st 1979 by Representative Gerry E. Studds, Senator Edward M. Kennedy and Senator Edward W. Brooke on Project PAVE PAWS noted that "...the central issue in the PAVE PAWS controversy is the adequacy of our national safety standard for exposure to non-ionizing radiation."

The Coalition finds it unacceptable that MDPH chose this panel unilaterally without public discussion. At your request, the Community Assistance Panel (CAP) and the public provided names of at least 4 individuals, 2 of which we are now certain were not contacted at all by MDPH. We find it puzzling that in your November 23rd memo to CAP members you state, "All of those suggested found it difficult to participate due to previous commitments or full schedules."

You have denied our repeated requests for the removal of Ms. Erdreich, Dr. Gandhi and Dr. Ziskin from the panel. You have also denied our repeated requests to expand the panel. At the PAVE PAWS meeting on February 16th, you announced that you would now consider the addition of one panel member. Given the inappropriateness of the above named panel members and the fact that you mislead the CAP members and the public regarding the contacting of Dr. Ruth Hubbard and Dr. Ross Adey, the addition of another panel member at this time would be inadequate and unproductive.

Sincerely,

Sharon Judge
Cape Cod Coalition to Decommission PAVE PAWS

cc Commissioner Howard K. Koh, MD, MPH
Suzanne Condon
Robert Knorr

COMMENT NUMBER

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
BUREAU OF ENVIRONMENTAL HEALTH ASSESSMENT

PAVE PAWS RADAR FACILITY MEETING

Date: **Tuesday, February 16th, 1999**

Place: Sandwich High School Auditorium
365 Quaker Meetinghouse Road
East Sandwich, MA

Time: 6 PM to 9 PM

Purpose: On behalf of the Upper Cape Community, The Massachusetts Department of Public Health (MDPH) has convened a panel of experts to evaluate health and environmental concerns associated with the PAVE PAWS radar facility. The Department will host an informational meeting to present the panel members to the public, discuss the mission of the panel and provide the opportunity for citizens to express their concerns regarding PAVE PAWS directly to panel members. Following the meeting, MDPH staff will work with the panel members to prepare a document which outlines the concerns expressed by citizens. This document will be made available for a two-week public comment period. Following that the experts will work to consider citizen concerns in light of existing PAVE PAWS emissions data and the scientific literature regarding RF emissions and health. The panel's responses to citizen questions, and conclusions and recommendations concerning the feasibility of future investigations concerning PAVE PAWS will be presented in a final report to the MDPH. The final report will be made available to the public.

If you have questions, feel free to contact Kevin Costas

psw010h

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Cape Cod Coalition To Decommission Pave Paws

Concerns Addressed to the Scientist Panel Convened by
The Massachusetts Department of Public Health

Presented at the informational meeting of February 16, 1999
at the Sandwich High School Auditorium, East Sandwich, MA

To help assure our concerns are addressed, the Cape Cod Coalition to Decommission PAVE PAWS ("Coalition") supports the Massachusetts Department of Public Health's ("MDPH") approach of panel members receiving our concerns, and then preparing a document in which the panel describes, not a mere outline of our concerns, but the specific questions they plan to address to respond to these concerns. We also support the MDPH approach that there be a public comment period on the document indicating the specific questions panelists will address [See formal announcement of February 16th PAVE PAWS meeting]. However, we find a 2-week period for public comment is insufficient for us to review and discuss the matter with each other and our panel.

Accordingly, as is standard for most government actions, we request a comment period of 30 days. We also request that a revised panel document reflecting the public comment received be made available. If the Coalition then finds that our concerns are not adequately reflected in the specific questions to be answered, then the purpose of the proposed panel will not be met and another course of action should be considered. We request 3 weeks after the release of this final specification to inform MDPH if the proposed efforts will adequately address our concerns.

Scope of our questions:

Below are listed the questions that the Coalition would like the panel to address. These questions are in seven different areas. They are:

(1) **Questions about the scope of the evaluation.** In particular

- should the evaluation be limited to evaluating specific studies or groups of studies and the strength of the evidence there in, or
- should the evaluation also extend to setting public policy on what should be the tolerated exposure, given the potential for harm and the level of uncertainty of the evidence portending harm

(2) **Questions to the science panelists regarding their willingness to comment on the adequacy of present standards.**

The outcome of decisions regarding continuance of Pave Paws may be viewed by some people as depending on comparison of the present standard with the anticipated exposures in our community. Since these exposures are expected to be far below the maximum allowed by present standards, it is important to us to have our questions about the adequacy of the present standards addressed. Most of the panelists are or have been members of the Institute of Electronic and Electrical Engineers (IEEE) committee that developed its microwave exposure standard in 1991 (called IEEE C95.1-1991, hereafter IEEE 1991), or are members of those that re-affirmed IEEE 1991 in 1996 which PAVE PAWS follows. Hence, it is important for the Coalition to understand the willingness of panel scientists to be open-minded in reflecting upon our critical questions regarding the IEEE standard that most of them shared in developing.

(3) **Questions regarding what appears to the Coalition to be deficiencies in the establishment of the IEEE 1991 standard that PAVE PAWS now follows. Also questions regarding deficiencies in the 1986 microwave exposure standard of the National Council of Radiation Protection and Measurements (NCRP), charted by Congress.**

(4) **Questions regarding other studies, especially recent studies, not considered by the 1991 IEEE and 1986 NCRP standards.**

(5) **Questions about developing more stringent standards when there is only limited and not conclusive evidence of harm.**

COMMENT NUMBER

(6) **Questions about reporting all past and existing PAVE PAWS microwave exposure and potential exposure if proposed up-grades are implemented.**

We understand that Dr. Gandhi participated in the National Research Council PAVE PAWS study in 1979. This being so, then we would like to ask Dr. Gandhi about recent developments in relating external RF exposure to internal absorption of RF energy. In particular we would like to know if this new information changes 'worst case' estimates of exposure on pp.46-51 of this NRC report. We would like this 'worst case estimate' to also take into account developments in wireless telecommunications since 1979, and what the cumulative 'worst case' exposure may be.

(7) **Questions about verifying observed incidence of disease in our community.**

The Coalition believes that upon receiving answers to questions in the above areas, described in detail below, that the Cape Cod community may be sufficiently informed to weigh the evidence, uncertainties, and health risks. Then we can indicate what is in our community interest regarding the possible decommissioning of PAVE PAWS.

To conduct such a weighing of the evidence, uncertainties, and health risks, the Coalition intends to establish a PAVE PAWS Public Policy Stakeholders group. We will begin meeting to familiarize ourselves with the scope of the issues and make a plan for proceeding in order to expedite action while the responses from our science panel are prepared.

Specific Questions and Concerns Addressed to the Scientist Panel to be Included in the document prepared by MDPH Staff andPanel Members:

I. **Questions about the scope of the evaluation.**

I.1 Granger M. Morgan, wrote an article "Power-Frequency Electric and Magnetic Fields: Issues of Risk Management and Risk Communication" We believe his comments are relevant to the question of whether to decommission the present site of PAVE PAWS. He writes,

"But, even if research is rapidly expanded, it could be a number of years before scientific consensus is reached. While we are waiting for those answers, there are basically three policy choices available:
- a minimum response involving no action on exposure,
- a response based upon 'prudent avoidance' that only takes actions that can avoid exposing people to field environments at modes cost, or,
- a dramatic response that entails major action on modifying or eliminating the exposure."

"Because they [scientists] must always be concerned with protecting the integrity of scientific knowledge . . . the question such a scientist will probably answer is 'Using the standard criteria employed to judge veracity of scientific knowledge, how sure are you that a risk has been demonstrated?' In contrast, public health officials, who are professionally concerned with the possibility that people might be injured . . . are likely to require a significantly lower threshold of proof before they consider it plausible that a risk may exist and decide that it is appropriate to take action to avoid exposure. . . . The question a public health official will probably answer is, 'How likely is it that some people could suffer health damage if we do not take action today?'

[M. Granger Morgan, "Power-Frequency Electric and Magnetic Fields: Issues of Risk Management and Risk Communication," in Biological Effects of Electric and Magnetic Fields, Vol. 2, ed. D. Carpenter et. al., Academic Press, New York, 1994, pp. 297-319, quotes on pp. 301-302.]

If a government regulator wants to promulgate exposure standards today, they face three choices:
- ignore the fact that science will not support a safety standard and pretend that it will;
- use a standard as way to implement a strategy of prudent avoidance;
- or set a standard on the basis of some criterion other than safety such as equity or 'similarity' (e.g. make the fields similar to that we all encounter regularly in modern society). While some U.S. states have blurred the issues, more recently several have explicitly argued that they have based their standards on some combination of prudence and equity." [See footnote #1]

I.2 An editorial in The New England Journal of Medicine states,
". . . perhaps it is time to reexamine whether scientific standards of proof of causality – and waiting for bodies to fall – ought not to give way to more preventive health policies." [April 1987]

COMMENT NUMBER

psw010i

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

	COMMENT NUMBER

1.3 EPA issued the report, "Summary and Results of the April 26-27, 1993 Radiofrequency Radiation Conference Volume 1: Analysis of Panel Discussions," Office of Air and Radiation and Office of Research and Development, March 1995, EPA #402-R-95-009. Panel 6 was the panel on "Biological Effects Basis For Exposure Limits," and Dr. Gandhi was listed as one of the 6 panel members. The analysis of the discussions indicated for this panel that,

"They ["Several panelists"] felt that overall there must be more willingness to accept certain publications, even though, because of reasons such as constrained funding, the results might not have had what might be considered by some to be adequate replication; any ensuing uncertainty resulting from such an approach can be incorporated into the standard."

Our Citizen Questions and Concerns to be included in the document prepared by MDPH staff and panel members :

Will each of the panelists in their first written response to us indicate:

- Do you agree or disagree that the strength of evidence for making a public health policy decision sometimes need not be as stringent as the level of evidence to establish scientific fact, when there is 'conclusive proof' and scientific consensus.'

  Please note that, if 'scientific consensus' were required before warnings of increased health risks were put on cigarette packages, then scientists of the Tobacco Institute would probably not agree, consensus would not have been reached, and then no warnings would have been placed.

- What do you think are the different kinds of scientific evidence a public health professional or public health policy maker should consider when there is not conclusive proof of harm and not a scientific consensus – as is likely the case with questions about the health risks from PAVE PAWS? How do you think these different kinds of scientific evidence should be weighed in the absence of 'conclusive proof' needed to establish scientific fact?

- We would like to ask Dr. Gandhi, as a member of the EPA Panel 6, as well as all of our science panelists,
  What is your view of the above approach reported of the 'several panelists' of Panel 6?
  When standard setting and making other public policy, what guidance would you give on how to take into account evidence of adverse effects which have not been replicated, or which may appear inconsistent with other evidence? Before taking any preventive action to protect the public health, do we need to resolve all inconsistencies?

- After having an understanding of the evidence and its strengths and weaknesses, and recognizing that evidence is likely 'not conclusive', what group of stakeholders do you think should have legitimate input on the making of a policy decision whether to decommission Pave Paws at its present location? What do you think the role of each should be?

2. Questions to the science panelists regarding their willingness to comment on the adequacy of present standards.

Dr. Om Gandhi, we understand at the time the RF standard ANSI C95.1-1982 was approved that you were a member of Subcommittee IV on Safety and/or Tolerances with Respect to Personnel of the ANSI 95 committee that developed this standard. Also that you were co-chairman of the committee that developed the RF exposure standard, IEEE C95.1-1991 update of the ANSI 1982 standard (but was not on the balloting committee). And you were a member of the 1996 reaffirmation balloting committee who voted to reaffirm the IEEE C95.1-1991 RF standard without submitting any comments qualifying your 'yes' vote. Is this correct?

Dr. Marvin Ziskin we understand you were a member of the 1996 IEEE reaffirmation balloting committee, and voted to reaffirm without any comments qualifying your 'yes' vote. Is this correct?

Dr. Linda Erdriech, we understand you are now a member of the IEEE committee that is developing a revision of the IEEE 1991 standard.

Dr. Henry Lai, we understand you were listed as a participant in the list of persons whom we understand attended one or more meetings during the development of IEEE 1991. It this correct?

Is it correct that the Air Force evaluates exposure from PAVE PAWS using the Institute of Electrical and Electrical Engineering (IEEE) RF standard IEEE C95.1-1991 ("IEEE 1991"), reaffirmed in 1997? We understand 'Yes'

	COMMENT NUMBER

Accordingly, it is important for the Coalition to understand the role each of the above panelists had in the development of the above IEEE C95.1-1991 standard, and their assessment of this standard.

Our Questions: The purpose of the questions below is to help the Coalition members gain a general understanding of how our expert panelists weigh different factors in deciding what is appropriate for exposure of the public. We will be asking about the frequency band of PAVE PAWS, modulation and peak pulses (as opposed to "time-averaged" power density estimates).

- To Dr. Gandhi and Dr. Lai who participated in the IEEE C95.1-1991 RF standard (IEEE 1991). Were there any recommendations you made concerning what the standard should include, either in terms of the criteria for exposure, the explanation, rationale, definitions, or papers which should be included in the evaluation that were not finally included?

  Questions to Dr. Gandhi:
  1. Why did you vote without comment to reaffirm IEEE 1991which has 10 fold higher exposure limits than you had recommended to prevent people from feeling 'very warm or hot' at the very short frequencies?

  In your articles, both of which were referenced in the IEEE 1991 standard,

  O.P. Gandhi, "Advances in Dosimetry of Radio-Frequency Radiation and their past and Projected Impact on the Safety Standards," Proceedings of IMTC Instrumentation and Measurement Technology Conference, April 20-22, 1988, San Diego, CA pp 109-113, 1988,

  O.P. Gandhi, "Absorption of millimeter waves by human beings and its biological implications," IEEE Trans. Microwave Theory Tech. Vol.34 – pp. 228-235

  You consistently emphasized that at the very short wave lengths of less than an inch people can feel "very warm or hot" at levels of about 8.7 mW/sq. cm. and recommended for the short wave lengths a maximum of 1 mW/sq. cm. Yet the IEEE 1991 standard allows exposures even greater than that at which you found people felt very warm or hot.

  It is important to our Coalition to understand why you affirmed without comment exposure levels that you previously thought adverse, making people 'very warm to hot'.

  Dr. Ziskin, we would appreciate it very much if you would also indicate why you supported this level? The reason we ask is that this touches on how close is our perception of what we should be protected from vs. your perception. It seems very clear to us that people should not be expected to live 24 hours a day feeling very warm to hot. Yet, you voted without comment to affirm this standard. So we can weigh your perception of acceptable living with ours, we ask this question – as this may affect your assessment of what is acceptable exposure from PAVE PAWS as well.

- To all of our distinguished panelists, as you will be providing important assessments, it is important to us that we know to what extent, if any, your views differ from those in IEEE 1991. Again, we ask this because the Air Force and perhaps other parties will be included to apply the IEEE standard to assessing if PAVE PAWS creates a health concern. Therefore, it is relevant for us to know whether your views are different from those in this standard. Will you please indicate if at this time you have any reservations about criteria for exposure, the explanation, rationale, definitions, or papers that were included in the preparation of this standard?

- We recognize that sometimes members of standard making groups are reluctant to publicly disagree with the final decisions of the group, or are reluctant to share their view of what any revised standard should be.
  We ask our panelists to please indicate to what extent they feel they can forthrightly share any views they have on deficiencies, if any, they perceive in any in IEEE 1991 and whether they are reluctant to indicate what they think the RF exposure criteria of a new standard should be – in spite of any studies we may ask them to assess?

  Clearly, if some panelists are reluctant to share their views on deficiencies if any in the present standard or share their view on what a revised standard should be, then this is important for planning to go forward and for all parties assessing the responses of each panelist.

psw010j

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

3. **Questions regarding what appears to the Coalition to be deficiencies in the establishment of the IEEE 1991 standard that PAVE PAWS now follows. Also questions regarding deficiencies in the 1986 microwave exposure standard of the National Council of Radiation Protection and Measurements (NCRP), charted by Congress.**

Comments regarding the 1986 NCRP RF criteria.

We understand that the Chairman of the 1986 NCRP microwave exposure criteria committee, Dr. Arthur W. Guy, was the Chairman of the previous 1982 microwave standard of the American National Standards Institute (ANSI), i.e. ANSI C95.1-1991, the Vice-Chairman of the IEEE 1991 Balloting committee, and member of the 1996 IEEE reaffirmation committee, and Chair of the Physical Principles Validation committee for IEEE 1991.

We also understand that Mr. Don Justesen served on the ANSI subcommittee IV that developed the RF 1982 ANSI standard, was one of 6 members of the RF 1986 NCRP committee and who was acknowledged for his "significant time and effort to the editing of the scientific aspects of this report;" who served as the chair of the IEEE 1991 Biological Principles Validation group.

Thus, we note the membership of these committees had in common persons who played leadership roles. Hence, it is not surprising to the Coalition that our concerns are similar about the 1986 NCRP and the 1991 IEEE exposure standards.

Questions on IEEE 1991

1- Is our understanding of the above roles of Dr. Guy and Mr. Justesen correct?

2. The IEEE 1991 standard defines its MPE limits (maximum permissible exposure) limits as, "limits to which a person may be exposed without harmful effect."

It is not clear to us how this was determined since amongst the IEEE Final list of papers found suitable for standard setting, is a paper by Belokrinitskiy (1982) in which he reports what he finds to be adverse effects on certain nerve cells of the brain at levels as low as 10 microwatts/sq. cm. [see item 1.5.2 attached]. We estimate that this is about 1/600th of the hazard threshold adopted by IEEE 1991, NCRP 1986 and the FCC in 1996. Given the limited information provided on exposure, and since the frequency was about 2380 MHz, close to the 2450 MHz that Dr. Lai has studied, what range of internal absorption of RF energy likely occurred? Is it likely to be no more than 1/600th of the hazard threshold of the aforementioned standards?

The author states "the changes can, most probably, affect their function and constitute one of the elements in pathogenesis of early disturbances in people who have been exposed to this environmental factor." How then can IEEE 1991 be so confident that its limits, that are based on a hazard threshold about 600 fold greater, are those" to which a person may be exposed without harmful effect," since the IEEE Final list papers include an article reporting adverse effects at very low levels?

3. Why does IEEE 1991 announce that the buzzes, screeches, chirps, knocking sounds, etc. which people experience as 'sound' in radar environments and now recently reported by EPA in PCS wireless communications environments as "clearly not deleterious." [IEEE 1991 sec. 6.9]. [see discussion in attached item 1.2, microwave hearing]. Please explain your view on what quality of life concerns, such as not hearing these noises 24 hours a day, you weighed when you voted for this standard (for panelists who voted).
What is the view of panelists regarding such annoying effects (that can deprive people of sleep, enjoyment of life)?

4. We note that IEEE 1991 states in its rationale that,
"Studies, such as those indicating effects, in vitro, on cell function were considered transient and reversible with no detrimental health effects." [IEEE C95.1-1991, Section 6.4 Rationale: Assessment Criteria].

We fail to see the application of scientific thinking in this approach, especially since the IEEE 1991 Final list papers (Wachtel, 1975) include results on nerve transmission which the author indicates could disrupt information processing should the same findings occur in live animals. Since information processing is important to learning and avoiding accidents, it is unclear by what application of science the above assumption was made.

Can you verify we have properly represented the above assumption? Can you verify our representation of assessment by Wachtel, 1975)? Will you please give your view on the appropriateness of this assumption in the rationale?

5. The IEEE Rationale states that its review of the literature finds that disruption of operant behavior in rats occurs at a level no lower than a rate of absorbing RF energy into the body of 3.2 Watts per kilogram of body weight (3.2 W/kg). [IEEE 1991, sec. 6.4] Yet the IEEE Final list papers themselves list a number of studies that contradict this conclusion in the Rationale section [see IEEE 1991 Final List references: Mitchell 1977, Gage 1979, Gage 1982, Thomas 1982]. Indeed, some of the IEEE Final list papers [Schrot 1980] report disruption of operant behavior in rats at levels about 22% of that asserted in the Rationale section, and one paper shows that when rats are treated with a medication, dextroamphetamine, given to children with attention deficit, that behavior is disrupted at about 7% of the IEEE stated 3.2 W/kg level.

Are the above statements correct? Can you please indicate for the above papers how much below the IEEE 1991 hazard threshold the results reported occurred – in W/kg and in % of the hazard threshold.

Our Coalition is concerned about the apparent misstatement of facts and surprising assumptions being made on the approach to follow for adopting a safety standard. Since you will be providing to us your assessments, we ask that you give your view on the above, and the extent to which you agree with the IEEE 1991 formulation.

We note that the IEEE 1991 standard makes little provision for pulsed radar systems. See Rationale page 23 of IEEE 1991 in which it states their observation that "no reliable scientific data exists indicating that non-thermal or modulation specific sequelae of exposure may be meaningfully related to human health." Do you agree with this statement, as any of our concerns about radar pulses are relevant to this issue?

It seems to us that the results of the IEEE Final List paper of Thomas et al (1982) shows that pulsed signals disrupt learning behavior at lower levels than continuous signals, and at levels about 30% of the IEEE 1991 hazard threshold. Do you agree with this assessment. Do you agree that since this is a final list paper, having standard-setting quality, that it seems to bring into question the statement in the Rationale above that no such data exists?

It is said that 'microwave hearing' may be due to a small but rapid thermoelastic expansion of the brain when the pulse is of a certain nature – do you agree? Can you speculate how such rapid expansion may stress the brain and its cell structures – even if not to the level where microwave hearing occurs? Please comment?

4 **Questions regarding other studies, especially recent studies, not considered by the 1991 IEEE and 1986 NCRP standards.**

In the attached papers we cite studies which seem to us to indicate the RF standards need to be more stringent. Of particular interest are studies on radar pulse patterns – as this is what occurs for PAVE PAWS.

2.3 Cancer – human studies: We note the following studies find a positive association between RF and cancer: Hocking 1997, Hawaii Department of Health 1986, Dolk 1997 (2 papers). Please review these papers. Please report on the findings, especially positive findings. Please indicate possible weaknesses in the study. Please indicate, given the weaknesses how should weight be assigned to the evidence – given the discussion above about evidence for setting public policy when it is not sufficient to establish scientific fact?
Please also see our comments on the NCRP review of the Moscow Embassy study and the U.S. Navy study.

Please indicate each of our statements is correct or not and, if not, give what you believe to be correct. Plus any other comments.

Please see our review of some animal cancer studies in our attachments. Please verify the correctness of our statements and make any additional comments.

- We find that there is evidence at RF exposures below the hazard threshold adopted by IEEE 1991, NCRP 1986 and FCC 1996 of the following: , chromosome[4]/DNA[5] breakage and free radical formation[13], increased tumor growth rates[14], headaches[15], nausea[16], perception of screeching sounds reported by EPA[17], and others[17,18], brain cell damage[19], delayed reaction times[20], memory loss[21], attention deficit[22], reproduction[23] and sleep impacts[24]. Evidence is growing that some people are electrically sensitive and more readily at risk to some of these symptoms[25].

We note that existing standards use disruption of behavior as an outcome upon which to determine a hazard threshold. Based on the studies noted in footnotes [22.1-10], it seems to us that the number of studies supporting a hazard threshold about 15% of the present one is stronger than the evidence for the present hazard threshold – which we find to include only about 4 studies on monkeys by a single author. We also think that the approach to test for an effect is not very sensitive since it requires seeing how well hungry monkeys trained to respond to a signal do so when irradiated with RF. It seems to us more complicated tasks, and tasks where there is not a signal to respond to would be more sensitive – such as the experiments by Schrot 1980 and Thomas 1982, 1979 listed above. Also the 'radial arm' maze studies where rats have to remember where they have been in a 12 arm radial maze seems more challenging tasks. Please evaluate these studies. We find they show disruption at about 15% of the FCC hazard threshold – do you agree?

COMMENT NUMBER

psw010k

COMMENT NUMBER

5. **Questions about developing more stringent standards when there is only limited and not conclusive evidence of harm.**

In evaluating these studies, to what extent are you impacted by the effect your assessments may have on the military or the telecommunications industry?

6. **Questions about reporting past and present PAVE PAWS microwave exposure and potential exposure if proposed up-grades are implemented.**

- We find the discussion on the absorption of RF in humans as described in the PAVE PAWS 1979 NRC report very illuminating. We agree that such factors as reflections off room walls, multi-person (multi-animal) effects should be considered along the approach on page 46-52 of the NRC report.

  We understand that studies by Guy (1984), Hill (1984), and Gandhi (1992) indicate that people absorb about 2 fold more RF than originally thought when the 1982 ANSI RF standard was developed. Do these recent papers provide evidence that the absorption rates given in the NRC report on pages 46-52 need to be revised? What do the range of reasonable revised estimates show?

  Since Cellular and PCS frequencies are also present in our areas, how would the information on the above pages be modified to reflect these other frequencies and their cumulative effects?

These include questions to Dr. Gandhi about 'worst case' estimates of exposure on pg. 51 of National Research Council 1979 report that now exceed more stringent RF limits, and which may be underestimates due to improved dosimetry methods and more RF sources.

Please review all past enhancements (1986 and 1996,etc.) and proposed enhancements of the PAVE PAWS system, as described in President Clinton's proposals and other proposals to enhance the power and function of PAVE PAWS. Please include these considerations when you make estimates of past, present and future exposure.

Please give estimates of peak exposure in each pulse, the average during a series of pulses, and the average over a whole second - which includes when the there is a waiting period. We also request data on peak and average electric field exposure.

Please relate the maximum pulse anticipated with the minimum levels at which microwave hearing has been identified? Can we anticipate rapid thermoelastic expansion of our brains, to some extent, even if we are not aware of microwave hearing?

We note that the Boston University research team which performed the Upper Cape Cancer Incidence Study in the late 1980's reported in Microwave News [January/February, 1992] regarding PAVE PAWS, "...the available exposure data are inadequate. We strongly recommend that systematic power density measurements be taken throughout the area scanned by PAVE PAWS so that useful exposure data will be available for future analysis." The 1994 Public Health Assessment for MMR recommended that "relevant electromagnetic field (EMF and non-ionizing) monitoring data be provided for the PAVE PAWS radar facility. Both recommendations were not followed up by MDPH.

The Coalition requests that exposure measurements be taken immediately of PAVE PAWS emissions. We request that measurements be taken by individuals who are independent of MDPH, the military or telecommunications industry. This test should monitor and graph the peak pulse in addition to average radiated power from 420-450 MHz coming from the direction of the PAVE PAWS installation over several hours on different days (not contiguous days). The instrumentation must include an appropriate spectrum analyzer tuned in to this frequency range in conjunction with an appropriate low noise amplifier and a calibrated directional antenna.

Measurements must be taken at all beam elevations. Note that the 1996 Radiation Survey was done at a beam elevation on 6 degrees around the PAVE PAWS facility only. No measurements were taken at 3 degrees and no measurements were taken out in the Cape community. Measurements must be taken before Spring when leaves are back on trees. The amplitude, modulation, atmospheric conditions, propagation, hotspots, elevation etc. must be considered. We also request that measurements include upper floors of buildings and schools, commercial airspace where local pilots fly daily and inside the PAVE PAWS installation and on the grounds of the facility as the public is exposed during tours of PAVE PAWS.

psw010l

COMMENT NUMBER

7. Questions about verifying observed incidence of disease in our community.

The Coalition requests that the panel review the Sandwich Health Professionals Cancer Study and the ATSDR 1994 Health Assessment of MMR. We request that the panel review the Environmental Impact Statement (Parts 1 and 2) and the National Research Council's "Radiation Intensity of the PAVE PAWS Radar System." It is critical that the panel understand the technicalities of the PAVE PAWS system and the unique and complicated electromagnetic environment it creates. The EIS provides important information including the 60 degree overlap sector, sidelobes, backlobes, etc.).

We request that the panel review and comment on Part 1 of the EIS paying close attention to section 3 "Probable Impact of the Proposed Action on the Environment" which includes a section on "Unresolved Issues." Troubling evidence existed 20 years ago of a potential human hazard and the Coalition would like the panel to do a "then and now" review of the available data. This review must include quantitative analysis of recent, reliable scientific studies including studies the Coalition cites in the materials we have forwarded to the panel.

We request that the panel identify "gaps" in the current state of knowledge regarding RF/MW radiation and health effects as it relates to the PAVE PAWS system. The Coalition requests that the panel review Part 2 of the EIS noting all of the comments and questions raised 20 years ago by public agencies, politicians, community members, etc. We ask that these comments and questions also be included in the document prepared by MDPH staff and the panel.

The panel must have access to current capewide population statistics and must be aware of alternative technologies (i.e. satellites) and alternative actions to the present operation of the PAVE PAWS system at MMR (i.e. moving the facility as was the case of the PAVE PAWS in Eldorado, Texas. The Coalition would like to remind the panel that the Cape Cod community was told 20 years ago that PAVE PAWS would be "a short term use of the environment" and would operate continuously for 10-20 years. PAVE PAWS is now 20 years old and the population of Sandwich has grown from approximately 5,000 people when PAVE PAWS went online, to over 20,000 people today. Cape Cod is one of the fastest growing regions in the country with some of the highest rates of cancer and neurological issues in the country.

The Coalition believes that upon receiving answers to questions in the above areas, the Cape Cod community may be sufficiently informed to weigh the evidence, uncertainties, and potential harms. Then we can indicate what is in our community's best interest regarding the possible decommissioning of PAVE PAWS.

The Coalition is looking forward to the panel's prompt response.

Thank you.

Cape Cod Coalition to Decommission PAVE PAWS
C/O Sharon Judge

COMMENT NUMBER

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Cape Cod Coalition To Decommission Pave Paws

Concerns Addressed to the Scientist Panel Convened by
The Massachusetts Department of Public Health

Presented at the informational meeting of February 16, 1999
at the Sandwich High School Auditorium, East Sandwich, MA

Some Articles We Would Like The Panel To Review
[footnotes 6-12 are omitted]

We are concerned because the Food and Drug Administration (FDA) stated it does not know what exposure is safe, reporting,

> *"In addition, there are insufficient studies of the health of humans who have been exposed to RF for several years or more. Although the current state of scientific knowledge does not enable us to offer a specific alternative to the exposure levels in the new standard, we do not believe this standard addresses the issue of long-term, chronic exposure to RF fields."*[1]

Recent science articles report growing evidence of:

Cancer[2,3],
Chromosome[4]/DNA breakage[5] and free radical formation[13],
Increased tumor growth rates[14],
Headaches[15], nausea[16], perception of screeching sounds reported by EPA[17], and others[18],
Brain cell damage[19],
Delayed reaction times[20], memory loss[21],
Attention deficit and disruption of learning or learned behavior[22],
Reproduction[23] and
Sleep impacts[24].

Evidence is growing that some people are electrically sensitive and more readily at risk to some of these symptoms[25]. What evidence is there of sensitivity to radar? EPA in footnote 15.2 indicates that the perceived hearing of sounds are generally complaints heard near radar facilities, such as airports.

If PAVE PAWS is upgraded how likely is it that the incidence of microwave hearing in our area will change?

We understand 'microwave hearing' is likely due to a rapid thermoelastic expansion of the brain with each pulse – is this the more commonly accepted theory? Can you imagine how such a rapid expansion might put stress on brain cells and cause harm?

Now we do not only live near PAVE PAWS as in 1979 but in a complex environment of PAVE PAWS and wireless communications. Therefore we are concerned whether the existing standard of the FCC is adequate.
Can you please review your work and that of Dr. Guy in his 1984 papers studying 450 MHz SAR absorption, and the paper of D. Hill, studying SAR absorption at 40 to 70 MHz. It seems to us that your work shows that for an adult man and for infants, the estimated exposure will be higher than was estimated in the 1979 National Research Council PAVE PAWS study you participated in. Given the latest dosimetry methods, can you re-calculate your exposure estimates.

Also since we have cellular at 800-900 MHz and PCS at about 1900 MHz, can you let us know what might our total exposure be if the cumulative power density allowed by FCC is reached, due to nearby

COMMENT NUMBER

multiple cellular and PCS sources. If PCS sources radiate near the maximum of 1000 microwatts/sq. cm. then what will be the SAR of adults, children and infants? Since at 900 MHz your work shows the SAR of a man is about 0.08 W/kg – the FCC limit, it seems that for children, especially small children it will be higher. Is this correct?

We are asking this to understand what our total cumulative exposure may be.
Below are some of our concerns about the FCC limits. This is relevant to PAVE PAWS and what exposures may be since there is a mixture of signals.

Current FCC rules contribute to risk of over-exposure because FCC rules do not require measurement of exposures to the upper floors of apartments, schools and offices from high power from transmitters on nearby towers or from the cumulative impact from transmitters on adjoining buildings[27].

[footnotes 26-31 are missing by intention]

- Also, present FCC RF exposure rules are inadequate because:
  - They do not set any absolute limits, but only require an environmental assessment report if certain exposure limits are exceeded[32].
  - They do not require evaluating exposure to the upper floors of apartments, schools, or businesses that are close to the heights nearby high power transmitters on towers, and do not sufficiently consider cumulative exposure from multiple transmitters on nearby rooftops[33].
  - They do not take into account recent scientific findings of adverse effects[34] – such as many of those on the above list.
  - They did not report the advice of the National Institute of Occupational Safety and Health (NIOSH), EPA, and FDA that advise that FCC limits only protect from heat stress and that there is evidence of other effects, and that FCC limits do not consider chronic low-level exposure[35].
  - The Institute of Electrical and Electronic Engineers (IEEE) 1991 RF standard was published before studies showing the body absorbs more RF energy than 1991 IEEE uses when calculating environmental RF limits, i.e. the standard is now out-of-date[36].
  - The NCRP 1986 criteria note the public may be exposed continuously. To keep their cumulative exposure similar to that of workers that population exposure NCRP says exposure should be 1/5th that permitted for workers[37]. Yet, NCRP indicates that since the public has more affected people, may expose the sick or disabled, pregnant women, and others who may be at higher risk, that there should be reductions in allowed exposure. Yet no additional reduction in RF limits is made beyond that for additional exposure duration[38]. This is not rationale.

Please comment on the above, as to the extent you agree or disagree and why. Please see further comments in footnotes.

We believe this is relevant because if PAVE PAWS is to continue in this mixed signal environment, we need to have confidence that exposure from all sources is safe, and that the FCC rules will adequately assure that out of compliance is detected and corrected.

Thank you.

Cape Cod Coalition

psw010m

COMMENT NUMBER

Footnotes of Statement by Cape Cod Coalition for February 16, 1999 meeting

1 From November 10, 1993 letter of Lillian J. Gill, Interim Director, Office of Science and Technology, Center for Devices and Radiological Health, FDA, to Thomas P. Stanley of FCC per ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (RF). Available from FCC document service.

2 Four epidemiology studies of RF and association with cancer are noted below:

2.1 H. Dolk et al., "Cancer Incidence near Radio and Televison Transmitters in Great Britian, II. All high power transmitters" American Journal of Epidemiology, Vol. 145, No. 1, 1997, pp 10-17. "When we combined results for all 20 transmitters together, there was a significant decline in risk of leukemia with distance from transmitters. . . " [pp. 15.1]

2.2 H. Dolk et al., "Cancer Incidence near Radio and Televison Transmitters in Great Britian, I. Sutton Coldfield Transmitter," American Journal of Epidemiology, Vol. 145, No. 1, 1997, pp 10-17, "Acute leukemias, acute myeloid leukemia, and chronic lymphatic leukemia showed significant declines in risk with distance [from transmitters]." [pp. 5]. Risk of adult leukemia within 2 km of transmitter was 1.83 greater than living beyond this region.[pp. 5]

2.3 Hocking et al., "Cancer incidence and mortality and proximity to TV towers," Medical Journal of Australia, Vol. 165, No. 2, Vol. 165, pp. 601-605. "[Childhood] incidence and mortality were significantly increased in the inner area [within 4 km of towers]. . ." [pp. 603]. "[T]he rate for childhood leukemia mortality was 2.32 [for children within 4 km of the tower]." [pp. 603]. The calculated exposure of the high exposure group did not exceed 5% of the FCC RF limits.

2.4 "Cancer Incidence in Census Tracts With Broadcasting Towers In Honolulu, Hawaii," 1986. Hawaii Department of Health, Environmental Epidemiology Program, Sate of Hawaii, P.O.Box 3378, Honolulu, Hawaii 96801. Contact as of 1986: Bruce S. Anderson, Ph.D or Alden K. Henderson, M.P.H. at (808) 548-2076. "Altogether, the observed incidence rate of all cancers for males and females was found to be significantly higher in census tracts with broadcasting towers that the expected rate after adjusting for age and race." (summary page). Age and race adjusted rates were 1.45 and 1.88 times higher respectively for the population in census tracts with towers [Table 1, pp. 11 and Table 4, pp. 14] than without broadcast towers.

2.5 S. Szmigielski, "Cancer morbidity in subjects occupationally exposed to high frequency (radiofrequency and microwave) electromagnetic radiation," The Science of the Total Environment," 1996, Vol. 180, pp. 9-17. Reports 2 fold increased cancer incidence in career military personnel occupationally exposed to levels considered safe by FCC. Risks for leukemia or lymphoma were 6 fold greater for the exposed group.

3 Ten animal studies of RF exposure and cancer were reviewed in a 1997 paper by M.H. Repacholi. In only 7 of these were animals exposed for at least 3 months and at levels below the hazard threshold upon which FCC limits are based – these are cited below in 3.1-3.7. Note that FDA advises that at least 3 months of RF exposure should be provided for a likely impact on cancer to be observed3a.

[3a: FDA report, "Current Status: Microwaves and Cancer, 1993, in Appendix 5, Potential Public Health Risks From Wireless Techonolgy: Research Agenda for the Development of Data for Science Based Decision Making, ," August 1994, published by Scientfic Advisory Group on Cellular Telephone Research (SAG) (now Wireless Technology Research, LTD) 1711 N. Street, N.W. Washington, D.C. tel: (202) 833-2800. Also available from Exhibit 192 in Ex Parte comments of Ad-Hoc Association, dated July 31, 1997 submitted to FCC ET Docket 93-62

For 2 papers animals were exposed for less than 3 months and are excluded from 3.1 – 3.7 below.

- R. Santini et al., "B16 Melanoma development in black mice exposed to low-level microwave radiation. Bioelectromagnetics, Vol 15: 531-538 (1994)
- L.G. Salford et al., "Experimental studies of brain tumor development during exposure to continuous and pulsed 915 MHz radiofrequency radiation," Bioelectrochemistry and Bioenergetics, Vol 30, 313-318 (1993)

Also excluded is R.Y. Wu et al. "Effects of 2.45 GHz microwave radiation and phorbol ester 12-O-tetradecanoylphorbol-13-acetate on dimethylhydrazine-induced colon cancer in mice," Bioelectromagnetics, Vol 15, 531-538 (1994). This is because exposure level was 250% of the hazard threshold of the FCC, i.e. was 10 Watts/kg of body weight compared to FCC hazard threshold of 4 Watts/kg (see FCC 96-326, para# 3). The high levels of RF could 'cook' the cancers. In any case,

1

COMMENT NUMBER

studies of levels that are above the FCC hazard threshold are not helpful in evaluating if low-level exposure below the FCC hazard threshold are harmful.

3a FDA report, "Current Status: Microwaves and Cancer, 1993, in Appendix 5, Potential Public Health Risks From Wireless Techonolgy: Research Agenda for the Development of Data for Science Based Decision Making, ," August 1994, published by Scientfic Advisory Group on Cellular Telephone Research (SAG) (now Wireless Technology Research, LTD) 1711 N. Street, N.W. Washington, D.C. tel: (202) 833-2800. Also available from Exhibit 192 in Ex Parte comments of Ad-Hoc Association, dated July 31, 1997

7 of 7 animal cancer studies below, 3.1- 3.7 that are listed in M.H. Repacholi find a positive association between RF and cancer when RF exposure is at least 3 months and exposure is below the FCC hazard threshold.

3.1 **Lymphoma:** M. H. Repacholi, "Lymphomas n Eμ-Pim1 Transgenic Mice Exposed to Pulsed 900 MHz Electromagnetic Fields," Radiation Research, 1997, Vol. 147, 631-640" "Thus, long-term intermittent exposure to RF fields can enhance the probability that mice carrying a lymphomagenic oncogene will develop lymphomas." The expose was designed to be "pulse-modulated RF fields similar to those used in digital mobile telecommunications" [above from abstract pp. 631]

3.2 **All primary malignancies:** C.K. Chou et al.,"Long term, low level Microwave Irradiation of Rats," Bioelectromagnetics, 1992, Vol. 13, 469-496. At no more than 10% of the FCC hazard threshold, there was a 3 fold increase in primary malignant tumors after 25 months of RF exposure.

3.3 **Skin Cancer:** A.Szudzinski et al., "Acceleration of the development of benzopyrene induced skin cancer in mice by microwave radiation," Arch. Dermatology Research, 1982, Vol .274, pp. 302-312. At 50% of the FCC RF hazard threshold, mice RF exposed for 6 months and treated with a skin carcinogen, 50% of the exposed animals died by the 268th day vs. 50% of the controls living to the 331st day.

3.4 **Skin Cancer:** S. Szmigielski et al. "Accelerated development of spontaneous and benzopyrene-induced skin cancer in mice exposed to 2450 MHz microwave radiation," 1982, Bioelectromagnetics, Vol. 3, pp. 179-191. At no more than 50% to 75% of the FCC RF hazard threshold mice were RF exposed 1 month and then treated with a skin carcinogen for 5 months. After 8 months from the start of the skin carcinogen treatment the 4.5 fold more RF exposed mice had skin cancers than those not RF exposed.

3.5 **Mammary Cancer:** Reported in 3.4 above. At no more than 50% to 75% of the FCC hazard threshold mammary cancer prone mice were exposed to RF. After 8 months, there were 6 fold more mice with mammary cancers among the RF exposed than the controls.

3.6 **Sarcoma cancer nodules in lung:** Reported in 3.4 above. At 50% to 75% of the FCC hazard threshold for mice injected with sarcoma cancer cells, mice exposed 3 months to RF at 2450 MHz (near PCS frequency of 1900 MHz) had 69% more sarcoma cancer colonies on the average than control mice.

3.7 S. Szmigielski et al., "Immunologic and cancer-related aspects of exposure to low-level microwave and radiofrequency fields," Modern Bioelectricity, pp. 862-925, Marcel Decker, New York, 1988. "[E]exposures increased the number of heptomas, sarcomas, and skin tumors in mice treated with chemical carcinogens."

3.8 FDA Center For Device and Radiological Health presented a report in 1993 at a conference on RF and cancer sponsored by the SAG noted in reference 3a : "Current Status: Microwave and Cancer." See 3a above for reference. The report concludes, *"The fact remains, however, that the data which exists strongly suggests that microwaves can, under at least some conditions, accelerate the development of malignant tumors. This in vivo data is also supported by in vitro data which has demonstrated not only malignant transformation but other effects on the cell's growth control mechanisms."* [Summary section]

4 **Chromosome breakage:** Z. Balode, "Assessment of radio-frequency electromagnetic radiation by the micronucleus test in Bovine peripheral erythrocytes," The Science of the Total Environment, Vol. 180, pp. 81-85 (1996). "Micronuclei arise from chromosomal fragments or chromosomes that are not incorporated into daughter nuclei at the time of cell division." The incidence of micronuclei was 6 fold greater in cows grazing in areas exposed to RF levels no more than 1/20th FCC 'safe' limits

5 **DNA breakage**: Four experiments done in two laboratories report DNA breakage at RF levels between 15% to 33% of the FCC hazard threshold. These are:

5.1 DNA breakage: H. Lai et al, "Acute low-intensity microwave exposure increases DNA single-strand breaks in rat brain cells. Bioelectromagnetics, Vol. 16, pp. 206-210. Breaks occurred at 15% of FCC

2

psw010n

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

	COMMENT NUMBER

hazard threshold.[

5.2 DNA breakage: H. Lai et al. "DNA Single- and double-strand breaks in rat brain cells after acute exposure to low-level radiofrequency electromagnetic radiation," International Journal of Radiation Biology, Vol. 69, pp. 513-521. Effect occurred at 30% of the FCC RF hazard threshold.

5.3 **DNA breakage:** H. Lai et al. "Melatonin and Spin-Trap Compound Block Radiofrequency Electromagnetic Radiation-Induced DNA Strand Breaks in Rat Brain Cells," Bioelectromagnetics, Vol. 18, pp. 446-454 (1997). RF exposure of 30% of the FCC hazard threshold significantly increased DNA single and double strand breaks, confirming two previous experiments. Free radical scavengers Melatonin and a spin-trap compound blocked the RF DNA breakage effect. Authors note, "[These data suggest that free radicals may play a role in the RFR-induced DNA single- and double-strand breaks observed in brain cells in the rat."].

5.4 **DNA Alterations:** S. Sarkar et al, "Effects of low power microwave on the mouse genome: a direct DNA analysis," Mutation Research, Vol. 320, pp. 141-147. At 30% of the FCC hazard threshold authors report that repeated exposure for 2 hours a day for 120 to 200 days to 2450 MHz, near the 1900 MHz of PCS, caused DNA alterations in brain and testicular cells of mice.

5.5 **DNA damage:** Phillips et al.,"DNA damage in Molt-4 lymphoblastoid cells exposed to cellular telephone radiofrequency fields in vitro. Bioelectrochemistry and Bioenergetics, Vol. 45, pp. 103-110 (1998). Authors report damange to DNA in human cells exposed to very low intensity cellular phone signals (0.0024 to 0.24 W/kg) for up to 21 hours of exposure.

13. **Free radical formation**

13.1 **Free radical formation:** W.R. Adey, "Bioeffects of mobile communications fields: possible mechanisms for cumulative dose," in Mobile Communications Safety, ed. N. Kuster, Q. Balzano, J.C. Lin, pp. 95-132. *"An enzymatic cascade is initiated within cells when glutamate receptors are activated, leading to the synthesis of nitric oxide (NO)... . The pathophysiology of NO links its free radical molecular configuration to oxidative stress, with a role in Alzheimer's and Parkinson's disease, and in certain types of epilepsy."* [pp. 112] *"As a function of field intensity, sensitivities of GABA and glutamate receptors persisted for field intensities as low as 50 microwatts per sq. cm. [at 915 MHz within the band of frequencies used for cellular phones]"* [pp. 103]. For 915 MHz the FCC safe limit is about 600 MHz. Thus, stimulation of glutamate receptors which initiate NO free radicals appear to occur at 1/12th (50 microwatts per sq. cm. compared to 600 microwatts per sq. cm.]

13.2 **Free radical formation:** H. Lai et al. at footnote 5.3 demonstrate that in the presence of either of two free radical scavengers that RF induced DNA breakage is blocked. Authors find this suggest that "free radicals may play a role in the RFR-induced DNA single- and double-strand breaks observed in brain cells in the rat," [see reference in footnote 12.3]

13.3 **Free radical formation:** A.M. Phelan et al., "Modification of Membrane Fluidity in Melanin-Containing Cells by Low-Level Microwave Radiation," Bioelectromagnetics, Vol. 13, pp. 131-146 (1992). At 5% [0.2 Watts per kilogram of body weight, 0.2 W/kg)] of the FCC hazard threshold of 4 W/kg, the authors report changes in the melanotic membranes and state, "This alteration was unique to melanotic membranes ans was due, at least in part, to the generation of oxygen radicals." [pp. 131]

14.1 **Increased tumor growth rates:** See 3.1- 3.7 above. The increased incidence of cancer in the test animals is strongly suggestive of increased tumor growth rates.

14.2 **Increased tumor growth rates:** Increase found in growth rate of human brain tumors in cell culture and at levels deemed safe for cellular phone radiation to the head. Reported at FDA Workshop, "Physical Characteristics and Possible Biological Effects of Microwaves Applied to Wireless Communication, was held in Rockville, MD, February 7, 1997, and sponsored by the Food and Drug Administration (FDA). "EFFECTS OF RADIOFREQUENCY ELECTROMAGNETIC RADIATION ON CELL PROLIFERATION", Ewa M. Czerska, Jon Casamento, Center for Devices and Radiological Health, Food and Drug Administration, Rockville, Maryland 20857, U.S.A. et al. Authors report, *"In the present experiment, cells of the human glioblastoma (type of brain cancer) cell line [ ] were exposed to 827 MHz frequency modulated radiation, with a wave form identical to that used in digital phones."* The cells were exposed at the maximum FCC RF level recommended for general population exposure to the head. The researchers found, *"Statistically significant increases in cell proliferation were observed at both exposure levels. The increase also appeared to be dose dependent."* [available on

	COMMENT NUMBER

Internet at http://www.microwavenews.com/FDA_Workshop_Abstracts.html]

15.1 **Headaches:** The following was reported at the FDA Workshop referenced in 14.2 above. "HEADACHES FROM CELL PHONES: ARE THEY REAL?", Allan H. Frey, 11049 Seven Hill Lane, Potomac, MD 20854, USA, voice 301.299.5181.

"The users of handheld cell phones seem to be increasingly reporting headaches associated with their use of the phones. It appears from the reports that it may be digital rather than analog phones that are associated with headaches. I did a series of experiments with human subjects years ago in which I used a band of frequencies that included the cell phone frequency. An incidental outcome of those experiments, in which headaches were encountered, indicate that the association of headaches with cell phone use is real. I am now starting experiments to determine if there is a causal effect and, if so, the mechanism."

15.2 **Headaches**: Letter of Jane Saginaw, Regional Environmental Protection Agency (EPA) Region 6, dated November 25, 1996, to Honorable Senator Phil Gramm. Region 6 EPA at 1445 Ross Avenue, Suite 1200, Dallas Texas 75202-2733. "With the advent of digital cellular telephone and paging systems, the number of complaints similar to those of Mr. and Mrs. [ ] has increased significantly, both in the United States and worldwide. Symptoms attributed to radiofrequency exposure such as nausea, headaches, dizziness, pain in the eyes, ringing in the ears, screeching and sizzling sounds, and irregular heartbeat are described collectively by the term electrosensitivity."

15.3 **Headaches:** For affidavits describing headaches associated with cellular phone exposure, see Memorandum in Support of Motion to Make Final Expedited Oral Argument Setting, submitted by J. E. Schulz, January 18, 1999 in behalf of Cellular Phone Taskforce, pertaining to Cellular Phone Taskforce et al. v. FCC, lead case number 97-4328, in the U.S. Court of Appeals for the Second Circuit.

15.4 Headaches - an annecdote: "Noise annoys family, Nearby cellular phone tower blamed" by Ray Stern, Mesa Tribune, Dec. 11, 1996, Mesa Arizona. *"Hill blames the tower's transmissions for headaches, tension, and other ailments she and her children suffer. . . ."*

16. Nausea: see reference 15.2

17. **Perception of screeching and other sounds:**

17.1 Region 6 EPA report at 15.2. See above. Report also states, *"EPA has for many years received similar complaints from relatively few individuals living in the general vicinity of air traffic control radar transmitters, which are pulsed systems, similar in many respects to digital cellular telephone systems. Clicking, buzzing, hissing and knocking sounds are known effects in some individuals exposed to high intensity radar signals."*

17.2 EPA, Federal Register, "Federal Radiation Protection Guidance; Proposed Alternatives for Controllying Public Exposure to Radiofrequency Radiation," Vol. 51, No. 146, July 30, 1986, pp. 27318-27339. *"Pulsed RF radiation can be perceived ('heard') by some people. The perception of sound associated with 'RF hearing' varies with pulse width and pulse-repetition rate and is described as a click, buzz or chirp."* [pp. 27327]

18.1 National Council for Radiation Protection and Measurements, (NCRP), "Biological Effects and Exposure Criteria For Radiofrequency Electromagnetic Fields, Bethesda, MD, 1986. *"Depending on pulse parameters, the sensations were perceived as buzzing, ticking, hissing, or knocking sounds that originated within or immediately behind the head. Sound was perceived at all frequencies except 8.9 GHz,"* (i.e. at 216 MHz, 425 MHz, 1310 MHz, and 2980 Mhz). [pp. 176]. Other studies are reviewed here.

18.2 See reference 15.4, "Noise annoys family – Nearby cellular phone toweer blamed". Article describes how mother and both children are annoyed by two noises claimed to due to a nearby cellular tower. "One is an annoying faint high-pitched noise. The other is a low, pulsating noise. The noises go on 24 hours a day, and get worse at night.". Three public officials checking the site confirmed the unusual sound.

18.3 Affidavits in reference 15.3 also frequently describe 'microwave hearing' due to presence of a wireless telecommunications tower

19 **Brain cell damage**:

19.1 V.S. Belokrinitskiy, "Destructive and Reparative Processes in Hippocampus with Long Term Exposure to Non-Ionizing Radiation," in U.S.S.R Report, "Effects of Non-Ionizing Electromagnetic Radiation, No. 7, JPRS 81865, pp. 15-20. At 2380 MHz (12.6 cm waves) which is near the PCS frequency of about 1900

	COMMENT NUMBER

MHz authors report, *"Thus, it was determined that long-term exposure to nonionizing microwave radiation with intensity of 1000 to 10 microwatts/sq. cm. elicits changes in the ultrastructure of the hippocampus... The demonstrated changes can, most probably, affect their function and constitute one of the elements in pathogenesis of early disturbances in people who have been exposed to this environmental factor."* [pp. 19] Thus, this effect on the rat was seen 10 microwatts/sq. cm. which is 1/100th the FCC RF exposure limits of 1000 microwatts/ sq. cm. for this frequency.[see Table 1, 47 CFR 1.1

19.2 L.G. Salford, "Permeability of the Blood-Brain Barrier Induced 915 MHz Electromagnetic Radiation, Continuous Wave and Modulated at 8, 16, 50 and 200 Hz," Microscopy Research and Technique, Vol. 27, pp.535-542. "This type of finding was regarded as pathological...[pp.537]. The effect [partial breakdown of the blood-brain-barrier] was shown for continuous radiation and for radiation pulsed with repetition rates of 8, 16, 50, and 200 per second and SARs (specific absorption rates) as low as 0.016 W/kg." [pp. 541] Please note the FCC 'hazard threshold' is 4 W/kg [see FCC 96-326, para #3], so this pathological result occurred at exposures of 0.016/4=1/250th of the FCC hazard threshold.

19.3 K. Oscar et al., "Microwave Alteration of the Blood-Brain Barrier System in Rats," Brain Research, Vol. 126, pp. 281-293 (1977). The alteration suggested partial breakdown of the barrier. Occurred when there were 5 pulses per second with average exposure of 30 microwatts/sq. cm. at 1300 MHz. Estimated exposure is 0.01 W/kg [based on EPA estimate that at 300 microwatts/sq. cm. internal exposure was 0.1 W/kg – see 19.4 below.

19.4 EPA, Biological Effects of Radiofrequency Radiation, 1984, EPA-600/8-83026F. EPA estimates that at 300 microwatts/sq. cm. that the internal absorption of RF energy was 0.1 W/kg – per the study by Oscar et al. at footnote 19.3. See EPA report, Table 5-12, pp. 5-51. EPA reports that a subsequent study of Oscar suggested that earlier findings at exposures of 1000 and 300 microwatts/sq. cm. may have been due to a spurious effect of increased blood flow. This does not detract from their finding at 30 microwatts/sq. cm. See EPA report at pp.5-47 and NCRP 1986 at footnote 18.1 chapter 10 discussion.

20. Delayed reaction times:

20.1 A.A. Kolodynski et al, "Motor and psychological functions of school children living in the area of the Skrunda Radio Location Station in Latvia," The Science of the Total Environment," 1996, Vol. 180, pp. 87-93. Authors report, "Motor function, memory, and attention significantly differed between the exposed and control groups. Children living in front of the RLS [Radio Location Station) had less developed memory and attention, their reaction time was slower and their neuromuscular apparatus endurace was decreased." [from abstract, pp. 87] Exposure was less than 10 microwatts / sq.cm. at 165 MHz, which is 1/20th the FCC limit of 200 [see 47 CFR sec. 1.1310 Table B].

20.2 H. Chiang et al., "Health Effects of Environmental Electromagnetic Fields," Journal of Bioelectricity, 1989, Vol. 8, No. 1, pp. 127-132. College students at a radar college or soldier exposed to radar at over 10 microwatt/sq. cm (1/20th FCC limits) had vision reaction time delayed. They also had lower scores in the memory function test than the control groups.

20.3 J.O.de Lorge, "Operant Behavior and Colonic Temperature of Macaca mulata [Rhesus monkeys] Exposed to Radio Frequency Fields at and above Resonant Frequencies," Bioelectromagnetics, Vol. 5, pp. 233-246. "At all three frequencies and at most power densities the monkeys tended to take longer to make a detection-response during an irradiation session."[pp.240] This occurred at the lowest exposure evaluated, 2 W/kg, which is 50% of the FCC hazard threshold.

21. Memory loss:

21.1 See A.A. Kolodynski at 20.1 for memory loss of children exposed to radar at 1/20th FCC limits

21.2 See H.Chiang et al at 20.2 for memory loss of college students and soldiers exposed to 1/20th FCC limits

21.3 H. Lai, "Low-Level microwave irradiation and central cholinergic systems," Pharmacol. Biochem. Behavior, Vol. 33, pp. 131-138 (1989) Rats exposed to 0.6 W/kg (15% of FCC hazard threshold) showed a deficit in learning to perform in the radial arm maze. This behavioral task involves spatial memory functions.

	COMMENT NUMBER

21.4 H. Lai, "Microwave Irradiation Affects Radial-Arm Maze Performance in the Rat," Bioelectromagnetics, Vol. 15, pp. 95-104 (1994). Results of 21.2 replicated, exposure is 0.6 W/kg, 15% of FCC RF limits. Find deficit spatial memory effect was blocked by pretreatment with opiate antagonists. Authors report, "These data indicate that both cholinergic and endogenous opoid neurotransmitter systems in the brain are involved in the micro-wave induced spatial memory deficit." [from abstract, pp. 95].

22. Attention deficit and disruption of learning or learned behavior

22.1 Attention deficit: Kolodynski at 20.1 for increased attention deficit in children exposed to radar at 1/20th FCC limits.

22.2 Disruption of learning or learned behavior. The FCC RF limits are based upon those of IEEE C95.1-1991 (IEEE 1991) and the 1986 NCRP RF limits in its Report #86. Both of these standards use disruption of learned behavior or learning of a new task as the criteria for their 'hazard threshold' of 4 W/kg. These standards use two series of experiments (one on rhesus monkeys and one on squirrel monkeys) by one author (J.O. deLorge) who uses a simple approach of heating hungry monkeys until they no longer can pull a lever to get food at the appropriate external signal. .See IEEE 1991, Rationale, sec. 6.3, pp. 27, 28, and see 1986 NCRP, pp. 184, 279. IEEE 1991. This on these studies of this author rests these standards.

22.3 R.G. Medici, "Considerations for Science: Where has all the science gone?", in Risk Benefit Analysis: The Microwave Case, ed. N. Steneck, The San Francisco Press, Inc. Box 6800, San Francisco, CA 94101-6800 (1982). She emphasizes that behavior tests that can be sensitive to low-level RF effects are those where "the task involves enough control so that there is a reliable baseline of behavior, yet the animal is not forced to become highly involved in the task; there is relatively low external stimulus control." [pp. 185]. The studies used by IEEE 1991 and NCRP 1986 do not meet this criteria, since they rely on an external stimulus for the hungry monkey to push a lever for food. Footnotes 22.4 to 22.6 below are IEEE Final List papers on rodents and applying 'low external stimulus' (22.4 and 22.6) or a complex experiment (22.5) that Medici recommends; these show disruptions at much lower levels than found by de Lorge upon whose results the FCC hazard threshold is based. Had the results of these other IEEE Final List papers been applied, then the FCC standard would have been lower. More recent studies applying 'low-stimulus' experimental designs also show disruptions of learning at low RF levels. See 22.8-22.9 below.

22.4 J.R. Thomas et al.,"Comparative Effects of Pulsed and Continuous Wave 2.8 GHz Microwaves on Temporally Defined Behavior," Bioelectromagnetics, Vol. 3, pp. 227-235 (1982). "The rat's ability to discriminate the appropriate [time interval to wait to get food] was disrupted...Results of the present study indicate, that at the same field strength, a PW [pulsed wave] field is more likely than a CW [continuous wave] field to affect temporal discrimination." Effect occurred at 1.2 W/kg, 30% of the FCC hazard threshold of 4 W/kg.

22.5 J. Schrot et al., "Modification of the Repeated Acquistion of Response Sequences in Rats by Low Level Microwave Exposure," Bioelectromagnetics, Vol. 1, pp. 89-99 (1980). At 0.7 W/kg (18% of the FCC 4 W/kg hazard threshold), the authors report, "Error responding was increased during most of the session . ". A complex series of stimuli and switching of levers provided a complex task (i.e. not a single response to a stimuli as in studies of de Lorge).

22.6 J. Thomas, "Microwave Radiation and Dextroamphetamine: Evidence of Combined Effects and Behavior in Rats," Radio Science, Vol. 14 (6S) 253-258 (1979). Authors note, "The response rates were notably higher [too many responses – indicating more errors] after microwave radiation . even though the last exposure to radiation occurred 24 hours before the drug was administered," implying a cumulative effect of the irradiation. Exposure was 0.2 W/kg, or 5% of the FCC hazard threshold.

22.7 IEEE 1991 reports that the threshold for disruption of learning or learned behavior in rats was

psw010p

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

at or above 3.2 W/kg. [IEEE 1991, sec. 6.3, pp.27] Yet, this statement appears in error because the Final List of Papers reported by IEEE as suitable to develop its 1991 standard includes many papers with such disruptions below 3.2 W/kg. This oversight raises doubts about the rationale of the standard.. See 22.3 to 22.6 above.

22.8 Disruption of spatial memory needed for learning is documented in H. Lai et al. at 21.3 and 21.4 above. These learning disruptions occurred at 0.6 W/kg, or 15% of the 4 W/kg FCC hazard threshold.

22.9 J. D. D'Andrea, O.P. Gandhi et al.,"Intermittent Exposure of Rats to 2450 Microwaves at 2.5 mW/sq. cm.: Behavioral and Physiological Effects," Bioelectromagnetics, Vol. 7: 315-328. Animals had to learn to wait 12 to 18 seconds to push a lever for food. Poor performance occurred at 0.7 W/kg, 18% of the 4 W/kg FCC hazard threshold.

22.10 J.O. de Lorge and J.A. D'Andrea, "Behavioral Effects of Electromagnetic Fields," in Biological Effects and Medical Applications of Electromagnetic Energy, ed. O.P. Gandhi, Prentice Hall, New York, 1990, Chapter 13, pp. 319-338. Authors conclude, "Based on results of these studies, it is possible to specify that a threshold for significant behavioral effects at 2450 MHz [near the 1900 MHz of PCS] is between 0.7 and 0.4 W/kg." Thus, this literature review found that the hazard threshold for disruption of behavior should be no more than 0.7 W/kg. Yet the the FCC hazard threshold based upon disruption of behavior is 4 W/kg. The above 22.4 – 22.10 papers suggest that the FCC hazard threshold is inadequate. This portends the likelihood of harm from certain FCC licensed facilities and increased liability risks.

23. Reproduction impacts:

23.1 See A.A. Kolodynski at 20.1. "Preliminary data analysis showed that among grade 9 children, there were 16% fewer boys in Skrunda, and 25% fewer in the area exposed to the Skrunda Radar Location Station." [pp. 89]. This suggests that in areas exposed to radar at 1/20th FCC RF limits fewer boys relative to girls were born.

23.2 A.I. Larsen et al, "Gender specific reproductive outcome and exposure to high-frequency electromagnetic radiation among physiotherapists," Scand. Journal of Work Environmental Health, 1991, Vol. 17, pp. 324-329. Only 17% of the fetuses RF exposed in utero to highly exposed pregnant physiotherapists were boys. The high RF exposure was associated with stillbirth/death within a year, prematurity, and low birth weight.

23.3 T.B. Weyandt, "Evaluation of Biological and Male Reproductive Function Responses To Potential Lead Exposures in 155 MM Howitzer Crewmen," U.S. Army Biomedical Research & Development Laboratory, Fort Detrick, Frederick, MD, January 1992, Technical Report #9124, NTIS #AD-A247384. U.S. military intelligence personnel whose duties were associated with the use of active microwave transmitter/receivers or passive microwave receivers were found to have less than half the sperm count of controls.[pp. 37]

23.4 I.N. Magras et al, "RF radiation-induced changes in the prenatal development of mice," Bioelectromagnetics, 18, pp. 455-461 (1997). Decrease in reproductive function occurred in mice at 0.016 to 1.053 microwatts/ sq. cm. from broadcast TV and FM transmitters, which is no more than 1/200th of FCC RF limits.

23.5 **Miscarriage, fetal anomalies:** S.Tofani et al.,"Effects of continuous low-level exposure to radiofrequency-radiation on intrauterine development in rats," Health Physics, Vol. 51, 489-499 (1986). At 0.00011 W/kg (1/4000th of FCC hazard threshold of 4 W/kg) authors report high rate of miscarriages (post-implantation losses) and incomplete ossification of cranial bones.

23.6 S. Tofani et al., Reply to Lu and Michaelson on 23.5. In Health Physics, Vol. 53, pp.546-547 Tofani et al. reply to Lu et al. criticism that Tofani did not expose or measure properly.

23.7 S. Lu and S. Michaelson, Comment on 23.5. In Health Physics Vol. 53, pp. 545-546.

23.8 **Fetal Anomalies:** E. Berman et al., "Observations of Mouse Fetuses After Irradiation with 2.45 GHz Microwaves," Health Physics, Vol. 35, p. 791-801 (1978). "The high rate of occurrence of

COMMENT NUMBER

35. See letters sent by federal health agencies to FCC in ET-Docket 93-62 – see footnote below.

36. New 1992 findings on the rate at which the body absorbs RF energy were not available for the IEEE standard from which the FCC RF limits were partly derived. For example, in 1992 O.P. Gandhi reported that at 450 MHz, that the average adult man absorbs about 0.08 W/kg. It is also know that the small bodies of infants absorb the short 26 inch 450 MHz waves more efficiently than adults.. Hence, at 450 MHz and power of 1 milliwatt/sq. cm., it is expected that infants will absorb more than 0.08 W/kg. But since 0.08 W/kg is the FCC RF limit for internal RF absorption, Gandhi's finding implies that adjustment to more stringent limits on external RF power is needed, and that present FCC external RF power limits do not correctly associate with the internal amount absorbed.

36.1 O.P.Gandhi et al., "Specific Absorption Rates and Induced Current Distributions In An Anotomically Based Model For Plane Wave Exposures," Health Physics, Vol. 63(3), pp. 281-290 (1992).

36.2 "Analysis of the Exposure Levels and Potential Biologic Effects of the Pave Paws Radar System", National Research Council, National Academy of Sciences, Washington, D.C. 1979. Co-authors include O.P. Gandhi. At 450 MHz at 1 milliwatt/sq. cm. (same as above), the report states the absorption by an adult man is 0.033 W/kg and for an infant 0.15 W/kg – over 4 fold higher than an adult [see NRC pp. 49].

Gandhi now estimates the internal absorption of an adult to be 0.08 and this is more than 2 fold what was estimated in 1979, when he was on the NRC committee. This suggests that the estimate of the internal absorption rate for infants will also increase similarly, since ratio of man to infant is the same, i.e. the rate for infants is expected to be about 0.3 W/kg at 1 milliwatt/sq cm or 0.09 W/kg at 450 MHz where FCC limit is 0.3 milliwatts/sq. cm. However, 0.09 W/kg exceeds the FCC limit for internal absorption of RF. This indicates that adjustment is needed in the FCC formula for setting external RF limits to be sure that internal RF limits are not exceeded.

35.1 FCC persists in stating it believes its limits are safe, yet the federal health agencies do not advise this to FCC.

35.2NIOSH: "The exposure levels that would be set by the standard are based on only one dominant mechanism - - adverse effects caused by body heating. Nonthermal biological health effects have been reported in some studies and research continues in this area. The standard should note that other health effects may be associated with RF exposure and that exposure should be minimized to the extent possible." [letter of R.W. Niemeier, Director, Division of Standards Development and Technology Transfer, January 11, 1994 to FCC, in ET Docket 93-62]

35.3 FDA – see footnote 1.

35.4. EPA: "The thesis that the 1992 ANSI/IEEE recommendations are protective of all mechanisms of interaction is unwarranted because the adverse effects level in the 1992 ANSI/IEEE standard is based on a thermal effect." [letter of M.Oge, Director of EPA Office of Radiation and Indoor Air to Thomas P. Stanley of FCC, Nov. 9, 1993]

37. "The rationale for the reduction by a factor of 3 is based on the exposure periods of the two populations, rounded off to one digit (40 hours per week 168 hours per week = about 0.2)." [NCRP 1986 RF criteria, pp. 283].

38 NCRP notes additional factors justifying more stringent RF limits: that the public "are generally unaware of their exposure", include "subpopulations of debilitated or otherwise potentially vulnerable individuals," and "is much larger that the occupational population "[pp. 282] Yet, no additional reduction beyond the increased hours in the week is made – this does not make sense. has been requested by not yet assigned.

COMMENT NUMBER

Attachment 1, Revised Version (submitted to MDPH March 1, 1999, to be forwarded to PAVE PAWS Advisory Panel). Citizen comments, questions and concerns to be included in document prepared by MDPH staff and panel members along with all other materials previously submitted to MDPH):

Welcome to Participants in the Massachusetts Department of Public Health (MDPH)
Pave Paws Advisory Panel

We, concerned citizens and health professionals, have expressed to the MDPH our concerns about health and safety regarding the Pave Paws facility and express our appreciation for the convening of a scientific panel as one element of the efforts to further consider our concerns. We should note that our concerns pertain to RF radiation exposure in our homes, schools, commercial areas, and workplaces, including workplaces of civilian and military personnel who live in our communities and who work at the Massachusetts Military Reservation (MMR). Thus we are concerned both about public and occupational exposure to RF from PAVE PAWS.

Specifically, in response to concerns raised about the radar radiation from PAVE PAWS, MDPH issued a memorandum on Nov. 23, 1998 indicating that it was able to enlist the participation of 4 scientists,

"who have agreed to serve as experts for the MDPH advisory panel to address citizen concerns regarding the operation of the PAVE PAWS radar facility at the Massachusetts Military Reservation (MMR).

The memorandum gave the assessment of MDPH indicating,

"We feel the RF expert panel represents a balance of individuals who represent the scientific disciplines necessary to fully understand the PAVE PAWS issue and perspectives which allow them to be sensitive to citizen concerns and open to an unbiased review of the PAVE PAWS situation."

We therefore express our appreciation to MDPH and to all participating parties in efforts to select a panel which is believed may serve the above purposes.

Thoughts for consideration:

As concerned citizens and health professionals we believe it important to understand the nature of the "balance" in the panelists selected and what views each have that may significantly impact on the perspective which allows each to be sensitive to citizen concerns. Specifically,

1. We recognize that not only may there be differences in the disciplines represented by advisory panel experts, but there may also be differences in the weight each panelist gives to existing RF standards and the assumptions and rationale upon which these standards are derived. We think a scientist's perspective on current RF standards can have an important impact on their assessment of the PAVE PAWS situation. This is because it is very likely that RF exposure of the public to radiation from PAVE PAWS will be estimated to be within the limits of present RF standards, such as those of the Institute of Electrical and Electronic Engineers (IEEE), i.e. IEEE C95.1-1991 (reaffirmed in 1997), hereafter IEEE 1991. Indeed, it is likely public exposure from PAVE PAWS will be found to be less than 1/10th, 1/100th, or, in some locations, even 1/1000th or less of IEEE RF exposure criteria. Hence, scientists which fully endorse the current IEEE RF standards and their rationale may be expected to more likely have such endorsement reflected in their assessment of the PAVE PAWS situation.

COMMENT NUMBER

We believe knowing the extent our guest panelists support the IEEE 1991 RF standard and its rationale is particularly relevant since 3 of our 4 guest science panelists include those who have recently voted to reaffirm the IEEE 1991 RF standard or otherwise participate in the IEEE RF standard setting process. These include:

Panelists who voted to reaffirm the IEEE 1991 RF standard (and who submitted no comments with their vote)
Dr. Om Gandhi and
Dr. Marvin Ziskin

Dr. Linda Erdeich biography provided by MDPH indicates she is a member of the standards committee of IEEE and a member of the IEEE Committee on Man and Radiation.

Therefore, it is important for concerned citizens and health professionals to understand the perspectives which allow our guest RF experts to be sensitive to citizen concerns and open to an unbiased review of the PAVE PAWS situation.

For example:

1.1 Disregard for cell culture studies:

We believe that studies of animal or human cells in cell cultures (in vitro studies) can provide important indications or alerts of possible adverse effects, and accordingly, that the results of these cell culture studies should be taken into account when making risk assessments regarding PAVE PAWS. However, we note that IEEE 1991 states in its rationale that,

"Studies, such as those indicating effects, in vitro, on cell function were considered transient and reversible with no detrimental health effects." [IEEE C95.1-1991, Section 6.4 Rationale: Assessment Criteria].

We find this assumption and rationale puzzling since one of the IEEE 1991 papers in the Appendix B: Final List of Papers Reviewed for the IEEE C95.1-1991 standard (Final List papers) studying nerve cells in culture reported,

"We feel that the effects on firing patterns that we have detected at absorbed power levels below 10 mW/cc are very real and quite reproducible. Depending on whose skull model one believes in, these levels correspond to the power that might be absorbed by cortical neurons in a human being who is exposed to 'safe' free-field intensity of anywhere from 10 down to 1 mW/sq. cm. The question of whether the influences we have seen are 'harmful' or not cannot be answered from our results, but it is almost certain that these effects would be disruptive of ongoing information processing if they were to occur in an intact nervous system. It could very well be that prolonged exposure to such levels would result in far more pronounced and less reversible effects." (Wachtel, 1975, p. 59)

psw010r

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

It should be noted that all IEEE Final List Papers had to meet strict criteria of IEEE review committees selecting papers suitable for use for standard setting. IEEE reports that,

"Only those papers with adequate dosimetry were judged acceptable. The relevance of these reports to standard setting was evaluated, as were the scientific quality and originality of the data, reliability, and evidence of adverse effects. . . . The acceptable reports where then funneled to the Risk Assessment Working Group for an evaluation of the implied risk for human beings." [IEEE 1991, sec. 6.4, pg. 27]

Thus, it may be presumed that the above and all other IEEE Final List Papers noted here were found by IEEE review committees to be of good quality and are useful for standard setting.

While the authors appear to hesitate to call a 'disruption of ongoing information processing' a 'harmful' effect, it certainly seems to us that this can be a safety problem when operating a motor vehicle or machinery where quick reaction times are essential for safe operation. Indeed, in a paper by Dr. Lai and Dr. Arthur Guy (who also voted to reaffirm IEEE 1991) it states

"Deficit in memory functions, even transient, can lead to serious detrimental consequences." (Lai et al. 1994)

Thus, we would appreciate the panelists indicating whether or not they endorse the above rationale in the IEEE 1991 standard and the reasons therefore, since approaches to evaluating cell culture studies may have important implications for assessment of the PAVE PAWS situation. This would be appreciated since it appears the approach of MDPH panelists of IEEE RF committees is to automatically regard such studies as indicating effects that are "transient and not detrimental to health," – a an approach and rationale which we find puzzling.

We note that 'safe' exposure to the frequencies associated with PAVE PAWS allows occupational exposures within the range in which the authors anticipate the above disruption of ongoing information may occur. We also note that if the 'safety factor' of 10 for occupational exposure were applied to such exposure levels, that Cape Cod community members working at PAVE PAWS at the MMR would be subject to exposure limits that would be at least 10 fold more stringent than at present.

1.2 Microwave hearing:

Our quality of life and peace of mind are also a concern of members of the Cape Cod community. We note that EPA acknowledges that microwave radiation can cause the sensation of 'hearing' a buzz, chirp, or other can be annoying. Indeed, a Nov. 1996 'Fact Sheet from Region 6 (?) EPA in Texas reports there is a history of individuals who live near radar facilities, such at airports, complaining of microwave hearing, headaches, nausea and other symptoms.

We also notice that in the Bibliography referenced in the 1991 IEEE which discusses the "auditory effect" that it states,

COMMENT NUMBER

"The pulsed microwave energy, instead, initiates a thermoelastic wave of pressure in the head that travels to the cochlea and activates the hair cells in the inner ear." (Lin, 1981)

Given that (1) such microwave hearing occurs, (2) is annoying, (3) has initiated complaints to EPA of headaches and other problems, (4) and is expected to be due to a rapid thermoelastic expansion of the brain, it puzzles us that IEEE 1991, reaffirmed in 1996, states that the limits for RF radiation exposure allowed by the standard,

"is well above the threshold for auditory effect. The latter is clearly not deleterious."
[IEEE 1991, section 6.9: Rationale- Peak Power Exposure]

It puzzles us why scientists would knowingly approve limits that are known to be annoying and have the above history of complaints. Furthermore, it seems that any rapid thermoelastic expansion of the brain may put stress on its integrity and the nerve cells present. Indeed, it is rapid thermoelastic expansion of rock that is one of the means of its decomposition. In addition, we have not yet been able to identify in any of the IEEE references citing evidence that this annoying, headache causing, rapid thermoelastic expansion of the brain is "clearly not deleterious."

While many of us within the Cape Cod community may not be exposed to RF conditions so that we experience microwave hearing, this matter addresses the question of the importance of avoidance of annoying effects. It also addresses the level of evidence the IEEE RF scientific community finds sufficient to say an effect is "clearly not deleterious." We are puzzled by this IEEE approach since by our definition anything annoying, especially if it occurs 24 hours every day and even while we try to sleep, is deleterious to our mental and physical health. Also, since we could not find any evidence in the IEEE referenced studies that a rapid thermoelastic expansion of the brain is harmless, we are puzzled by what means this standard asserts that such an effect is "clearly not deleterious".

Accordingly, citizens and health professionals of the Cape Cod community would like to hear from the panelists on the above matter. For those who now support or who voted to adopt the above rationale that is puzzling to us we look forward to their explanation – for this touches on the important matter of the foundation criteria by which scientific judgments are made.

1.3 Is uncomfortably heating people OK?

We note an IEEE Final List paper by Dr. Gandhi indicates that he is concerned that the previous ANSI RF standard limit of 5 mW/sq. cm. for short wave lengths (above 1500 MHz) was not sufficiently stringent. He reported in an IEEE bibliography reference (Gandhi, 1988),

"We have previously projected that whole-body exposure millimeter-wave power densities on the order of 8.7 mW/sq. cm. are likely to cause associations of 'very warm to hot' (referring to IEEE Final List Paper Gandhi and Riazi, 1986) At higher frequencies, a power density of 1 mW/sq. cm. is suggested to prevent threshold perception of warmth." (Gandhi, 1988, pg. 111)

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Yet, the IEEE 1991 standard and its reaffirmation allow at the higher frequencies limits which are **10 fold higher than that which Dr. Gandhi recommended.** These present IEEE limits are also 2 fold greater occupational exposure than previously allowed by the American National Standards Institute (ANSI) ANSI C95.1-1982 standard, and assign the same exposure to the pubic as workers who are aware of the potential for exposure. It is also noteworthy that the exposure levels set for the public are **greater than** the levels at which Dr. Gandhi reports people feel "very warm to hot."

1.4 Conflicts of IEEE RF standard with recommendations of the federal health agencies

We also note the U.S. Environmental Protection Agency (EPA) reviewed the 1991 IEEE RF limits at the request of the Federal Communications Commission (FCC). For the short wave length signals, EPA compared the exposure limit choices of the 10 mW/sq. cm. limits of IEEE 1991 to the alternative of 1mW/sq. cm. limits of the 1986 National Council for Radiation Protection and Measurements (NCRP). EPA reported to the FCC that regarding the IEEE 1991 RF standard (adopted by ANSI in 1992) that,

"Changes that allow for a two-fold increase in the MPE (maximum permitted exposure) at high frequencies over the MPR permitted by the 1982 ANSI standard, and the application of the same MPE for both controlled (occupational) and uncontrolled (general public) environments for frequencies from 15 GHz to 300 GHz are not improvements. Therefore, EPA recommends against adopting the 1992 ANSI/IEEE standard because it has serious flaws that call into question whether its proposed use is sufficiently protective of public health and safety." (M. Oge, letter 1993) [emphasis added].

Also, the IEEE standard defines its exposure limits as those,

- "to which a person may be exposed without harmful effect and with an acceptable safety factor," [IEEE 1991 definitions, pg. 10],
- "the recommended exposure levels should be safe for all",[IEEE 1991 pg. 23] and
- "no reliable scientific data exists indicating that certain subgroups of the population are more at risk than others." [IEEE 1991 pg. 23]

Yet, it seems as if EPA disagreed with all of the above rationale. Specifically, EPA stated - EPA review of 1992 ANSI/IEEE leads us to believe that it is a standard with flaws that cast doubt about whether it is sufficiently protective of public health and safety, and its claim that "the recommended exposure levels should be safe for all." [EPA 1993, pg. 1 of comments to letter]

- The thesis that the 1992 ANSI/IEEEE recommendations are protective of all mechanisms of interaction is unwarranted because the adverse effects level in the 1992 ANSI/IEEE standard is based on a thermal effect." [EPA 1993, pg. 3 of letter]

- ANSI/IEEE does not allow for any variation in sensitivity to certain subgroups of the population [such as infants, aged, ill and disabled, persons dependent on medication, persons in adverse environmental conditions (excessive heat and/or humidity) voluntary vs. involuntary exposure] are more at risk than others (IEEE 1991, p. 23). This conclusion is not in agreement with conclusions of EPA report, 'Biological

COMMENT NUMBER

Effects of Radiofrequency Radiation', (EPA 600/8-83-026F) " . .that the general population has groups of individuals particularly susceptible to heat ."

1.5 Non-thermal effects demonstrated in Final List papers

The IEEE RF 1991 standard, reaffirmed in 1996, also states the committee preparing it makes the observation that,

"no reliable scientific data exist indicating that non-thermal (other than shock and burn) or modulation specific sequelae of exposure may be meaningfully related to human health." ([IEEE 1991, p. 23)

We find this a puzzling finding, since amongst the very IEEE Final List papers that were purportedly reviewed for preparing this standard there are papers showing non-thermal and modulation specific effects that are related to human health. As noted, in 1.1 above, one of the criteria for acceptance as a Final List paper was an acceptable evaluation of "the scientific quality and originality of the data (and), reliability." Thus, when IEEE 1991 states that "no reliable scientific data exists" indicating some concern, this implies that none of the IEEE Final List papers, whose findings were judged scientifically reliable, showed evidence of such a concern. But we find otherwise. For example,

1.5.1 For Pulsed vs. continuous wave exposure modulation, an IEEE 1991 Final List paper reports disruption of learning behavior in rats exposed to RF levels about 30% of the 'hazard threshold' adopted by IEEE (i.e. 1.2 W/kg vs. a hazard threshold of 4 W/kg). The author's report,

"The rat's ability to discriminate the appropriate (time interval to wait to get a food pellet) was disrupted... Results of the present study indicate, that at the same field strength, a PW (pulsed wave) field is more likely than a CW (continuous wave) field to affect temporal discrimination." (Thomas et al 1982).

1.5.2 Brain damage at 1/600th present IEEE hazard threshold may be presumed a 'non-thermal effect' unlikely to cause general body heating.

The lowest RF exposure level at which an IEEE Final List Paper found an adverse effect, as identified by the author, was at a level about 1/600th of the 'hazard threshold' identified by IEEE 1991 for deriving its limits based upon safety factors of 10 and 50.

Specifically, one IEEE Final List paper documents that at a wavelength of about 12.5 cm (about 2380 MHz) and at an exposure of 10 microwatts/sq. cm, that during a 2 month period of 40 minutes of exposure 3 times a day (total of 120 minutes or 2 hours a day) that there were changes to the ultrastructure of the hippocampus regions of the brains of rats. The author reported,

"The demonstrated ultrastructural changes can, most probably, affect their function and constitute on of the elements in pathogenesis of early disturbances in people who have been exposed to this environmental factor." (IEEE Final List paper of Belokriniskiy, 1982)

psw010t

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

[note: The 10 microwatts per sq. cm. exposure at 2380 MHz is far below the approximately 1580 microwatts per sq. cm. limit allowed by IEEE 1991. Using the charts in the 1986 Radiofrequency Radiation Dosimetry Handbook of the US Air Force School of Aerospace Medicine, we estimated that the internal absorption of RF energy is about 1/600th of the IEEE hazard threshold it used to derive its limits. Thus, it seems that if the same 'safety factor' of 50 is used, that applying this paper for obtaining safety limits would yield limits about 1/600th or more stringent than present IEEE limits.

1.5.3 At 5% of the IEEE hazard threshold (0.2 W/kg), rats were given doses of dextroamphetamine (used to treat Attention Deficit Disorder). Authors report, "The response rates were notably higher (too many responses) after microwave radiation . . .even though the last exposure to radiation occurred 24 hours before the drug was administered." (Thomas and Maitland 1979)

This exposure of only 5% of the IEEE hazard threshold, and well within the limits considered 'safe' for workers aware of their exposure, may reasonably be considered not causing an increase in general body heating, and thus may be considered a 'non-thermal' effect.

Thus, there is at least 1 Final List Papers that demonstrates brain damage as interpreted by the author, and 2 papers that demonstrate disruption of learning behavior at levels below that expected to cause general body heating. Disruption of learning behavior is the very criteria that the standard used to set its limits for what is safe for people. Thus, we are puzzled why IEEE should state no scientifically reliable data exists that demonstrates non-thermal or modulation effects since such effects are demonstrated within its own Final List Papers.

1.6 Cumulative effects demonstrated in Final List Papers.

1.6.1 Cumulative 24 hour effect of RF on rats given medication for ADD (Attention Deficit Disorder)(00020000

As noted above in 1.5.3, the authors found the rats could not perform a learned task as well and made more frequent errors even when the most recent RF exposure was just 5% of the IEEE hazard threshold and about 24 hours before a drug was administered. That an effect of RF persists for 24 hours, clearly demonstrates a cumulative effect.

1.6.2 Cumulative effect seen in increase in cancer

Cancer of the skin was much greater amongst mice exposed to a skin carcinogen and which had previously been exposed to RF at just below the IEEE 'hazard threshhold." For example, after 6 months of exposure to a skin carcinogen Benzopyrene, control animals who had been sham irradiated for 3 months prior to application of benzopyrene had 0 skin tumors out of 40 animals, but those RF irradiated 3 months prior to application of benzopyrene had 22 tumors out of 40 animals. This clearly shows a cumulative effect.

Thus, we are very puzzled how IEEE 1991 came to the conclusion that its Final List Paper provided no reliable evidence of adverse cumulative effects.

COMMENT NUMBER

1.7 Incorrect reporting of facts on lowest levels at which disruption of behavior occurs

What is very troubling to citizens and health professionals is that the IEEE 1991 rationale states for the criteria used to set the standard, disruption of learned behavior, that for rodents, the disruption of a highly operant task (learning behavior) occurred in the narrow range of between 3.2 and 8.4 Watts absorbed per kilogram of body weight (W/kg). [IEEE 1991 sec. 6.4 pg. 27].

Yet 6 studies on rodents in the Final List Papers report disruptions of behavior at levels below 3.2 W/kg. Such disruptions of learning behavior were reported at 2.3, 2.0, 1.6, 1.2, 0.7, and 0.2 W/kg.

Thus, there seems to be a clear incorrect statement of facts regarding rodent studies. This is an especial concern to our citizens and health professionals, since care in reporting facts in the rationale for a health standard is a serious over sight.

1.8 Unclear justification for basing standard on non-human primates

IEEE 1991 only identifies 4 papers on non-human primates upon which it chooses to base its standard. Since the standard also contains some studies on the amount of RF absorbed in the brains of rats at some frequencies, e.g. 2450 MHz, (Chou et al. 1985a) and since frequency is one of the most commonly used in rat studies, including those finding disruption of behavior at below 4 W/kg, it seems that the rat studies should not have been excluded from consideration.

It seems that there is a preponderance of studies showing that the hazard threshold should be lower than the 4 W/kg adopted by IEEE.

We would like the panelists to give their estimates of the range of the specific absorption rate for this study. If important information is lacking, then a range of what it might be would be appreciated.

The reason we have put so much focus on the IEEE standard is that it seems 2 of our 4 panelists either voted to reaffirm this standard, and an additional panelists now also sits on IEEE RF standard setting committees. We understand that if one fully endorses and supports this standard then it almost seems to necessarily follow that such a person would find no cause for concern regarding the PAVE PAWS situation. Moreover, there are some fundamental issues with regard to (1) the importance of cell culture data, (2) importance of quality of life effects, (3) what limits protect against, (4) both the criteria and care with which evidence is evaluated, (5) the basis of public health judgments which allow less stringent limits than those advocated by our federal health agencies. For concerned citizens and health professionals to have confidence in the review and assessments of the expert panel, it is important that the above observations which are puzzling to us be addressed by the panel.

	COMMENT NUMBER

While we recognize that the PAVE PAWS wavelengths are around 26 inches long and not the lengths of many of the signals studied in the IEEE Final List papers, we think that the points raised are only specific examples of what are properly related to the 5 general concerns just noted above.

Lin 1981: J.C. Lin, "Microwave Hearing Effect," in American Chemical Society Symposium 157, Biological Effects of Nonionizing Radiation, ed. By K.H.Illinger, American Chemical Society, Washington D.C., pp. 317-330, with quote from page 328.

H. Lai, A. Horita, A. Guy,."Microwave Irradiation Affects Radial Arm Maze Performance in the Rat, Bioelectromagnetics Vol. 15, pg. 95-104 (1994). Quote from pg. 95.

H. Wachtel, Effects of Low-Intensity Microwaves on Isolated Neurons, Annals of New York Academy of Sciences, V0l. 247, pp. 46-62, 1975, quote pp. 59.

2. Some questions regarding scientific basis for past assumptions made in standards

We have a question regarding a statement by Dr. Quirino Balzano. Dr. Balzano is Corporate Vice President of Motorola and Director of the Corporate Electromagnetic Research Laboratory of the Plantation, Florida. Dr. Balzano was a member of the Balloting Committee that adopted the IEEE C95.1-1991 RF safety standard (IEEE 1991). He also was a member of American National Standards Institute Subcommittee IV on safety levels and/or tolerances for radiofrequency radiation exposure at the time the ANSI 1982 RF exposure standard was adopted.

Concerning this ANSI 1982 standard, he wrote,

"Right from the onset of the development of the dosimetric concept, it became obvious that handheld mobile telecommunications equipment (MTE) would exceed the derived safety limits. ANSI C95.1-1982 (ANSI 1982) simply bypassed this problem by an exclusionary clause for low power handheld devices. In this clause all transceivers operating below ! GHz and radiating less than 7W (7 watts) were excluded from the requirement to demonstrate compliance with the basic safety limits. This exclusionary clause was adopted worldwide by most standard-setting organizations, although there was no real scientific back-up for this assumption."

["Experimental and numerical dosimetry," by Niels Kuster and Quirino Balzano, in Mobile Communications Safety, ed. By N. Kuster, Q. Balzano, and J.C. Lin, Chapman and Hall, London, New York, 1997, pp 13-64, quote from page 17.

Dr. Gandhi, you also are listed in the ANSI 1982 RF standard as being a member of the same ANSI 1982 subcommittee noted above as Dr. Balzano. Do you agree or disagree with the above assertion of Dr. Balzano that because it was obvious many handheld phones would not meet the safety limits that these were excluded from having to demonstrate compliance? Do you have other comments on this quote?

We ask this question because it relates to the broad topic of the extent to which science is considered or intentionally avoided when certain scientists have set criteria they deem appropriate for public exposure. Since you participated in the subcommittee that recommended this exclusionary rule we want to understand your view on this matter as it relates to the general question of concern to us of how scientific evidence is applied when determining what is appropriate for public RF exposure.

	COMMENT NUMBER

3. Questions regarding cumulative effects from many RF sources

While this panel is focused on our concerns about PAVE PAWS, we believe other sources of RF must be considered, such as from wireless telecommunications base stations. We understand that the present Federal Communications Commission rules are based upon a hazard level of absorbing on the average for the body of 4 watts of power per kilogram of body weight (4 W/kg). We further understand that based upon dosimetry principles that limits in terms of external power density exposure are derived and are given in 47 CFR Sec. 1.1310 Table 1 A and B. We note the limits in Table 1 A (for occupational exposure when the worker is 'aware and in control' of his exposure) are the same as in the ANSI 1982 RF standard which had the same hazard threshold of 4 W/kg and same 'safety factor' of 10, limiting human exposure to 0.4 W/kg. And Table 1 B providing a safety factor of 50, limiting exposure for the general pubic to 0.08 W/kg.

We also understand that there have been advancements in dosimetry which find the human body absorbs more RF than originally thought in 1982. Our question is how come the limits for external power density exposure have not become more stringent as the science of dosimetry is showing that less power is needed than originally thought to cause average whole body absorption of RF to exceed 0.08 W/kg.

For example:
In a 1992 study by Dr. Gandhi, it was shown that for an adult man facing an RF source that the amount of RF absorbed for frequencies from 350 to 915 MHz was about the same, 0.08 W/kg for 1000 microwatts/sq. cm and which is the limit for absorption allowed by the FCC, IEEE 1991 and NCRP 1986 standards. Yet we understand that at these wavelengths children whose bodies are closer in length to these short waves more efficiently absorb the RF energy. We understand from past studies that very small children would absorb about 2 fold more than an adult at 915 MHz – is this correct?

Also, your results show that above 350 MHz to 915 MHz that for an adult man the amount of average RF absorbed by the body is nearly constant, about 0.08 W/kg, does this suggest that this pattern continues up to 2000 MHz, the frequency range for PCS? If so, then it seems that for frequencies above 1500 MHz, at least, that the FCC, IEEE or NCRP power density limits would cause more than 0.08 W/kg in small children, causing the basic protections of these standards to be violated – is this correct? What do you estimate might be the RF absorbed by very small children at 915 MHz, at 450 MHz?

psw010v

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Also, since your results show that the amount absorbed by a average man is about constant for the range of 350 MHz to 915 MHz and probably the same up to 1500 MHz, it seems that the FCC limits and those of the IEEE and NCRP are based on more out-dated models that show RF absorbed on the average drops as frequency increases from 300 to 1500 MHz – is this correct?

This being so, can you see a reasonable basis for keeping the RF limits allowed at 350 MHz to be the same at 915 MHz since the amount absorbed by the body seems to be about the same?

Is it correct that there is a , "'hot-spot' range, extending form about 400 MHz up to about 3 GHz,. . . and that 915 MHz is near the optimum frequency for maximum heating in hot-spots." [see Environmental Health Criteria #137: Electromagnetic Fields: 300 Hz to 300 GHz, World Health Organization, 1993, Geneva, pp. 75]. Also see C.C. Johnson and A.W. Guy, "Nonionizing electromagnetic wave effects in biological materials and systems," Proc. IEEE, Vol. 60: 692-718]

And that "For the human head, the hot spot range extends from 300 MHz to 2000 MHz," International Radiation Protection Association Guidelines on limits of exposure to radiofrequency electromagnetic fields in the frequency range from 100 kHz to 300 GHz, Appendix 1, Rationale for Exposure Limits, in Health Physics, Vol. 54, pp. 115-123, 1988.

This being so, can you see a reasonable basis for setting more stringent RF exposure limits to protect the head from 'hot spots' for the frequency range 300 MHz to 2000 MHz – since it is in this range that the brain may be exposed to higher localized RF? Can you explain why this approach would have a justifiable basis? Given the need for prudence and caution, do you see the present limits as exemplifying prudence?

In a review article, it was noted that,

"Experimentally obtained whole-body average SAR for humans are three to four times greater than those calculated."

[Maria A. Stuchly and Stanislaw S. Stuchly, "Experimental Radio and Microwave Dosimetry," in Handbook of Biological Effects of Electromagnetic Fields, edited by Charles Polk and Elliot Postow, CRC Press, 1995, pp. 295-336, quote on page 331]

Can you please explain in detail the evidence from the various sources cited that are the basis for this assertion. Can you indicate the extent you agree or disagree with it and why? Can you indicate what the RF limits would be to assure the 0.08 W/kg limit is not violated, even for newborns, if the studies referred to that indicate four fold higher amount of RF is absorbed were used to set standards.

We ask this to get some idea of how close our RF exposure might be to the 0.08 W/kg if the latest science were used, even if there has not been sufficient replication of results

Can you please summarize for us the advances in numerical and computer dosimetry and experimental dosimetry and indicate how the findings would impact on setting power density limits to be sure that even for a newborn that the 0.08 W/kg would not be exceeded. This is relevant to our concerns because it relates to

- will we be appropriately protected from the cumulative effects of RF from all sources, including PAVE PAWS, and
- in general, do we see in fact that the RF standards are keeping pace with the developments in science? If not, then we have reason to question the validity of the standard.

See: O.P. Gandhi et al, "Specific Absorption Rates and Induced Current Distributions in an Anatomically Based Model For Plane Wave Exposures," Health Physics, Vol.. 63(3): 281-290, 1992.

4. Some questions about the Moscow Embassy and Korean War Veterans studies

Because the exposure to our community is likely to be very low relative to present FCC, IEEE or NCRP standards, we are particularly interested in studies of human populations exposed to RF at relatively low levels for long periods of time. This being so we would like to ask about RF studies of the U.S. Moscow Embassy staff and studies of Korean War Veterans exposed to RF.

4.1 Questions on the Moscow embassy study:

1- Is it correct that the NCRP 1986 RF report, Report #86, states that except for about 7 months (June 1975 to Feb. 1976) that the maximum exposure to US Moscow Embassy staff was 5 microwatts/ sq. cm. based upon State Department data? [pp. 212]

2- Is it correct that the NCRP 1986 report states that a subsequent study by the Johns Hopkins Applied Physics Laboratory "estimated uniformly lower power densities than those provided by the State Department" (except for one recording in one room)? [pp. 214]

3- Therefore, based on the above, what would you suggest the maximum and average exposure was to staff at the Moscow Embassy? Does an average of about 1 or 2 microwatts seem reasonable?

4- Is it correct that the "background" exposure at the other Eastern European embassies was reported by NCRP to be about 1 microwatt/sq. cm [pp. 213]

5- Is it correct that the U.S. Environmental Protection Agency estimated in a 1979 report that 97% of the U.S. population received no more than an RF exposure of 0.2 microwatts/sq. cm? [see David E. Janes, Jr., "Radiofrequency Environments in the United States," 15th IEEE Int. Conf. On Commun. 1979, Boston, MA, June 10-14, Vol. 2 of 4 , pp. 31.4.1-31.4.5]

6- Is it correct then that U.S. staff at the Eastern European embassies were receiving a "background" radiation of about 1 microwatt/sq. cm. (as reported by NCRP 1986) and that this was about 5 fold higher than what 97% of the U.S. population received?

COMMENT NUMBER

psw010w

COMMENT NUMBER

7. Given the above, is it correct to state that it is reasonable to expect that both the U.S. staff of the Moscow Embassy and the Eastern European Embassies were receiving about the same amount of average RF exposure and that this amount was about at least 5 fold what 97% of the U.S. population received?

8. Is it correct that when U.S. staff mortality was studied at the U.S. Embassy and at other U.S. Eastern European embassies that the following was reported:

	Moscow Embassy			Other East. Europ. Embassies		
	Observed	Expected	Standardized Mortality Ratio	Observ.	Expected.	Std. Mortality. Ratio
All causes of death:	49	105.3	0.47	132	223.7	0.59
All malignant neoplasms	17	19.0	0.89	47	41.1	1.1

Standardized mortality ratio is the ratio of t he observed to the expected deaths, where the expected deaths is based upon United States mortality experience specific for age, race, age, and calendar time applied to the study persons.

[Source: Table 5.6 page 91 of A. Lillenfeld et al, 1978, "Evaluation of Health Status of Foreign Service and Other Employees from Selected Eastern European Posts," National Technical Information Service # PB 288163]

9. Does it follow then That for non-cancer Deaths we have	32	86.3	0.37	85	182.6	0.47

10. Is it correct that the authors report that the 0.47 above for overall death rate means that their mortality experience was 47% of that of the comparison general United States experience. And that this represents 'a healthy worker effect' which results from the selection of healthy individuals for employment in the different government agencies. In addition, the degree of selection is probably even greater for assignment to these study posts." [pp. 84 Lililenfeld et al. 1978]

11. Is it then correct to say that for the non-cancer deaths the experience in the Moscow and other Eastern embassies was about 37 to 47% of that of the comparison population in the United States?

12. Is it correct to say that for the cancer deaths this "health worker" effect did not seem to apply, but that the standardized mortality ratio for cancer was about 2 fold that of the non-cancer death standardized mortality ratio.

13. Are the above results consistent with the hypothesis that the above suggest that there was "some environmental factor" common to both the Moscow and Eastern European embassies that resulted in an increased risk of cancer in both the Moscow and Eastern European study populations?

COMMENT NUMBER

14. Given the above, since both the Moscow and Eastern European embassies were estimated to be exposed to about 5 fold the levels of 97% of the U.S. population, could it be reasonably argued that the RF levels at both the Moscow and Eastern European Embassies were about the same and relatively high compared to the general experience at that time of the U.S. population?

15. If so, could it be reasonably argued that the data from the Lilienfeld study are consistent with the hypothesis that chronic low level exposure to RF at levels of about 1 to 2 microwatts/sq. cm can result in a 2 fold increase in the standardized mortality ratio for cancer? (of course there could be other environmental factors that were not explicitly studied).

[We note that the NCRP 1986 review of this study did not consider the above, rather it pointed out that the cancer rates between the Moscow and Eastern European groups were similar – which is indeed the case. The question is that given that NCRP 1986 reports the "background" exposure of the Eastern European embassies to be almost the same as for the Moscow group, is it rational to treat the Moscow group as the "exposed" and the Eastern European group as the "comparison" (or control) group?

We also have questions about the study of Korean War Veterans reviewed in NCRP 1986 pp. 207-211.

Is it correct that in a study by Robinette et al. 1980 that estimates of RF exposure were categorized by "hazard number" based on job experience history, but only for those in occupational classifications which may include relatively high exposures?
[C. Robinette, Effects Upon Health of Occupational Exposure to Microwave Radiation (Radar), American Journal of Epidemiology, 1980, vol. 112, No. 1, pp. 39-53]

Is it correct that there was a statistically significant increase in death rates as hazard number increased?

Is it correct that when people with hazard numbers less than 5000 are compared to those with hazard numbers greater than 5000 that there was a significant increase in cancer of the respiratory tract?

Is it correct that for all cancer categories (except digestive system) studied by Robinette and for people for whom the hazard number was determined, that cancer rates were higher in the highest hazard group compared to the lowest hazard group?

Is the above consistent with an hypothesis that RF exposure is associated with increased cancer risks? [Note: We ask "consistent with" since the higher, but not statistically significant cancer rates, may have been due to chance or not – since the small sample sizes make it difficult to distinguish real effects from chance.]

Is it correct that the NCRP 1986 Report #86 did not mention in its review the above statistically significant findings of increased death rates overall and increased respiratory cancer rates? This is important, since if scientific reviews do not mention statistically significant results, this is important for us when we consider the weight to give to such reviews.

Thank you for giving the above questions your consideration.

Cape Cod Coalition to Decommission PAVE PAWS

psw010x

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Dear Mr. Costas,

The Cape Cod Coaliton to Decommission PAVE PAWS ("Coalition") would like the Massachusetts Department of Public Health to forward the following additional materials to the PAVE PAWS Advisory Panel to review and comment on:

1. The Coalition would like the panel to review and comment on the following publication by Dr. Neil Cherry, Lincoln University, New Zealand: "Actual or potential effects of ELF and RF/MW radiation on accelerating aging of human, animal or plant cells." Presented June 17th, 1998. If you have difficulty obtaining this document, contact Sharon Judge, P.O. Box 150, Sandwich, MA 02563 for a copy.

2. The Coalition would like the panel to review the book, "Microwaving Our Planet" by Arthur Firstenburg. We ask that the panel review and comment on the studies Discussed in this publication. Copies can be obtained by calling 718-434-4499 or Writing P.O. Box 100404, Brooklyn, NY 11210

Thank you.

Cape Cod Coalition to Decommission PAVE PAWS

COMMENT NUMBER

PAVE PAWS Meeting, February 16th, 1999
Statement by Sharon Judge

INTRODUCTION

Welcome expert panelists. My name is Sharon Judge. I represent the "Cape Cod Coalition to Decommission PAVE PAWS." We are a group of citizens from all walks of life, including full and part-time residents of Cape Cod. Our Coalition is calling for the PAVE PAWS radar installation to be put into "warm caretaker" status immediately until the structure can be moved (as was the case of the PAVE PAWS in Eldorado, Texas). PAVE PAWS sits on top of former Shawme Crowell State Forest land in the northern section of the Massachusetts Military Reservation. Given our explosive population growth, our significantly elevated rates of cancer and neurological issues, and the recent, reliable scientific evidence showing adverse effects from exposure to microwave radiation, any future "study" of PAVE PAWS must be done retrospectively. We call on Governor Paul Cellucci to revoke the lease for this state owned land immediately.

20 YEARS AGO

I think it is important for the "expert panel" to understand some of the history regarding PAVE PAWS and the community. 20 years ago, on January 22, 1979, a public hearing was held on Project PAVE PAWS in this very room. Residents brought a lawsuit against the Airforce forcing them to produce an Environmental Impact Statement that would adequately address the issue of potential adverse effects to humans and the environment. The Environmental Impact Statement, Parts 1 and 2, is a legal document and part of a legally required process. Most all the issues of substance we will be raising tonight in verbal and written form, were raised 20 years ago by:

- The U.S. Environmental Protection Agency

Senators Kennedy, Brooks and Rep. Gerry Studds;

- The Executive Office of Environmental Affairs
- The National Telecommunications and Information Administration;
- The National Defense Council, Inc
- The Cape Cod Planning and Economic Development Commission;
- The Association for the Preservation of Cape Cod;
- The Conservation Law Foundation;
- The PAVE PAWS Plaintiffs;
- Numerous Lawyers, Physicians, Politicians, Citizens

I am disappointed that the Massachusetts Department of Public Health did not include <u>this legal document, the most important document on PAVE PAWS,</u> in the materials forwarded to this panel studying PAVE PAWS. How did the Department of Public Health determine which materials would be forwarded to the panel? Was the Airforce consulted in this matter?

This document needs to be put in the hands of the "expert panel" members right away. Part 1 includes <u>critical</u> information regarding the technicalities of the PAVE PAWS system. It documents evidence that existed 20 years ago regarding adverse effects from low level microwave radiation. The section on "Unresolved Issues" regarding Biological Effects is especially sobering. Part 2 contains all public comments. We request that the panel, as part of their scope, address all issues raised in this document. Even though these concerns are 20 years old, they still ring true today.

The Airforce and Raytheon put this facility near a densely populated area without adequate risk assessment. . Page C-10 states, "...the uniqueness of PAVE PAWS (frequency, waveform, and power

COMMENT NUMBER

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

densities), renders all known experimental evidence indirect as it relates to the exposure parameters." Page C-13 states, "In view of the known sensitivity of the mammalian Central Nervous System to electromagnetic fields, especially those modulated at the brainwave frequencies, the possibility cannot be ruled out that exposure to PAVE PAWS radiation may have some effects on exposed people. Because these effects are still hypothetical, it is not feasible to assess their health implications. Such assessment will require additional research and surveillance and must be addressed in future evaluations of the potential exposure effects of PAVE PAWS." In this Impact Statement many urgent requests were documented including:

- That there be continuous cape-wide monitoring of ground level radiation exposures;
- That an epidemiological study begin from the moment the power was turned on at PAVE PAWS;
- That the public be notified if their was a power increase at PAVE PAWS.

20 YEARS LATER

It's now 20 years later, and none of these things have been done. Although I recognize the decades of pressure put on the Massachusetts Department of Public Health by the military, your mandate is to protect communities health. PAVE PAWS has slipped through the cracks. What do we have 20 years later? We have inadequate exposure data, no epidemiological study, and the community never received notification of a power increase at PAVE PAWS in 1996. All of these things were called for 20 years ago in this room. We also have some of the highest rates of cancer in the state. Now you have the opportunity to make things right for the people of Cape Cod.

I understand that the Air Force funds the Department of Public Health through the Environmental Public Health Center. This type of influence over the Department of Public Health must stop. The Boston University research team which performed the Upper Cape Cancer Incidence Study in the late 1980's reported in Microwave News regarding PAVE PAWS, "...the available exposure data are inadequate. We strongly recommend that systematic power density measurements be taken throughout the area scanned by PAVE PAWS so that useful exposure data will be available for future analysis." **This was not followed up on.** The 1994 "Public Health Assessment for MMR" recommended that relevant electromagnetic field (EMF or non ionizing) monitoring data be provided for the PAVE PAWS radar facility. **This too was not followed up on.**

The Silent Spring Institute, which is funded through your Department, did not have enough exposure data to release the statement to the press that "the regional excess in breast cancer does not appear to be associated with the PAVE PAWS radar." When I asked Robert Knorr at a recent meeting of the Agency for Toxic Substances and Disease Registry if the Department of Public Health approves all Silent Spring's press releases, he replied that the Department of Public Health not only approves all press releases but all public documents Silent Spring releases to the public.

Did your department write the Silent Spring press release that included this statement? Did you approve this statement? Mr. Knorr, over a year ago, at the January 29th CAP meeting, said "PAVE PAWS is not an easy thing to study...that it may not be the thing to focus on right now as there is not a lot of information to suggest this was an important factor." (in regard to the high cancer rates). How could you say this when there has never been adequate exposure data to adequately assess risk? How could you approve the Silent Spring press release?

PROBLEMS WITH THE "EXPERT PANEL"

We appreciate the Massachusetts Department of Public Health assembling a "panel of experts." Your memorandum of November 23rd states, "the purpose of tonights meeting is to provide an opportunity for

COMMENT NUMBER

Upper Cape Citizens to express their concerns directly to the panel." As you are aware, our most pressing concern is the panel itself. **Did you consult with any individuals from the military or telecommunications industry in assembling this particular panel?**

The Department of Public Health considers the present "balanced." As concerned citizens and health professionals, we believe it's important to understand the nature of the "balance" in the panelists selected and what views each have that may significantly impact on the perspective which allows each to be sensitive to citizens concerns.

We recognize that not only may there be differences in the disciplines represented by advisory panel experts, but there may also be differences in the weight each panelist gives to existing RF standards and the assumptions and rationale upon which these standards are derived. We think a scientist's perspective on current RF standards can have an important impact on their assessment of the PAVE PAWS situation. This is because it is very likely that RF exposure of the public to radiation from PAVE PAWS will be estimated to be withing the limits of present RF standards, such as those of the Institute of Electrical and Electronic Engineers (IEEE), ie. IEEE C95.2-1991 (reaffirmed in 1997) hereafter IEEE 1991. Indeed, it is likely public exposure from PAVE PAWS will be found to be less than $1/10^{th}$, $1/100^{th}$, even $1/1000^{th}$ or less of IEEE RF exposure criteria. Hence h the anticipated exposures in our community.

Hence, scientists which fully endorse the current IEEE RF standards and their rationale may be expected to have such endorsement reflected in their assessment of the PAVE PAWS situation.

Panelists who voted to reaffirm the IEEE 1991 RF standard (and who submitted no comments with their vote) were Dr. Om Gandhi and Dr. Marvin Ziskin. Dr. Linda Erdreich's biography provided by the Department of Public Health indicates she is a member of the standards committee of IEEE and a member of the IEEE Committee on Man and Radiation. We are concerned that she is a paid consultant to the wireless industry. Ms. Erdreich, we understand that you have testified in court on behalf of the telecommunications industry. Is this correct? Have any of the other panelists testified on behalf of the telecommunications industry or been a paid consultant to that industry? Dr. Henry Lai, we understand you were listed as a participant in the list of persons whom we understand attended one or more meetings during the development of IEEE 1991. Is this correct?

Therefore, it is important for concerned citizens and health professionals to understand the perspectives which allow our guest RF experts to be sensitive to citizen concerns and open to an unbiased review of the PAVE PAWS situation.

PANEL HAS LIMITED ROLE

When the Department of Public Health first told the Community Assistance Panel that they were assembling an "expert panel," Kevin Costas asked the panel members for suggestions. 2 or 3 names were provided of which none were used. Then Mr. Costas went ahead, without public discussion, and chose the panel you see here tonight. The Department of Public Health denied our repeated requests to 1. remove certain panel members, and 2. to expand the panel. After the Departments refusal last year to expand the panel, we began assembling a second panel which will have an independent scope. This second panel will include local health professionals, a Harvard Biologist, an RF Engineer, Physicist, public policy experts and local citizens who will be able to advise public policy makers on "next steps" to take. These experts will be free of ties to the military or telecommunications industry. The scope of this panel will expand beyond PAVE PAWS health issues. The two panels will have different charges and scopes and will work parallel to each other.

COMMENT NUMBER

psw010z

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Clear Air Station breaks ground on $106 milli... Page 1 of 1

Air Force News

Clear Air Station breaks ground on $106 million radar

Released Apr 21, 1998

CLEAR AIR STATION, Alaska (AFNS) -- The Air Force's largest military construction project for fiscal 1998 kicked off with a groundbreaking ceremony here April 16.

The Clear Radar Upgrade program, a $106.5 million project, will replace the last mechanical radar in the Ballistic Missile Early Warning System network, which is currently operated by the 13th Space Warning Squadron here.

The existing mechanical radar are being replaced with a phased array warning system, commonly referred to as PAVE PAWS. PAVE is an Air Force program name, while PAWS stands for Phased Array Warning System. The PAVE PAWS system will increase mission capability and provide a more reliable warning system well into the future.

Unique to this project is that the new radar facility will use existing equipment from another PAVE PAWS site in Eldorado, Texas, thereby avoiding the acquisition of an entirely brand new radar system at a cost savings of $140 million.

Several military and contractor organizations are working together on the Clear Radar Upgrade program. The Electronic Systems Center at Hanscom Air Force Base, Mass., is the overall program manager, and the Raytheon Company, is the primary contractor. The U.S. Army Corps of Engineers, working with Electronic Systems Center and Raytheon, will oversee the construction portion of contract for the new facility that will hold the two radar faces and all related equipment.

The 13th SWS, a geographically separated unit of the 21st Space Wing, Peterson AFB, Colo., provides tactical warning and attack assessment of sea-launched and intercontinental ballistic missiles as part of the U.S. Ballistic Missile Early Warning System. (Courtesy of Air Force Space Command News Service)

RELATED SITES

- Air Force Space Command
- Electronic Systems Center
- Hanscom Air Force Base, Mass.
- PAVE PAWS
- Peterson Air Force Base, Colo.
- U.S. Army Corps of Engineers

COMMENT NUMBER

THE RISKS DIGEST

Forum on Risks to the Public in Computers and Related Systems

ACM Committee on Computers and Public Policy, Peter G. Neumann, moderator

Volume 9, Issue 47

Friday 24 November 1989

Contents

Air Force Radar Risk (update) [See Jon Jacky, RISKS-8.28]

Thu, 23 Nov 89 10:20:29 PST

RADAR AT U.S. BASE CAN TRIGGER PLANES' EJECTION SEATS: ...

psw010za

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Robins Air Force Base, Ga. - The US air force has learned that radiation from its PAVE PAWS radar at Robins AFB could activate internal equipment - including ejection seats and fire extinguishers - on virtually all planes that land at the base.

The disclosure was made in an Air Force "update" letter to Senator Sam Nunn (D-Ga.) made public this week by the senator's Washington office.

Although the air force originally said that PAVE PAWS would not endanger electro-explosive devices other than those on the outside of its plane, a recent review of the radar has concluded otherwise, the air force letter said.

"As a result, Air Force Space Command is co-ordinating with the Air Logistics Center at Robins AFB to implement procedures to ensure aircraft with internal EEDs are also protected," wrote Maj.-Gen. Burton R. Moore, the air force's director of legislative liaison.

But Nunn, in a written reply to Moore dated Nov. 20, says that the air force hasn't fully answered his questions of last January, and has "raised new questions" with its latest update.

"It would be helpful to know more about the hazard to such devices, what the devices are used for, and what aircraft are equipped with them. I would also like to know how the air force determined that these devices were at risk," said the Senate Armed Services Committee chairman in his two-page letter.

→ The radiation hazard to internal EEDs is the latest safety revelation concerning the southeastern PAVE PAWS - built too close the runway at Robins AFB. The radar, one of four nationwide, is designed to warn of sea launched missile attacks and track satellites in space. But since November of 1987, the air force has been turning off the north face Robins PAVE PAWS to protect vulnerable planes landing on its runway 3 kilometres north of the radar.

According to air force documents obtained by Knight-Ridder Newspapers recently under the Freedom of Information Act, one aircraft at risk to PAVE PAWS is the Strategic Air Command's KC-135R tanker, some of which are based at the 19th Air Refuelling Wing at Robins.

EED equipment on other aircraft includes "flare/chaff dispensers, pylon/ejector racks, tactical missiles, cruise missiles, crew escape, and engine start cartridges," according to air force documents.

[This problem was noted in RISKS-8.28, 19 FEB 1989. Details are new. PGN]

Congressional report: "Bugs in the Program" [Benson, RISKS-9.45]

Gary Chapman <chapman@csh.Stanford.EDU>
Wed, 22 Nov 89 12:06:19 PST

I have a copy of the report David Benson's quoting extensively from, the congressional committee report called "Bugs in the Program"--and I have some comments on its recommendations about software development.

There is an emphasis in the report--an overemphasis in my view--on the federal procurement process for software. This is probably understandable given the source of the report: Congress is concerned about spending money, not about methodological issues in software engineering. However, the attention paid

psw010zb

COMMENT NUMBER

U.S. Govt Flight Information Publication
Airport/Facility Directory 6/98

NOTICES

LACTICE AREA
. Berkeley Springs, WV

TE SYSTEM (WATRS)

MONSTRATION
Maryland
Inner Harbor
days per week

ONSTRATION
ew Jersey

ONSTRATION
rlen Center, New York

PATTERN MAXIMUM
SPEED

SPECIAL NOTICES 249

INTERSECTION DEPARTURES DURING PERIODS OF DARKNESS
BOSTON–LOGAN AIRPORT, MASSACHUSETTS

LAND AND HOLD SHORT LIGHTS (for LAHSO)
BOSTON–LOGAN AIRPORT, MASSACHUSETTS

Temporary Flight Restrictions
Cape Cod, Massachusetts

BOSTON ARTCC RADAR COVERAGE

CHARLESTON, WEST VIRGINIA

CAUTION—FISH SPOTTING ACTIVITY

BOSTON, MASSACHUSETTS

BOURNE, MASSACHUSETTS

COMMENT NUMBER

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

FOR IMMEDIATE RELEASE
MARCH 31, 1978

JOINT STATEMENT BY REPRESENTATIVE GERRY E. STUDDS, SENATOR EDWARD M. KENNEDY, AND SENATOR EDWARD W. BROOKE ON PROJECT PAVE PAWS

Earlier this week, we received a report from the Air Force, requested last January, on the research it used as the basis for its determination that the PAVE PAWS radar will not endanger residents of Upper Cape Cod. Even though this report does not, unfortunately, address the central issue in the PAVE PAWS controversy -- the adequacy of our national safety standard for exposure to non-ionizing radiation -- we have forwarded copies to the Environmental Protection Agency, the Council on Environmental Quality, the Bureau of Radiological Health and the Office of Telecommunications Policy for the earliest possible review. We are especially interested in learning whether these agencies believe that the Air Force has overlooked any aspect of current research which might lead us to question the safety of the PAVE PAWS installation.

In a meeting held at our insistence late Wednesday between representatives of our offices and Air Force officials, we learned that the Air Force intends to begin initial alignment and calibration of the PAVE PAWS radar on Monday of next week (April 3). We were told, however, current construction schedules still dictate that the system will not become operational until April of 1979.

Until that time, a number of tests will be conducted so that the Air Force is certain its contractor has met each of the system's specifications, and so that both the Air Force and Cape Cod residents can be more accurately advised of the radiation levels that will be produced when the system becomes fully operational.

We have been guaranteed that at NO TIME during the months of April and May will any radiation be produced that will approach the level of one microwatt per square centimeter, a level recognized as safe by nearly all American and foreign researchers. We have been further assured that the Air Force will not test the system at levels that will produce operational levels of radiation until late in the summer, after initial test results have been thoroughly reviewed.

Because we had been led to believe before Wednesday that the Air Force would not begin testing any portion of the radar's electrical system until June, we have requested and received from the Air Force a complete breakdown of the schedule for further testing of PAVE PAWS. As a further safeguard that unexpected levels of radiation will not be produced at any time, we have obtained assurances that we will receive regular briefings throughout the spring and summer months on the results and nature of all activities at PAVE PAWS. At each of these briefings, we will be advised of the amount of radiation being produced, any malfunctions within the system, and any revision in the testing schedule we have received. In this way, we feel confident that Cape Codders will for the first time be kept aware of all Air Force activities related to PAVE PAWS. The Air Force has also agreed to notify us immediately if at any time radiation levels are produced that measurably exceed the levels predicted by their testing schedule.

Furthermore, the Air Force has agreed to conduct a field survey of radiation in communities near PAVE PAWS in early May after an Air Force team completes a two week radiation survey of Provincetown, Truro and Wellfleet. By determining existing radiation levels prior to the operation of PAVE PAWS, we believe we will be able to more accurately assess the amount of radiation PAVE PAWS can be expected to produce when fully operational.

Nonetheless, for a variety of reasons, including the length of time it has taken the Air Force to advise us of its testing schedule, the length of time it will take us to carefully analyze the Air Force report we have received and because we are concerned that we were not given full information before this week about Air Force plans to test PAVE PAWS, we feel strongly that an Environmental Impact Statement should be prepared by the Air Force before any testing that will produce over one microwatt of radiation is allowed to begin. Next week we will personally express that view in the strongest terms to Secretary of the Air Force John Stetson.

COMMENT NUMBER

By requesting that an Environmental Impact Statement be completed, we do not mean to suggest that radiation from PAVE PAWS will be harmful to residents of Cape Cod. On the contrary, there is some evidence to suggest that radiation levels may in fact prove to be harmless. We recognize that there is little disagreement that the levels will be lower than the Russian military standard of 10 microwatts per square centimeter. However, the fact remains that the levels of radiation which will be produced do, in some limited areas, exceed the Russian population standard for safe radiation exposure and do approximate the levels with which the Soviets have bombarded our Moscow Embassy for the past 20 years. To date, the Air Force has not adequately addressed either of these points, nor have they conducted a long-term study of the effects of low-level radiation exposure. In June, such a study of the medical records of all employees who served in our Moscow Embassy over the past 20 years will have been completed by Johns Hopkins University. We feel strongly that studies of this type should be carefully reviewed before any full power testing of PAVE PAWS is allowed.

But even beyond these important questions of the safety of radiation from PAVE PAWS we firmly believe that an Environmental Impact Statement should be completed because of the controversy this project has generated. This position is supported by the Defense Department's own regulations which state:

> "Even though a written assessment supports the conclusion that an action is not a Major Action Significantly Affecting the Quality of the Human Environment, an environmental impact statement is to be written on a proposed action which is highly controversial because of environmental aspects."

The controversial nature of this construction has been demonstrated repeatedly by the hundreds of letters that have been sent to our offices requesting that an impact statement be completed and by the attendance of thousands of Cape Codders at a number of public information sessions on PAVE PAWS, some of which Air Force officials have declined to attend. We firmly believe that this indication of widespread concern by the people of Cape Cod is in itself enough to warrant the completion of a full impact statement.

The clamor over the PAVE PAWS installation on Cape Cod dramatizes the public's desire for better scientific answers to certain important questions concerning the safety of radiation exposure. It highlights the need for a national assessment of the biological effects of day-to-day exposure to non-ionizing radiation at different levels. To address these important concerns, we are requesting that an independent agency -- like the National Academy of Sciences -- perform a series of studies which shall include the following:

1. An analysis of all existing research on the effects of exposure to non-ionizing electromagnetic radiation, particularly microwave radiation.

2. Recommendations for a series of research studies to assess the actual effects of long-term, chronic exposure to non-ionizing electromagnetic radiation.

3. Recommendations for the reorganization of the Federal Government to more effectively administer radiological studies and programs, including the development of environmental standards and guidelines.

4. A review of existing scientific data including the work now being performed by the Environmental Protection Agency, toward the development of environmental standards for public exposure to non-ionizing radiation from multiple sources and at various levels.

In light of the fact that the public will be confronted with even greater exposure to radiation from a variety of sources in years to come, we firmly believe that these studies are absolutely essential. And it is clear that increased funding is needed for research efforts in this important area of public health. Serious issues have been raised within the Federal Government, the scientific community and by the public which must be more completely addressed.

Until we have received more complete answers to these concerns, we are not prepared to support the full operation in the Spring of 1979 of the PAVE PAWS installation on Cape Cod.

psw010zc

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Safe Power Density Limits for Human Exposure to RF Fields

at 450 MHz (PAVE PAWS Maximum Frequency)

	Source Document	Maximum Permissible Exposure	Surrounding Conditions	Exposure Averaging Time Limit
• 1976	USAF Report [1]	10.0 mw/cm^2	None	6 minutes

"Measurements to date ... demonstrate that radiation intensities at ground level are ... far below the level of 10.0 mw/cm^2 that is the currently accepted U.S. occupational safety level for human exposure." [2]

• 1997	FCC Bulletin 65 [3]	1.5 mw/cm^2	Controlled	6 minutes
• 1997	FCC Bulletin 65 [3]	0.3 mw/cm^2 (300 μw/cm^2)	Uncontrolled	30 minutes
• 2017	?	? μw/cm^2	Uncontrolled	?Years?

References:

[1] National Research Council, Om P. Gandhi, et. al. "Radiation Intensity of the PAVE PAWS Radar System", p. 1, 1979

[2] National Research Council, Om P. Gandhi, et. al. "Radiation Intensity of the PAVE PAWS Radar System", p. 6, 1979

[3] Federal Communications Commission (FCC), Reviewed by Professor Om P. Gandhi, Dr. John M. Osepchuk, et al. "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency (RF) Electromagnetic Fields, Bulletin 65", pp. 67-68, Table 1 and Figure 1, August, 1997

Notes: "Controlled" limits apply ... where persons exposed are fully aware of the potential radiation. "Uncontrolled" limits apply ... where the general public may be exposed ... and may not be fully aware of the potential exposure. [3]

Charles W. Kleckner, February 15, 1998

COMMENT NUMBER

The Precautionary Principle

(excerpt)

"The ... physical alterations of the environment have had substantial unintended consequences affecting human health... Therefore it is necessary to implement the Precautionary Principle: When an activity raises threats of harm to human health... precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context, the proponent of such an activity, rather than the public, should bear the burden of proof."

"The process of applying the Precautionary Principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives..." [1]

Notes:

[1] An international group of scientists, government officials, lawyers, and labor and grass-roots activists met January 23-25 at Wingspread in Racine, Wisconsin to define and discuss the Precautionary Principle. A complete statement is available.

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

psw010zd

COMMENT NUMBER

Attachment B

UNIVERSITY OF WASHINGTON
Department of Bioengineering, Box 357962
Seattle, Washington 98195

March 15, 2000

Suzanne Condon
Director
Bureau of Environmental Health Assessment
Massachusetts Department of Public Health

Dear Suzanne,

I am writing to clarify and elaborate my answer to a question raised at the March 13, 2000 Public Meeting in Sandwich. This relates to the question of 'health versus biological effects'. Even though there is not enough information to indicate that exposure to radiofrequency radiation causes harmful health effects in humans, there are ample of evidence and studies showing that radiofrequency radiation can cause biological effects in cells, animals, and humans. Some of these studies are described in the 'Panel Report'. In my opinion, biological effects alone are sufficient causes for regulatory action. Actually, in the summary of the 'Panel Report', it is stated that "...it is prudent for the MDPH to take interim action to limit public exposure to PAVE PAWS RFR, according to prudent avoidance and the precautionary principle, to levels considered safe by national standards..." Since the national standards are recommended exposure guidelines which give the upper limit of exposure and do not consider the effect of long term exposure, it is logical that the MDPH adopts a guideline of lower levels in order to sufficiently protect the health of its citizens. In the third paragraph of the summary of the 'Panel Report', it is stated that "It is the opinion of this Panel that the evidence for these 'low-level' (< 10 microwatt/cm2) effects does not reach a level sufficient to justify claims of any health hazard." Therefore, I think it is also logical that MDPH uses a 10 microwatt/cm2 limit for RFR exposure. This limit should be used until it is proven that chronic RFR exposure does not cause any harmful health effect.

Sincerely,

Henry Lai

COMMENT NUMBER

Attachment C

Upper Cape Cooker 11/4/99

PAVE PAWS report due in December

By Marcia Kozubek

The public will have plenty of time to comment on an environmental impact statement for the PAVE PAWS anti-ballistic defense system on Cape Cod. The that the report for the Cape has not been written yet.

Capt. Barbara Sacra, a community liaison for PAVE PAWS, said community groups concerned about changes at the PAVE PAWS site on Flat Rock Hill may have been looking at a draft environmental impact statement for Alaska and North Dakota. The public comment period for that statement is up in two weeks, Capt. Sacra said.

"The plan for the Cape is only being written now," she said. Representatives from the U.S. Army Space and Missile Defense Command in Huntsville, Ala. visited the Cape's PAVE PAWS station last week. Rather than purchasing new equipment, most of the changes they discussed involve upgrading computers and software. "After they publish their environmental impact statement at the end of December, there will be a 45-day public comment period," she said. "At that time we will invite people from the Missile Defense Program to speak and answer questions," she said. It would be premature for them to meet with people now, she added.

It is important to note it will be a "draft" environmental impact statement. That means it is subject to change, Sacra said. The idea that the military is attempting to withhold information about the project is simply not true, she said.

"One of my main objectives is to bring people from the community into the process. We are at the ground level of building a community involvement program," she said.

This week Sacra will be in touch with selectmen, Congressional liaisons, local boards of health and others to update them on progress. "We will be sending out survey cards to residents asking if they want periodic updates," she said. "There will be plenty of public briefings at town meetings," she said.

Local anti-war activists and those concerned about the long-term health effects of microwaves emitted by PAVE PAWS to track submarine launched missiles are urging the public to comment on all aspects of the project. That includes environmental impact statements for North Dakota and Alaska.

Sacra said she will post copies of the environmental impact statements on Alaska and North Dakota at local libraries. That will help people become familiar with military terms, equipment and concepts of the National Defense System, she said.

Copies of the lengthy document will be available at the Jonathon Bourne Library at 19 Sandwich Road, the Falmouth Public Library on Katharine Lee Bates Road, the Mashpee Public Library on Steeple Street, the Sandwich Public Library at 142 Main Street, and at the U.S. Coast Guard Library at Otis Air National Guard base.

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Attachment D

NEWS RELEASE CONCERNING PAVE PAWS

Date:
April 12, 2000

Contacts:
Captain Barbara Sacra
6 Space Warning Squadron Public Affairs
508-968-3235

FOR IMMEDIATE RELEASE

Public Hearing for the Supplement to the National Missile Defense Deployment Draft Environmental Impact Statement to be held on April 27, 2000.

(Massachusetts Military Reservation - MMR) - The Ballistic Missile Defense Organization (BMDO) will conduct a public hearing on April 27, 2000 at a to-be-determined location on Cape Cod to solicit comments from the local community on the Supplement to the National Missile Defense (NMD) Deployment Draft Environmental Impact Statement (EIS). The public comment period for the Supplement has been extended from April 17, 2000 to May 5, 2000 to accommodate the public hearing and allow additional time for comments. The comments received during this period along with their responses will be incorporated into the NMD Final EIS scheduled for completion later this summer.

The Supplement to the NMD Draft EIS addresses the environmental impacts of proposed replacement of interior electronic hardware and computer software at the PAVE PAWS Early Warning Radar (EWR) facilities at Cape Cod Air Force Station, Massachusetts, Clear Air Force Station, Alaska, and Beale Air Force Base, California. The proposed NMD modifications would not result in any change to peak or average power levels at these facilities, and power density levels would remain well-within current safety standards.

- /// -

COMMENT NUMBER

This supplement is part of the NMD Deployment Draft EIS which is being prepared to support a Department of Defense (DoD) recommendation to the President on whether to deploy the NMD system. The NMD system is being developed to protect the United States from ballistic missile threats by rogue nations. The President is expected to decide whether to proceed with deployment of the overall NMD system this summer. If the President decides to deploy NMD the specific decisions on whether to proceed with the EWR upgrades and the deployment of the other NMD elements would be made at a future time following further DoD-level review.

The U.S. Air Force, which operates the PAVE PAWS facilities, recently announced that it will be conducting a separate EIS to address maintenance and sustainment of its current EWR operations at Cape Cod AS, Clear AS and Beale AFB. The Air Force is currently beginning its EIS process, and is planning to conduct public scoping meetings in May of this year to gather community input on issues to be addressed in the EIS. The Air Force process will include public scoping, publication of a Draft EIS for public review and comment, and public hearings on the Draft EIS (which are distinct from the upcoming NMD public hearing). The Air Force anticipates the EIS process will require approximately 18-24 months to complete.

Details of the April 27 public hearing will be announced through various news media outlets within the next seven to 10 days. Individuals may review the NBD Deployment Draft EIS document at the libraries of Bourne, Falmouth, Sandwich, Mashpee, and the U.S. Coast Guard, or on the Internet at www://acq.osd.mil/bmdo/bmdolink/html/nmd.html.

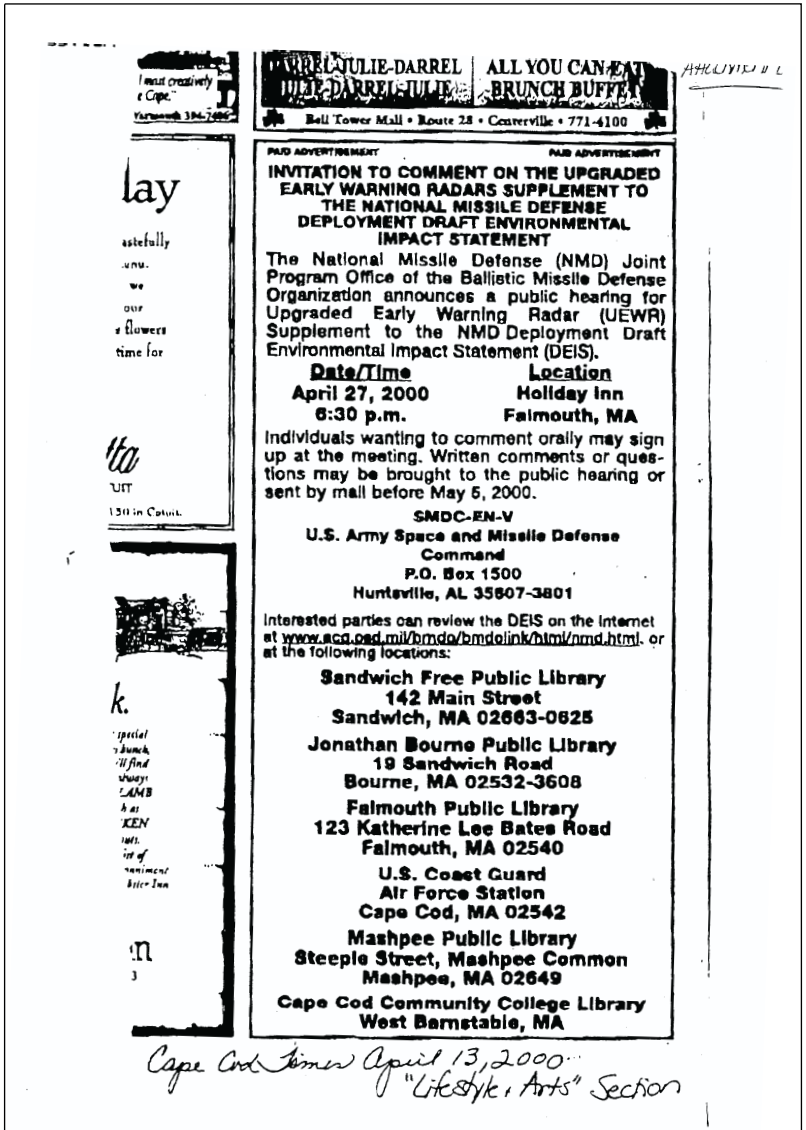
For additional information, please contact Capt. Barbara Sacra at (508) 968-3235. Comments on the Supplement to the NMD Deployment Draft EIS may be sent to U.S. Army Space and Missile Defense Command, ATTN: SMDC-EN-V, P.O. Box 1500, Huntsville, AL 35807-3801.

- End -

psw010at_d

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER



DARREL-JULIE-DARREL-JULIE | ALL YOU CAN EAT BRUNCH BUFFET

Bell Tower Mall • Route 28 • Centerville • 771-4100

PAID ADVERTISEMENT PAID ADVERTISEMENT

INVITATION TO COMMENT ON THE UPGRADED EARLY WARNING RADARS SUPPLEMENT TO THE NATIONAL MISSILE DEFENSE DEPLOYMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT

The National Missile Defense (NMD) Joint Program Office of the Ballistic Missile Defense Organization announces a public hearing for Upgraded Early Warning Radar (UEWR) Supplement to the NMD Deployment Draft Environmental Impact Statement (DEIS).

Date/Time	Location
April 27, 2000	Holiday Inn
6:30 p.m.	Falmouth, MA

Individuals wanting to comment orally may sign up at the meeting. Written comments or questions may be brought to the public hearing or sent by mail before May 5, 2000.

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

Interested parties can review the DEIS on the internet at www.acq.osd.mil/bmdo/bmdolink/html/nmd.html, or at the following locations:

Sandwich Free Public Library
142 Main Street
Sandwich, MA 02663-0625

Jonathan Bourne Public Library
19 Sandwich Road
Bourne, MA 02532-3608

Falmouth Public Library
123 Katherine Lee Bates Road
Falmouth, MA 02540

U.S. Coast Guard
Air Force Station
Cape Cod, MA 02542

Mashpee Public Library
Steeple Street, Mashpee Common
Mashpee, MA 02649

Cape Cod Community College Library
West Barnstable, MA

Cape Cod Times April 13, 2000
"Lifestyle + Arts" Section

COMMENT NUMBER

April 19, 2000

General Franklin
BMDO
The Pentagon
Washington, DC 20301-7100

Dear General Franklin:

I appreciate the Ballistic Missile Defense Organization (BMDO) extending the public comment period for the Supplement to the Draft Environmental Impact Statement (EIS) for the National Missile Defense Deployment (Supplement) regarding the upgrades to PAVE PAWS, however, I find this 21 day extension unacceptable. As of today, Wednesday, April 19, 2000, the BMDO has not properly notified the public of the hearing for the Supplement scheduled for April 27th. With only one week to go before the public hearing, no location or time has been announced. Less than one months public notification is unacceptable for any public hearing in an EIS process.

Furthermore, the April 27th date for the BMDO public hearing for the Supplement is unacceptable as it conflicts with a public meeting the Massachusetts Department of Public Health (MDPH) has scheduled for the same evening at which time MDPH is convening an advisory committee regarding an upcoming cancer study on Cape Cod. This meeting was announced in the Cape Cod Times on April 17, 2000. I am requesting that you postpone the BMDO public hearing since stakeholders in the BMDO EIS process, including the MDPH, will not be able to attend due to this previously scheduled MDPH meeting. I have secured an available meeting place for May 24, 2000 and I am formally requesting that you consider this as an acceptable new hearing date. I am also formally requesting that you extend the public comment period for the BMDO Supplement to accommodate this change in date for the hearing.

Although I appreciate your need to put a report on the president's desk in the near future regarding the readiness of the National Missile Defense Program for deployment, I do not want, as I am sure the BMDO does not want, this report to be incomplete when it is presented to the president. The BMDO EIS process was established to provide an avenue for public participation. You will not have full public participation on April 27th because of the challenges stated above.

Sincerely,

Richard Judge

cc. Lt. General Donald Cook, USAFSPC
Crate Spears, BMDO
Lt. Col. Rick Lehner, BMDO
F. Whitten Peters, Secretary, USAF
Thomas McCall, Deputy Assistant Secretary, USAF
Federal and State Delegation
Boards of Selectmen
Boards of Health
JPO
Media

COMMENT NUMBER

psw010at_e

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

April 26, 2000

Major General Peter Franklin
Deputy Director
BMDO
The Pentagon
Washington, DC 20301-7100

Dear General Franklin:

I am in receipt of the letter dated April 21st from your office in response to my letter of April 19th to you. Although I appreciate the Ballistic Missile Defense Organization's (BMDO) recognition of the conflict with the April 27th public hearing and your willingness to reschedule this hearing, perhaps you did not understand the reasoning behind my suggestion of May 24th as an acceptable alternative for the BMDO public hearing. The challenge with the April 27th hearing date for the Supplement to the Draft Environmental Impact Statement (EIS) for the National Missile Defense Deployment (NMD) program (Supplement), is the culmination of an EIS process that has fallen far short of what the people of Cape Cod expect and deserve.

First and foremost, given the history of controversy regarding the operation of the PAVE PAWS Radar Installation on Cape Cod, it is unconscionable that the BMDO chose not to hold public scoping meetings on Cape Cod in order to properly initiate the EIS process. According to the Programmatic EIS for the NMD program, scoping meetings were held in December, 1998, "in communities perceived to be affected by the NMD program." It is unfortunate that the BMDO did not "perceive" the Cape Cod community as being affected by the NMD program, especially in light of the fact that at the time BMDO announced their plans to upgrade the PAVE PAWS on Cape Cod, there was an ongoing investigation into the health affects associated with the 21 year old radar installation.

Officials with the Joint Program Office on the MMR and PAVE PAWS Commander Cal Hutto, have done a fine job attempting to deal with decisions being handed down from the Pentagon. They unfortunately are on a "need-to-know" basis and have been given the difficult job of trying to reach out to the public with their hands tied. It is unacceptable that to date, the BMDO has not held any public information meetings to educate the public on the BMDO's EIS process for the proposed NMD Program and to give the public the opportunity to ask questions and provide input into the scope of environmental analysis in the NMD EIS process.

The first contact BMDO had with the public on Cape Cod, was a small legal notice around March, 2000, announcing the availability of the Supplement for the NMD EIS. No announcement of a public meeting or public hearing regarding the Supplement was made at this time. The second contact BMDO had with the public on Cape Cod, was the advertisement of the final public hearing for this Supplement scheduled for April 27, 2000.

Your advertisement announcing this hearing, was an embarrassment. Not only did it fail to use the words "PAVE PAWS," but it appeared in the "Lifestyle" section of the newspaper. Due to the BMDO's lack of communication with the Massachusetts Department of Public Health, the advertised date of April 27th for the public hearing, as it turns out, would also prove to be wrong.

On April 12th, a news release sent to public officials, clearly stated that a time and location for the April 27th hearing, had not been determined, yet, the advertisement mentioned above, appeared the very next day with the time and location. Needless to say, it is disturbing that the BMDO hearing information was withheld on April 12th. Which brings me back to my reasoning for a hearing date in late May. I do not find that postponing the date by five days, sufficiently addresses the major failure of the BMDO to include the "public" in this critical process. The public expects and deserves at least 30 days public notice in an EIS process. The notification must also be effective in content and placement.

The lack of appropriate public involvement and notification, has tainted the BMDO's EIS process. If the BMDO continues with this course of action, the EIS process will be incomplete and thus the report that the BMDO will present to the President will be incomplete due to the fact that the BMDO did not educate the public on Cape Cod on the EIS process and the public was not provided appropriate opportunities for meaningful involvement in the process.

COMMENT NUMBER

As you are aware, due to intense public pressure, the US Air Force recognized that there was sufficient reason to prepare a full EIS for the Cape Cod PAVE PAWS, which will include formal public scoping meetings to determine the extent of environmental analysis that will be expected. When the Air Force publicly announced their intentions on December 13, 1999 to prepare a full EIS for PAVE PAWS, the BMDO, should have folded their process into the Air Force's EIS saving the public's time and money. This is logical since the Air Force is the lead agency for the comprehensive EIS for PAVE PAWS and the BMDO is a cooperating agency.

Instead, there are two separate EIS processes going on concurrently for the same installation. This presents a serious challenge, not only has it sufficiently confused the public and elected officials, but it also has created procedural challenges.* The BMDO, in completing their Supplement before the Air Force EIS is completed, without public scoping meetings and adequate public involvement, has produced a deficient document. BMDO has put the cart before the horse.

If the hearing date cannot be postponed and rescheduled for May 24th as I originally suggested, then it should be canceled. If the BMDO insists on continuing with the May 3rd hearing, then it should be changed to a public information meeting only and a public hearing should be rescheduled with adequate time to properly notify the public. The only other viable and logical alternative, would be a joint scoping meeting involving the BMDO and the Air Force. As I said in my letter of April 19th, I understand the BMDO is required to put a report on President Clinton's desk this fall. Unfortunately, the BMDO Cape Cod PAVE PAWS section of the EIS will need to be stamped "incomplete" due to the poor public involvement process and other challenges.

The BMDO should be aware that the lack of public participation in their EIS process is not because of lack of interest, but because of a failure on BMDO's part to properly notify, educate and inform the public in an effective manner and within a reasonable timeframe. The BMDO plans to spend in excess of $60 billion on the proposed National Missile Defense Program, it is completely unacceptable that you will have only held one public meeting on Cape Cod.

Sincerely,

Richard Judge

*The Air Force stated in a March 13th press release that the "findings from the NMD EIS will be incorporated into the Air Force's PAVE PAWS modernization EIS." The NMD Supplement on the other hand states that "the Ballistic Missile Defense Organization would reassess its proposed usage of the Early Warning Radar facilities (PAVE PAWS) in light of the results of the Air Force EIS prior to installation of the NMD modifications.

cc. President William Clinton
Lt. General Donald Cook, USAFSPC
Lt. Col. Rick Lehner, BMDO
F. Whitten Peters, Secretary, USAF
Thomas McCall, Deputy Asst. Secretary, USAF
Federal and State Delegation
Boards of Selectmen
Boards of Health
JPO
Media

psw010at_f

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Attachment 6

DEPARTMENT OF THE AIR FORCE
21ST SPACE WING (AFSPC)

May 4, 2000

TO: Attendees of PAVE PAWS Convening Meeting, March 28, 3000

SUBJECT: Meeting Minutes of March 28, 2000 Public Meeting

Thank you for attending the PAVE PAWS meeting held on March 28, 2000 at the Sandwich Public Library to discuss our proposal to convene a Working Group for discussing issues related to our operations and Environmental Impact Statement. Attached for your information is a detailed summary of that meeting.

Please note that this style of meeting summary is intended to capture, in some detail, what was said at the meeting, but that it is not an official transcript. These minutes, as well as any comments you may have on them, will be a part of the administrative record for the Environmental Impact Statement for the Service Life Extension Program at the PAVE PAWS radar on Cape Cod.

If you have any questions or concerns about the meeting summary, please contact me at 508-968-3223.

Sincerely,

Marilyn Null
Air Force Deputy
for Community-Based Programs
Senior Advisor to the Commander

STRENGTH AND PREPAREDNESS

COMMENT NUMBER

Draft MMR PAVE PAWS Stakeholder Working Group
Convening Meeting
Sandwich Public Library
March 28, 2000
Meeting Minutes

Name:	Affiliation:	Address:	Telephone:	E-Mail:	Would you like to be on the PAVE PAWS mailing List?
Albert F. Badeau	HQ AFSPC				
Vicky Fogelman	HQ AFSPC				
Jeff Lindquist	HQ AFSPC				
Gary Maher	HQ AFSPC/CEV				Yes
Jane Ross	HQ AFSPC				Yes
Col. Sue Wentzell	HQ AFSPC/PA				Yes
Capt. Barbara Sacra	USAFR				
Cal Hutto	USAFR				
Eric Waters	AFCEE				
George H. Gauger	AFCEE				
Leslie Hough	Air Force				
Michael Hough	Air Force				
Crate J. Spears	US Gov/DoD/BMDO JPO				Yes
Jan Larkin					

COMMENT NUMBER			
	Maj. Bruce Ruscio	JPO	
	Robert Knorr	MDPH	Yes
	Sarah Levinson	US EPA	
	Haydon Coggeshall	Town of Bourne	
	Nancy Caffyn	State Representative	
	Ruth Provost	State Representative	
	Matt Patrick	Town of Falmouth	Yes
	Virginia Valiela	Town of Falmouth	Yes
	Dick Judge	Town of Sandwich	
	Richard Musiol	Office of Sen. Murray	
	Joshua Martin	Office of Sen. Murray	
	Mark Forest	Office of Rep. Delahunt	Yes
	Sharon Judge	Coalition to Decommission PAVE PAWS	Yes
	Larry Cole	FMMR/PACERS	Yes
	Paul Zanis	IART	Yes
	Sue Walker	AND/CC	Yes
	Warren Appleton	Citizen	Yes
	Joel Barnett	Citizen	Yes
	Charlie Bayberry	Citizen	Yes
	Katherine Bough	Citizen	Yes

COMMENT NUMBER			
	Jose Carvalho	Citizen	
	Roland Catani	Citizen	Yes
	Buzz Crocker-Strong	Citizen	Yes
	Louis Demarkles	Citizen	Yes
	Richard Hugus	Citizen	
	David Jury	Citizen	
	Chuck Kleecamp	Citizen	
	Diane Kovandt	Citizen	Yes
	Marc Malls	Citizen	Yes
	George Muhlebad	Citizen	
	Victor Vysstotsky	Citizen	Yes
	Regina Zanis	Citizen	Yes
	Raymond Pool	Retired USAF	Yes
	Raymond Bell	Resident	Yes
	Virginia Bell	Resident	
	Pat Bonanno	Resident	Yes
	Bob Bonanno	Resident	Yes
	Clement Burlington	Resident	Yes
	Natalie Cooper	Resident	Yes
	Joel Feigenbaum	Resident	

psw010at_g2

COMMENT NUMBER

Robert Fowler	Resident	Yes
Jeanne Hamilton	Resident	Yes
Stan Laine	Resident	Yes
Kay Merrell	Resident	Yes
Don Perkins	Resident	Yes
Kevin Perkins	Resident	Yes
J. P. Rully	Resident	Yes
Peter Schlesinger	Resident	Yes
Clare Schrader	Resident	
Paul Schrader	Resident	Yes
Linda Teacan	Resident	Yes
Tony Verderese	Resident	Yes
David Mason	Student/BDH	
Stetson Hall	Barnstable County	Yes
Jeff Burt	*Cape Cod Times*	Yes
Bill Barnes	*Upper Cape Codder*	
J. Paradise	*Sandwich Enterprise*	Yes
David Fairman	CBI	
Merrick Hoben	CBI	
Amy Brand	CH2M HILL	

COMMENT NUMBER

Jennifer Copeland	CH2M HILL
Sarah Corner	CH2M HILL

psw010at_g3

COMMENT NUMBER

Agenda Item #1. Introduction

Mr. Fairman convened the meeting at 7:01 PM. He explained that he works for the Consensus Building Institute (CBI), a non-profit organization based in Cambridge, Massachusetts, which provides neutral facilitation and mediation services to public, private, and non-profit clients. He further explained that CBI currently is doing work related to PAVE PAWS (Precision Acquisition Vehicle Entry - Phased Array Warning System), which will be the focus of tonight's meeting.

Mr. Fairman stated that in the late 1970s, when the PAVE PAWS facility was designed, constructed, and began operation, Sandwich residents raised concerns about possible exposures and health effects associated with the operation of the facility. A number of PAVE PAWS related issues recently have resurfaced and caused much discussion and debate in the Sandwich community. Tonight is an opportunity to see whether the group of individuals in attendance can make progress in clarifying the points of view that exist.

Mr. Fairman stated that the primary focus of tonight's meeting comes from a proposal that the United States Air Force made several months ago – to convene a working group to address PAVE PAWS related issues. This proposal came at a time when the Air Force was seeking to modernize the hardware and software of the PAVE PAWS facility. The modernization effort would be necessary to allow the PAVE PAWS facility to continue operating at a level that the Air Force considers necessary and appropriate to fulfill that facility's national defense function. Mr. Fairman stated that the modernization issue raised questions and concerns for a number of stakeholders about whether the health issues surrounding the PAVE PAWS facility have ever been addressed adequately. Questions and concerns also were raised about whether these health issues should be addressed now, prior to further commitments to continue operating, upgrading, and possibly integrating the facility into a new national missile defense (NMD) system.

Mr. Fairman reported that the Air Force asked CBI to assist in facilitating a convening process to determine whether a working group could be formed. He explained that the Air Force Space Command provided funds to the Air Force Center for Environmental Excellence (AFCEE). AFCEE has a contract with CH2M HILL, which provides community involvement and public information services, and which contracted with CBI to facilitate this convening process.

Mr. Fairman explained that CBI's primary role is to assist the attendees here tonight in having a conversation with each other. He noted that CBI had discussions with a number of individuals. As a result of those discussions, CBI produced a draft convening report summarizing concerns and views raised regarding the continued operations of the PAVE PAWS facility and its possible upgrade, and the possible exposures and affects of radio frequency radiation (RFR) emitted by PAVE PAWS. The report also summarizes possibilities for goals for the working group, and specific tasks that it might undertake to achieve those goals.

Mr. Fairman reported that the Air Force is undertaking the Environmental Impact Statement (EIS) process as part of its proposed upgrade of the PAVE PAWS facility. He stated that many stakeholders have raised questions about the relationship between this proposed working group and the EIS process, and about the relationship between looking at health issues, exposures, and possible health effects from RFR, and the EIS process. Mr. Fairman noted that for many stakeholders this question is very important and should be discussed prior to discussing the proposed working group and its possible goals and tasks. He noted the large number of attendees at this meeting, and stated that an attempt will be made to clarify the main concerns about the proposed working group, and to provide an opportunity for individuals and groups to express their points of view, but also, to listen to what others are saying. An attempt also will be made to determine whether there are options for the proposed working group's relationship to the EIS

COMMENT NUMBER

process, and to determine the goals and tasks that the working group might undertake to meet the interests of all the people in attendance and the communities represented tonight.

Mr. Fairman stated that based on how much this group accomplishes, in terms of the goals for tonight's meeting, an attempt will be made to discuss next steps. He then reviewed the agenda and explained the format for the participant discussion period. Mr. Judge requested that Senators and Representatives be offered the opportunity to speak first. Mr. Fairman replied that this could be done, if the Senators and Representatives prefer, and if other members of the group are amenable.

Mr. Fairman remarked that depending on the outcome of the "open discussion" agenda item, by 8:30 p.m. the attendees may or may not be ready to address the possible tasks for the working group. If ready, the attendees then can discuss whether the proposed working group wants to address a combination of exposures and possible health effects related to RFR exposures from the PAVE PAWS facility and how it may accomplish that. The attendees also can discuss what tasks the working group might do, other than those CBI has identified from discussions with stakeholders. Mr. Fairman stated that CBI has scoped out broadly what it has heard from the stakeholders, and has reflected it back. He acknowledged that it's likely that there are other issues that stakeholders believe are important to address. He reiterated that tonight's meeting is the opportunity for stakeholders to exchange feedback.

Mr. Fairman suggested that if by 9:00 p.m. progress has been made in terms of the working group's tasks, the discussion could move to that of membership for the proposed working group. He noted that this discussion will depend completely on the previous discussion, and whether or not people feel that they are moving in a direction of forming a working group. Mr. Fairman stated that there will be a formal end to this meeting by 9:30 p.m. He noted that at the end of the meeting there will be an opportunity to discuss next steps and determine whether or not there will be another working group meeting.

Mr. Fairman then reviewed the meeting groundrules. He noted that CBI thought it would be useful to allot a fair amount of time at the beginning of tonight's meeting for the presenters to speak, and then provide the opportunity for discussion. He explained that this approach would create a shared base of information for this group. He ensured the attendees that there will be ample time for open discussion.

Mr. Fairman stated that CBI was contracted as an impartial and neutral facilitator, and it is CBI's job to work on behalf of all of the stakeholders, regardless of who is paying for its services. Mr. Fairman stated that CBI's responsibility is not only a contractual one, but also is part of its code of ethics as a member of the Society of Professionals in Dispute Resolution. He encouraged anyone with concerns about CBI's impartiality in this meeting to raise those concerns. He reiterated that it is CBI's job to help everyone in attendance have an informed discussion.

Mr. Fairman reported that during the convening process, CBI conducted interviews with five stakeholder groups: public health agencies, elected officials, citizen groups, individual citizens, the Air Force, and the Department of Defense (DoD). Based on those interviews, CBI developed a *draft* convening report, which is CBI's best effort to reflect back what it heard from the interviewees. Mr. Fairman stated that tonight is an opportunity for the stakeholders to provide feedback on the contents and accuracy of the draft convening report. He noted that copies of the report are available tonight, and can be provided by CBI.

Mr. Fairman stated that three key issues were identified during the convening process as topics to be discussed: (1) the relationship between the study of PAVE PAWS exposures and possible health effects and the EIS process for the upgrade of this facility; (2) past, present, and future exposures and possible health effects from the RFR emitted by the PAVE PAWS facility and; (3) the proposed modernization

psw010at_g4

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

and continued operation of the PAVE PAWS facility. Mr. Fairman noted that in regard to modernization, there are two issues to be discussed. One issue is upgrading the hardware and software of the facility to allow it to continue fulfilling its current function as part of the national defense architecture, and the other issue is integrating the PAVE PAWS facility at the Massachusetts Military Reservation (MMR) into a proposed NMD system, should that system be approved by Congress and the President. Mr. Fairman also noted that the questions about health effects and exposures seem to be quite central in the minds of virtually all stakeholders, and should be considered seriously.

Mr. Fairman reported that CBI also asked interviewees about possible tasks for the working group to undertake if it were formed. He stated that many individuals expressed the importance of resolving the question of how exposure and health issues would be addressed within the scope of the EIS process, and how the working group's work on this issue would be addressed. He said that individuals also expressed the importance of monitoring, studying, and determining past, present, and future exposures, and determining what the data mean, in terms of health effects. Mr. Fairman noted that a number of stakeholders feel strongly that existing health standards are not an adequate basis for assessing health effects from RFR emitted by PAVE PAWS. However, others do believe that existing health standards are an adequate basis. Mr. Fairman reported that interviewees also expressed an interest in reviewing available scientific literature and determining whether there is any information that can narrow the uncertainty about how to interpret the exposure data.

Mr. Fairman stated that an attempt will be made tonight to determine whether the stakeholders present can identify areas of agreement and disagreement about exposures, possible health effects, and additional study that might be needed to reduce uncertainty. This input will be provided to the Air Force and possibly to other stakeholders. Mr. Fairman noted that an attempt also will be made to determine whether the stakeholders present can reach consensus on recommendations on how to identify and reduce health risks, if it is judged that the facility does cause health risks. This information also will be provided to the Air Force and possibly to other stakeholders.

Mr. Fairman stated that another goal of tonight's meeting is to discuss the future operation of the PAVE PAWS facility, the proposed upgrade, and the possible integration into the NMD system. He noted that most stakeholders are concerned primarily about health issues, and some stakeholders are concerned about the future of the facility; however, the outcome of the health issues will have a direct effect on the discussion about the future of the facility itself.

Mr. Fairman then discussed the tasks that the working group might undertake to address health issues. He reported that the Air Force agreed to provide the funds and a contracting mechanism to conduct an exposure study. Also, the Air Force has invited this proposed stakeholder working group to provide input on the selection of a contractor, and the contractor's design proposal. The proposed stakeholder working group could oversee the measurements of exposures, either by physically watching the measurement equipment being installed and ensuring that it keeps working, or by receiving feedback from the contractors that the study has been completed. The proposed stakeholder working group could review and interpret the data in light of existing standards and scientific information about possible health effects. The proposed stakeholder working group then would seek consensus on findings and recommendations, both on what the data mean in terms of health risks and possible actions to be taken, and in terms of what additional study might be needed if the available data do not produce a satisfactory picture for people to make informed decisions.

Mr. Fairman commented that there are stakeholders who feel strongly that while this is a good start, more needs to be done in terms of ongoing monitoring and assessment of health exposures and health effects in the local population. This issue can be discussed further tonight.

COMMENT NUMBER

Agenda Item #2. Comment from U.S. Air Force on Rationale for Working Group and on EIS Process

Lt. Col. Hutto introduced himself as the Commander of the 6th Space Warning Squadron. He apologized on behalf of the Air Force for hearing, but not listening to the concerns of the citizens and not communicating with the citizens, over the past 21 years. Lt. Col. Hutto stated that he does not believe that the Air Force has done enough and added, "I am here listening, I am here to try to take actions on your concerns." He acknowledged that there are many concerns related to this issue.

Lt. Col. Hutto stated that the missions of missile warning that are done in space surveillance still are important missions to this nation. If those missions are to continue, some of the equipment must be modernized through the service life extension program. Lt. Col. Hutto stated that the Air Force's effort to determine how to address the citizens' concerns, while considering the modernization of the site, evolved into the EIS. He explained that an EIS is the most comprehensive analysis that can be done under the National Environmental Policy Act (NEPA). The Air Force is undertaking the EIS process in an attempt to address the concerns raised and incorporate them into the Air Force's proposal to modernize the PAVE PAWS site.

Lt. Col. Hutto reported that the notice of intent (NOI), which was issued January 27, 2000, was the legal start of the EIS, and is when the scoping began. He noted that this meeting is part of the scoping process to determine what issues need to be examined in the EIS.

Lt. Col. Hutto stated that the Air Force conducts complete, comprehensive EISs, and this EIS will address health and safety. The first step in that regard is to conduct a radio frequency radiation survey. Lt. Col. Hutto stated that in order to determine exposures to the community from the radio frequency radiation emitted from the PAVE PAWS site, the Air Force wants to hire a radio frequency radiation safety expert, and medical and scientific experts to help collect exposure data. Lt. Col. Hutto reported that relocation of the PAVE PAWS facility also will be addressed in the EIS.

Lt. Col. Hutto defined the scoping process as an attempt by the Air Force to address the concerns raised, and try to narrow them down. He stated that the first step is to advertise through the community for the scoping process. He noted that comments are provided to the Air Force, and the Air Force responds to those comments. Also, comments are provided at public hearings, and the Air Force responds to those comments. Lt. Col. Hutto emphasized that the public can comment on the draft EIS and the Air Force will address those comments. In addition to that effort, the Air Force is proposing to create a stakeholder working group where concerns can be addressed and the community can be involved in those concerns. Lt. Col. Hutto stated that the stakeholder working group will be an official input into the EIS.

Lt. Col. Hutto stated that the stakeholder working group will provide an opportunity to engage in dialogue that will result in thoughtful input into the EIS process. He said that the Air Force wants the community to help choose the radio frequency radiation safety person, and the science and health experts. The working group's purpose will be to help ensure that the Air Force is collecting data that is meaningful to the stakeholders, to the medical and scientific community, and to the radio frequency radiation safety personnel. Lt. Col. Hutto stated that the Air Force is open-minded in terms of how this working group will operate, and it wants community input.

Lt. Col. Hutto said that he has reviewed the CBI convening report and its proposals on how to look at this working group and how the group may affect the EIS. He stated that the working group and the data on exposures and health will be part of the EIS scope, and the information will be addressed in the EIS. He also noted that the working group report and member comments will be incorporated into the EIS, and those conclusions and comments will be addressed. Lt. Col. Hutto said that he envisions the

COMMENT NUMBER

working group as a place where "we can roll up our sleeves and try to get down to the bottom of some of these concerns and how we want to solve them." He remarked that a good way to accomplish this is to summarize the working group's actions and inputs, and incorporate them into the EIS. The Air Force and the EIS process will address those inputs. Lt. Col. Hutto also noted that another option is to provide written letters to the EIS process to ensure that specific concerns are included and addressed. He said that it is his hope that if this proposed working group convenes, it could provide meaningful input that is part of the EIS process.

Lt. Col. Hutto stated that the Air Force wants the stakeholders to help determine how to collect data on health and effects. The Air Force envisions working group meetings with technical experts to review data and determine how it compares to adverse health effects. Lt. Col. Hutto stated that the Air Force is trying to engage the community to help in this process; the Air Force wants to work with the concerns raised, understand those concerns, and take action on those concerns, and it is looking for input in terms of the best way to do that.

Agenda Item #3. Citizen Comments

Ms. Judge noted that she recognizes many of tonight's attendees from Washington, D.C., where she and her husband testified in front of the Ballistic Missile Defense Organization (BMDO). She stated that it has been a long and hard fight to get an EIS for PAVE PAWS. She also reported that in September 1999, while waiting for the Massachusetts Department of Public Health (MDPH) panel report to be released, BMDO announced, at an invitation-only meeting at MMR, its proposed plans to upgrade PAVE PAWS to incorporate it into the NMD deployment. Ms. Judge said that the timing of this announcement was a surprise, given that there were so many unanswered questions regarding the PAVE PAWS facility. She said that citizens were calling for the facility to be decommissioned, and that more than 20 years had passed without an appropriate study. Ms. Judge stated that all of the scientific studies conducted to date and the literature are indirect as they apply to PAVE PAWS' unique radiation.

Ms. Judge said that it was even more of a surprise that only BMDO was planning to consider the proposed upgrade to PAVE PAWS in its environmental review. She stated that when a comprehensive EIS was requested, it was expected that *all* environmental and community concerns, past, present, and future, would be included in a legal EIS.

Ms. Judge stated that construction for PAVE PAWS began before anyone really knew about it. She emphasized that at that time, 21 years ago, the residents fought hard for an EIS and got one only after going to court and filing a lawsuit. She commented that "unfortunately, the system failed us Cape Codders." Ms. Judge said that she believes that NEPA is supposed to be an early warning system to protect against unintended adverse environmental consequences. She remarked that despite the intense public opposition, the many warnings from scientists and elected officials, and all of the unresolved issues that are documented in the 1979 EIS, the decision was made to allow PAVE PAWS to begin operating. Also, PAVE PAWS began operating despite the fact that the Air Force and Raytheon, who built the machine, conceded that they had no idea about possible long-term chronic health effects. Ms. Judge emphasized that the PAVE PAWS issue pertains to the long-term, chronic health effects of pulse microwave radiation, about which little, if anything, is known.

Ms. Judge stated that PAVE PAWS was, and still is, the most powerful microwave radiator in the world, and is unique to any other microwave-emitting facility. She reiterated that most all of the research to date does not relate directly to PAVE PAWS. Ms. Judge acknowledged that it was a very different time 21 years ago – the Cold War was on and Cape Cod was not as heavily populated as it is today. She stated that decisions were made based on cost and convenience, and not with Cape Codders' best interests in mind. Ms. Judge remarked that the site was convenient for the Air Force, and it did not want

COMMENT NUMBER

to spend the time to conduct the necessary studies to determine the level of risk to which Cape Codders would be subjected. She said that the Air Force admitted in a document that there was risk, which would be addressed later. She stated that it is important to note that MMR, or Otis, as it was referred to 21 years ago, was not the Air Force's first choice. Westover Air Force Base was the Air Force's first choice, but was eliminated from consideration because of its proximity to a population center. Ms. Judge noted that Flat Rock Hill, where PAVE PAWS is located today, was not even the first choice on Otis. The first choice was rejected because the National Guard said it would interfere with its firing ranges.

Ms. Judge stated that both the Air Force Space Command and BMDO are proposing upgrades to PAVE PAWS. She also said that there actually are two separate EISs currently occurring. She pointed out that again there is a fight for an EIS, even though 21 years ago the citizens were told that PAVE PAWS would be a short-term use of the environment. She reiterated that 21 years ago the citizens were told that PAVE PAWS would operate continuously for 10 to 20 years, after which the land would be returned to its normal state, and that the facility would be removed. Ms. Judge remarked, "We were told anything to get this thing through because it was the Cold War."

Ms. Judge noted that the population of Cape Cod has exploded, and the known rates of disease on Cape Cod remain unexplained. She said that when the Air Force first announced that it would prepare a full EIS for PAVE PAWS, she was cautiously optimistic and decided to wait and see the details. Ms. Judge noted that on December 13, 1999, she saw a news release issued by Senator Kennedy's office to announce the EIS, and she had questions about the line that referred to the Air Force's "unprecedented step of forming a citizen/government group to look into any past and current health impacts of PAVE PAWS." She said that she immediately called Senator Kennedy's office for an explanation of how this citizen/government group fit into the EIS process. She noted that Senator Kennedy's aid explained that this working group would be separate and apart from the legal and binding EIS process, which immediately "raised a red flag" in her mind.

Ms. Judge reported that she sent numerous letters to the Secretary of the Air Force asking for clarification of this issue. She also publicly asked Lt. Col. Hutto, Capt. Sacra, and Ms. Larkin – most recently at the January 22, 2000 public meeting of the Coalition for the Decommission of PAVE PAWS – and was told that the information provided by Senator Kennedy's office was wrong. Ms. Judge noted that there was no mention of a working group at that meeting on January 22, 2000. She said that Maj. Ruscio had quoted a letter written by Mr. Tad McCall, Assistant Undersecretary of the Air Force, assuring that everything would be under the EIS, but there was no mention of a working group.

Ms. Judge said that she was surprised to receive a message from CBI on February 3, 2000, indicating that a planning meeting would be held just three days later. She commented that Air Force Space Command was coming to town and expected citizens to attend a planning meeting on only three days notice. She said that "most of us could not jump that fast," and the meeting was cancelled. Ms. Judge stated that soon after that, CBI again contacted her regarding a *proposed* working group, and asked her to provide all her concerns regarding PAVE PAWS as well as a list of phone numbers for individuals and groups who she felt were PAVE PAWS stakeholders. Ms. Judge reported that her question to CBI was, "Is this under the EIS?" Ms. Judge asked Mr. Fairman if CBI is contracted, as of tonight, under the EIS. Mr. Fairman replied that it is not. Ms. Judge then noted that when CBI contacted her for the second time, she asked when the first scoping meeting would be held.

Ms. Judge reported that the NOI was filed in the *Federal Register* on January 27, 2000, and there had been no announcement of a scoping meeting. She explained that a scoping meeting is the first step in the EIS process, and there was no mention of a working group in the NOI in the *Federal Register*. Ms. Judge stated that she was uncomfortable with how quickly the Air Force was trying to convene a working

psw010at_g6

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

group when there had not been any formal scoping meetings. She emphasized that scoping meetings are part of the *legal* EIS process and allow the public to comment on what should be covered in the EIS.

Ms. Judge noted that CBI has always referred to this as a *proposed* working group, and it originally said that tonight's meeting would be an opportunity for stakeholders to determine whether a working group was possible. Therefore, she was surprised when she read in the newspapers that this working group was established, and that tonight was going to be the kick-off meeting. Ms. Judge stated that she contacted Capt. Sacra and subsequently received an e-mail from her that said, "sorry we made a mistake." Ms. Judge noted that the media did not receive that correction, and has been reporting that this stakeholder group is already formed. She remarked that the public has not been informed as to what is really going on here. She emphasized that the EIS is supposed to be "for the people, by the people." Ms. Judge stated that Lt. Col. Hutto referred to the working group as another public voice in the EIS process, and she is very uncomfortable that a draft convening document has been developed without notification of the public. She remarked that many attendees here tonight have no idea what the draft convening report is or what it looks like; some of the local representatives do not have that report.

Ms. Judge stated that she objects to Mr. Fairman's characterization of the possible tasks of the working group because she believes it is limiting the scope to an exposure study. She said that she thinks that in addition to an exposure assessment, an actual health outcome study of the community must be included in the EIS. This also must be scoped accordingly, along with the other issues that will be raised in the *formal* public scoping meetings that have yet to be announced. Ms. Judge commented that it is disturbing to her that there have not been any public meetings to inform the public of both the Air Force EIS and the BMDO EIS, their proposed plans, and the two EIS processes.

Ms. Judge reported that in November 1999, Capt. Sacra publicly stated that after the BMDO supplement to the draft EIS was released, BMDO representatives would hold meetings on Cape Cod to answer the public's questions, and to receive public comments on the BMDO document. She stated that this has not yet occurred and this document has a 45-day public comment period that ends April 17, 2000 – only 20 days from now. Ms. Judge also stated that the Air Force, in its recent news release, explained that the BMDO document will be incorporated into the Air Force EIS. Ms. Judge remarked that this is a problem because the Coalition to Decommission PAVE PAWS is not requesting a mere incorporation of the findings of the BMDO supplement, but direct input from the public and the scoping meetings to the Air Force EIS. She stated that the Coalition is requesting that this public comment period be extended in order to address properly all the procedural challenges that have arisen.

Ms. Judge further noted that the Coalition to Decommission PAVE PAWS has requested that the MDPH withdraw the PAVE PAWS panel report, due to a blatant conflict of interest regarding the lead scientist, Ms. Linda Erdright. She explained that Ms. Erdright, the chairperson of the panel, prepared contracts for the ballistic missile supplement to the draft EIS, regarding the upgrades to PAVE PAWS. She noted that the two reports were released within two months of each other. Ms. Judge reported that the MDPH chose not to withdraw the report and the state ethics commission now is investigating this conflict. The Coalition also has requested a congressional investigation into this conflict of interest. Ms. Judge stated that the Air Force and BMDO are using these reports to move ahead with their plans to upgrade PAVE PAWS. She reported that the Coalition also requested that the investigation look into the upgrades that have occurred at PAVE PAWS over the years.

Ms. Judge reported that in November 1999, she filed a Freedom of Information Act request regarding the technicalities of the PAVE PAWS system, and has yet to receive answers. She noted that the two EIS processes are proceeding on the assumption of the 1979 data. Ms. Judge emphasized that she thinks it is inappropriate for this working group to proceed at this time. She stated that, according to Senator

COMMENT NUMBER

Kennedy's office, scoping meetings would not occur until late April/early May 2000, which is after the closing of the public comment period for the BMDO supplement.

Dr. Feigenbaum noted that Mr. and Mrs. Judge asked him to speak tonight, and explained that he is uncomfortable speaking here because he is not an activist who is associated with the PAVE PAWS issue. He stated that his interest in this issue is related to his concern to safeguard the orderly legal processes of protecting the environment. Dr. Feigenbaum said that he has participated in EIS scoping processes, and the EIS tool is an important source of environmental protection relative to activities at Otis's Camp Edwards. He noted that a federal consent decree resulted in much of the cleanup and many of the progressive activities now occurring here. He emphasized the importance of safeguarding this process.

Dr. Feigenbaum also reported that he has been very active in trying to get comprehensive health studies of Upper Cape Cod, considering the very high rates of cancer here. He emphasized that some of the highest rates of female lung cancer in the entire Commonwealth persistently have been found within a couple of miles of the center of Sandwich. He stated that his intention is to ensure that the legal processes of protecting the environment are safeguarded and not trivialized, including the undertaking of comprehensive health studies.

Dr. Feigenbaum stated that he participates on a number of committees. One of those committees comes under the Safe Drinking Water Act (SDWA), which is a very specific law. Another comes under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and another is related to the Agency for Toxic Substances and Disease Registry (ATSDR) and its mandate to study Superfund sites and surrounding areas.

Dr. Feigenbaum commented that he is distressed at the prospect of too much time and energy being spent in a process that he considers to be essentially "extra-legal," such as this. He said that he believes that this process is being used to subvert the legal processes of a real EIS. He noted that just over a week ago, he spoke with an aid from Senator Kennedy's office in Washington, D.C and asked the question, "What is the relationship between this and the EIS?" Dr. Feigenbaum reported that the response he received was, "Every time I talk to somebody from the Air Force I get a different answer." He further reported that the aid from Senator Kennedy's office said, "these Air Force people ought to be taken out in the back and spanked." He remarked that if this is what is being conveyed to the Senator, "just imagine what you are conveying to the rest of the public in terms of a disorderly process."

Dr. Feigenbaum commented that the processes of orderly environmental investigation and remedy sometimes require the intervention of organizations like CBI, in its role as facilitators. He remarked that a facilitator brings together people who have a common goal. For example, in the case of AFCEE's cleanup program, the community, the United States Environmental Protection Agency (EPA), the local selectmen, the public health agencies, and so forth, all share the common goal of cleaning up the plumes, despite their different points of view and particular interests. The effort to achieve this goal is being done under a legal process.

Dr. Feigenbaum remarked that with regard to AFCEE's cleanup program at MMR, he thinks that CBI has, for the most part, functioned in a positive and progressive way. He noted that CBI is operating under law, and is trying to make possible the achievement of those common goals. Dr. Feigenbaum further commented, however, that in the present circumstances, he believes that CBI is utilizing the good will that it has built in the community in order to subvert the real community processes with this working group. He stated that, in his opinion, a tremendous amount of confusion has been coming out of CBI with regard to this issue. He noted that CBI's convening document did not indicate that CBI is working for and being paid by the proponent, Air Force Space Command, and not by AFCEE. Dr. Feigenbaum explained that AFCEE is the environmental arm of the Air Force, but Space Command's interests are

COMMENT NUMBER

specific to the PAVE PAWS site. He commented that while he may agree or disagree, Air Force Space Command's interests are clear. Dr. Feigenbaum noted that it is his belief that CBI is presenting itself as a neutral mediating agency, while it actually is working for Space Command. He further stated that CBI did not disclose this fact in its documentation, but he became aware of this information when it was revealed to him through a piece of correspondence from Mr. Pat Field.

Dr. Feigenbaum noted that he requested a copy of the contract under which CBI is operating, and was told today that he would need to file a Freedom of Information Act request. He remarked that he finds this absurd, and pointed out that, after months, Ms. Judge still has not received a response to her Freedom of Information Act request.

Dr. Feigenbaum stated at the public meeting held by the MDPH there was discussion about the need for a comprehensive, retrospective health study. He noted that in correspondence to Mr. Field ten days ago, he expressed the need for a retrospective health study. Dr. Feigenbaum also stated that CBI's convening report indicates that Air Force Space Command does not *believe* that an EIS *permits* a look at the past. He remarked that investigations into the health of the community must consider past effects because people have present health problems due to past exposures. He noted that it appears that CBI accepted this comment at face value, without any documentation, just "Space Command believes," and that is sufficient for CBI.

Dr. Feigenbaum commented that the only mention of health effects in tonight's presentation from CBI, and in the agenda that was distributed, is that there will be an exposure assessment. He emphasized that this would not be a health test, but an exposure assessment, which means nothing unless a profile of the health of the community is reviewed. He explained that the issue is the relationship between various levels of exposure of microwave radiation and health effects. If one were to review the literature and the exposures, the conclusion would be that there are not any health effects. Dr. Feigenbaum emphasized that a scientific investigation, which is what the EIS would require, would call for the investigation of exposures and a review of a profile of various kinds of diseases in the area of the highest exposure. He noted that he thinks that such a scientific investigation should occur. Dr. Feigenbaum reiterated that there is no mention in tonight's agenda of a health study. He also referred to tonight's presentation and noted that during the discussion of "health," there was only mention of exposure and reviewing the literature – and that is not a health study.

Dr. Feigenbaum further commented that anyone who believes that an EIS is not allowed to investigate the past should ask the Massachusetts Army National Guard (MA ARNG). He explained that the MA ARNG tried to conduct an EIS here without considering the past effects of artillery practice on the groundwater, and the EPA "stopped them dead in their tracks." Dr. Feigenbaum stated that not only are the environmental regulatory agencies not part of this process, but also legal cover is not a part of this process. He said that until those things occur, he thinks that the leaders at this meeting are correct in saying, "we are not going to participate."

Agenda Item #4. Participant Discussion

Mr. Fairman noted that Mr. Judge made a proposal that elected officials have an opportunity to speak first. Mr. Judge explained that this is standard procedure. Mr. Fairman asked if anyone objected to this approach, and there were no objections. However, a member of the audience noted that the length of comments made by the elected representatives also should be limited.

Rep. Caffyn commented that the issue of health should not be rushed because it is too critically important to everyone. She noted that for at least 18 years there has been a high level of cancer on Cape Cod. She also said that it is interesting that this past year she herself was diagnosed as having a type of

COMMENT NUMBER

cancer that is caused only by exposure to radiation. Rep. Caffyn stated that in her quest to find the cause of her own cancer, she believes that all people have an opportunity to determine whether anything that is emanating from PAVE PAWS is diminishing their health and could eventually cause a cell change to produce tumors.

Rep. Caffyn noted that there are many questions to be answered. She mentioned a reference in the convening document that it might not be possible to incorporate legally a retrospective assessment of health issues. She also noted that the CBI convening report indicates that some people *think* there might be no public health issues, and she questioned the reasoning of those people. Rep. Caffyn stated that as far as she knows, there is no information about the effects of PAVE PAWS. She also said that the convening document refers to "many stakeholders" and "a number of military," and she would like to have known exactly who they were. Rep. Caffyn stated that, in her opinion, the reference in the CBI convening report that she mentioned is misleading.

Rep. Caffyn emphasized the importance of taking the necessary time, and she asked the Air Force to commit to an extension of the EIS. She remarked that it is ridiculous to begin the NOI on January 27, 2000, and then ask for a final report by April 17, 2000. Rep. Caffyn reiterated that this issue is too important to rush.

Rep. Provost commented that although this is a federal facility and process, and she is a state legislator, she also is a concerned resident of Sandwich. She reported that after the last MDPH meeting, she and Senator Murray mailed a letter to federal representatives Ted Kennedy, John Kerry, and William Delahunt, because without their influence, it will be difficult to get the necessary studies done. Rep. Provost stated that she and Senator Murray have asked that the Air Force begin immediate background monitoring as a sign of good faith to the communities, since it has not been done for 21 years.

Rep. Provost reported that in response to the request for background monitoring for radiation, a letter was received from Mr. McCall, the Assistant Undersecretary of the Air Force, which indicated that additional continuing radiation monitoring is not required. She noted that the draft convening report also indicates that when the original EIS was done in 1970, the community had asked for background monitoring of the facility and was told that additional continuing radiation monitoring is not required. Rep. Provost said that in her opinion, one of the problems with the federal EPA NEPA process is that while citizens can make recommendations during the scoping process, in terms of what should be included in the EIS process, the Air Force then can determine which of those recommendations it will use. She announced that, therefore, she will write to Secretary Robert Durand and request that there be a concurrent Massachusetts Environmental Policy Act (MEPA) process along with the NEPA process. This would provide her, as a state legislator, input into a process from in which she currently is excluded.

Rep. Provost then questioned the usefulness of the proposed working group. She also questioned the short-term usefulness of conducting health studies, health summaries, and health assessments, without the 21 years of necessary background information, in terms of making a decision on the upgrades to PAVE PAWS. In addition, she requested an extension to the comment period, given that the NMD draft EIS will be incorporated into the service life extension program for PAVE PAWS.

Mr. Musiol, representing State Representative Terry Murray, commented that throughout the past four years that he has served as the Senator's ex-officio advisor with the military and the MMR, he has become quite aware of its history. He stated that when Rep. Murray first was contacted about PAVE PAWS, the correspondence was less than satisfactory; in Rep. Murray's opinion, the letter she received from Mr. McCall was insulting. Mr. Musiol stated that the letter said, "all we really had to do at the time, or were required to do, was file a real estate permit..." Mr. Musiol commented that although that might have been enough back then, today it is not enough.

psw010at_g8

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Mr. Musiol further stated that prior to being contacted by the public, he knew nothing about the BMDO EIS. He did not know it was available, did not know there was a comment period, and did not know that the comment period expires in 18 or 19 days. On behalf of Senator Murray, Mr. Musiol also asked that the BMDO comment period be extended. He stated that the communication issue is essential, and added, "it is not everything, it is the only thing." He stated that residents require communication from those who come to Cape Cod and participate and live in this community. He said that this also has been less than satisfactory, in terms of the stakeholder working group. Mr. Musiol noted that information from the local newspapers indicated that the working group had already been established and was having its first meeting, when, in fact, the community did not know this group actually was going forward.

Mr. Musiol noted that Mr. Fairman indicated that the work of this working group would be *covered* in the EIS, and Mr. Musiol requested that this work be *addressed* in the EIS. He said that he would hate to see the work of the working group merely noted in the EIS, and would rather see action taken on the working group's recommendations. Mr. Musiol noted that he will be available after the meeting if members of the public have any questions or concerns regarding this issue.

Mr. Coggeshall introduced himself as a member of the Senior Management Board (SMB) and the Bourne Board of Selectmen. He indicated that he was impressed that such a large group of people, with many diverse opinions, was gathered together here tonight. He also noted that many of the people here tonight attend many different evening meetings. Mr. Coggeshall stated that there is value in "all of us getting together and working together," and this meeting should not be summarily dismissed because it does not meet some technical issue that should be addressed another way.

Mr. Coggeshall stated that, effectively, there have been no meaningful studies conducted in terms of the effects of RFR. He noted that he spent two hours at the PAVE PAWS facility last week, asking numerous questions, many of which could not be answered. Mr. Coggeshall emphasized that technical answers need to be provided, in terms of what is sent out from the facility, the effect of the radiation as the beam is scanned, and the effect on those that may be in front of the radiation beam, or who may be affected by it. Mr. Coggeshall said that bibliographies must exist that include studies on the effects of RFR. He noted that in 1979 he was a member of a group that conducted this type of assessment, which probably is archaic compared to what is available today.

Mr. Coggeshall emphasized that the public deserves much more information than what has been provided. He said that in his opinion, technologically and scientifically that information could and should be made available.

Mr. Judge stated that he too is a member of the SMB, and a Sandwich Selectman. He said that he shares Mr. Coggeshall's concerns about the effects of PAVE PAWS on the citizens. He then referred to Mr. Coggeshall's interest in reviewing past studies conducted on PAVE PAWS, and how they related to the Cape Cod residents, and stated that there never has been a study of PAVE PAWS's unique radiation. Mr. Judge stated that the main reason he became involved in this issue is because he had asked the Air Force for information on how to eliminate PAVE PAWS from his list of possible causes of cancer on Cape Cod. At that time, the Air Force indicated that it did not have that information or any studies related to PAVE PAWS.

Mr. Judge stated that he is very disappointed that this meeting is occurring tonight. He further stated that he is disappointed that citizens have been invited to this meeting to be exposed to what they believe is new information, and to provide input into what they believe is a legal and binding process. Mr. Judge remarked that tonight's meeting is not part of the legal and binding process.

COMMENT NUMBER

Mr. Judge asked Capt. Sacra if this is the kick-off scoping meeting for the EIS. Capt. Sacra replied that it is not, and stated that it is part of the scoping process for the EIS. Mr. Judge disagreed and stated that "part of" is not "official." He said that he thinks that "part of" means that the Air Force takes information and questions from people and decides, in Lt. Col. Hutto's words, what is "relevant information," and submits that into the EIS. Mr. Judge stated that this is not exactly what he has in mind when he thinks of an EIS. He explained that he believes that an EIS was developed "for the people, by the people," as a "checks-and-balances for a person to be developing a technology, or installing something in a neighborhood."

Mr. Judge reiterated that tonight's meeting is not part of the legal EIS process. He also said that CBI is not contracted under the EIS process, and this meeting is not part of the official scoping process. He said that this meeting was designed to take concerns from those in attendance, decide what is relevant, and then interject them into the EIS process later. He emphasized that the EIS process was set up so that citizens could provide direct input, receive responses to that input, and that is not happening. Mr. Judge stated that he is here tonight to let everyone know that he thinks this process is subverting the process of the EIS. He questioned why this meeting is not considered the first scoping meeting, if the Air Force is indicating that this is "part of" the scoping. He noted that the first step in an EIS is a scoping meeting, and it has been two months since the NOI, and still there has not been a scoping meeting, although the Air Force did manage to organize this meeting tonight. Mr. Judge stated that he was told by the Air Force that it did not have the time to develop a scoping meeting.

Mr. Judge stated that the message to send tonight to BMDO and the Air Force Space Command is that the citizens expect and deserve a full EIS process, starting with scoping meetings and not community events.

Mr. Fairman noted that many questions have been raised and he thinks it will be useful for the Air Force representatives to respond to some of those questions. He proposed that three more people have an opportunity to speak, after which he will invite Lt. Col. Hutto and others from the Air Force to respond to questions that have been raised.

Ms. Walker, the president of Action for Nuclear Disarmament (AND), stated that she has been working on the PAVE PAWS issue since approximately 1985. She reported that she has received correspondence from the Air Force, which said, "don't worry about it." She also noted that she has communicated with Senator Kerry, Senator Kennedy, Congressman Gary Studds, and Congressman Delahunt.

Ms. Walker stated that she also agrees that there is a need to conduct an exposure study and a health study that takes into account the past, present, and future. She also requested an EIS extension on the ballistic missile defense system. She noted that although she gave testimony to the BMDO draft EIS and received it, she has not yet received a supplement. Ms. Walker questioned why she had not received the supplement, given that she gave comment on the original process. She said that she needs the time to receive and review the supplement, and to make comments.

Ms. Walker then stated that she does not believe that PAVE PAWS should be upgraded. She said that the nuclear arms race careens back and forth from offensive weapons to defensive weapons, and it is her opinion that "when you increase your defense, you make your enemies feel insecure." She explained that she thinks our enemies will increase their numbers of nuclear weapons and will be able to overcome any ballistic missile defense system here, and in turn, "we will increase our nuclear weapons." Ms. Walker emphasized that she believes this will not make us safer, but will put us at risk.

Ms. Walker stated that although she is concerned about the exposure data, she is more concerned that an escalated arms race will rob our descendants of good health, education, food, and housing, and will put

	COMMENT NUMBER

the entire survival of the Earth at risk. She added that, "We are on good economic grounds, and should continue to disarm and make ourselves safer in a world that people are taking care of."

A member of the audience asked whether this "attack" on international relations and ballistic missiles pertains to the question of whether there is danger to Cape Cod residents, which is the question being addressed tonight. Mr. Fairman replied that the proposed questions for this group are the rationale for the proposed working group, the possible goals for the group, and what it might do as tasks. One of the proposed goals for the group is to discuss the possible upgrade of the PAVE PAWS facility. In that respect, the question of whether and how the facility should be upgraded is an appropriate question. Mr. Fairman remarked that his main goal is to ensure that there is a range of views that are related to the issues at stake.

Mr. Vysstotsky said that his background is in technology, and he does not know much about law or regulatory processes. He noted that he designed a large phased array radar before PAVE PAWS was designed. Also, he was a member of the engineering panel of the National Research Council that reviewed the engineering design of PAVE PAWS; however, he was not a member of the biomedical panel, which reviewed the possible biologic effects. Mr. Vysstotsky remarked that contrary to what some have said this evening, he is glad that this meeting is being held tonight. He noted that in 1979 there were many questions that were not answered, and in the year 2000, many of those questions still have not been answered. He said that he also has many questions and does not care about the deadlines. Mr. Vysstotsky stated that he views this meeting as an opportunity to break down the hostility and mistrust that has developed over the last 20 years, and to say "we all have the same concerns."

Mr. Vysstotsky said that he first visited Cape Cod in 1935, and he loves Cape Cod. He noted that he has worked with the government, and "got out of uniform before Lt. Col. Hutto was born." He said that he has worked with BMDO and with the Air Force, and he cares about both sides of this issue. Mr. Vysstotsky said that although he does not know what needs to be done or what processes need to be used to get past the legal and regulatory obstacles, he is glad that this meeting is being held tonight to begin this process.

Mr. Hugus commented that he does think that it is legitimate to talk about the mission of the PAVE PAWS facility. He stated that if this were part of the legal EIS scoping process, he would be inquiring, for example, about the risk of the Town of Sandwich being bombed because the PAVE PAWS facility even exists. He remarked that he thinks that some opponent of the United States certainly would want to eliminate this PAVE PAWS facility immediately.

Mr. Hugus stated that he thinks tonight's meeting is not a legitimate process, and is not part of the EIS process. He said that he thinks this is a false procedure, undertaken by the Air Force – of, by, and for the Air Force. He said that although this mimics the EIS process, it is not it. Mr. Hugus appealed to the citizens in attendance not to participate as if this meeting were legitimate because, "it is not, this is a fraudulent meeting." Mr. Hugus indicated that he would be leaving now because he does not want to waste any more of his time. He then commented that he thinks that the scientist who just spoke is not aware that citizens here sometimes attend two or three meetings a week about the military base. He added, "If we go to meetings, we want to make sure that it is a legal process taking place."

Mr. Fairman proposed that the Air Force respond to the questions that were raised about the nature of what is proposed for this working group. He also clarified that one goal of tonight's meeting is to determine whether there is a way to proceed with a conversation that would meet the interests of the stakeholders present. He explained that many stakeholders are concerned about this being part of a legally valid process, while many stakeholders also are interested in addressing, together, the questions of what are the exposures, what are the health effects, and what can be found out together.

	COMMENT NUMBER

A member of the audience suggested that other people be heard because nobody with opposing views has had the opportunity to speak. Mr. Fairman agreed that this is a fair comment, and proposed that the Air Force be provided the opportunity to respond, after which, people who have not yet had the opportunity to speak will be invited to do so.

Mr. Vysstotsky suggested that there be a five-minute break. The meeting adjourned for five minutes, and reconvened at 8:40 p.m.

Lt. Col. Hutto clarified that BMDO is not part of the United States Air Force, and noted that the Air Force will provide BMDO with the comments made tonight. He encouraged anyone interested in receiving BMDO's telephone number to call the Air Force Space Command for that information. Lt. Col. Hutto reiterated that in the EIS the Air Force will address the concerns and issues raised by the stakeholder working group, if it convenes. He apologized if he misspoke in that regard. He then introduced Maj. Ruscio, from the Joint Program Office (JPO), to discuss the health and studies issues, and Ms. Jane Hunter-Ross, from Air Force Space Command Environmental, to provide feedback on the EIS process.

Ms. Hunter-Ross stated that she works for the Air Force at Air Force Space Command in Colorado Springs. She concurred that the NOI was released on January 27, 2000, and stated that there is no requirement that a scoping meeting must be the first step after the NOI is published. Ms. Hunter-Ross noted that the first step is to begin the scoping process, which is occurring currently. She explained that the scoping process is the legal and binding process where the public can comment and provide input into the process; the Air Force incorporates that input into the administrative record. She further explained that as this process proceeds, comments are incorporated into the document, or they are responded to – that is how the process works.

Ms. Hunter-Ross stated that the scoping process is a broad and flexible process, on which there are no stringent requirements. She stated that the Air Force can be open and creative, which is what it is attempting to do with the idea of a working group. The intent of the working group is to provide a forum where people can bring ideas to the Air Force, which can incorporate those ideas into the entire EIS. Ms. Hunter-Ross reported that the first true document that comes out of an EIS is a description of proposed action and alternatives. The Air Force knows that its proposed action is the modernization action at the PAVE PAWS sites. Ms. Hunter-Ross noted that the Air Force does not want to try to determine the alternatives unilaterally. She said that another goal for the working group is to get the public together to become part of that process and to have direct input into the initial stages of the NEPA process. She noted that it is early in the process and there is no limit on when the Air Force needs to complete the document of proposed action and alternatives, when it needs to have a scoping meeting, or when it needs to finalize anything. Ms. Hunter-Ross stated that the Air Force hopes that part of the decision-making process and public involvement, which NEPA is all about, can be accomplished using the working group process, if the group convenes.

Ms. Hunter-Ross stated that a scoping meeting is a valuable part of the NEPA process, and is the final formal culmination of the true scoping process. She said that the scoping meeting is designed to be one-sided, and she explained that the public "comes in, has five minutes to comment, and they sit down." She noted that there is no dialogue involved. Ms. Hunter-Ross stated that the working group allows the Air Force the opportunity to have dialogue with the community. Another reason for convening this working group is so that the Air Force could have a forum for dialogue – nothing one-sided, but pure involvement from the community.

psw010at_g10

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Lt. Col. Hutto added that the Air Force's concept of the working group is not to subvert or take anything away from EIS, but to add to it.

Maj. Ruscio, the health advisor at the JPO, acknowledged that there has been an emphasis on the exposure assessment, and suggested that everyone keep in mind that the exposure assessment is the first part of the process. He noted that the Air Force is open to reviewing that data in relationship to adverse health effects and concerns with the community. He remarked that this could be done in conjunction with bringing in a radio frequency (RF) expert and maybe and epidemiologist, who would be involved from the beginning, to help ensure that those issues are addressed. Maj. Ruscio agreed with Dr. Feigenbaum that this information should be reviewed in relationship to adverse health effects, not just in relationship to exposure assessment or survey characterization.

Mr. Patrick, a Falmouth Selectman, noted that he has experience working with stakeholder groups. He said that the Department of Telecommunications and Energy (DTE) regularly forms stakeholder groups and he thinks it is important to know who the stakeholders will be. He remarked that all too often stakeholders turn out to be people who have a definite conflict of interest. Mr. Patrick stated that in this case he thinks stakeholders would be in conflict if they work at the base, or if they are Air Force or military personnel. He said that he thinks that the public should be able to choose, or at least have a part in determining who has legal standing in this process as stakeholders. Mr. Patrick commented that he thinks stakeholder groups are a "code for compromise," and if there is one thing that cannot be compromised, it is our health and the health of our children.

Mr. Schlesinger, a Sandwich citizen, added "we cannot compromise with our health, your health, my health, our public health," and said that he is miffed that this meeting is taking place. He noted that he had thought that citizens could have input into the scoping meetings, and could request to have a meeting like tonight's. In this way, the citizens could have input into who would represent the meeting, who would host the meeting, and who would pay for the process. Mr. Schlesinger stated that in his opinion, this process is one-sided, and he is very disappointed.

Mr. Schlesinger noted that there has been mention of *two* EISs, and of *one* scoping process, as well as mention about how this meeting and the input provided tonight is part of the scoping process and therefore, would be part of a *legal* process. He then read from page 3 of the draft convening report, "Please note that this assessment is not a legal document or technical report." He questioned how this is part of the legal process if the assessment is not a legal document. Mr. Schlesinger again read from page 3, "Nor is it an exhaustive study of all those individuals and organizations with a stake in the PAVE PAWS facility and its operation. There may be other important stakeholders in and around the Cape Cod area, the Commonwealth and North America who have different interests, concerns, and view points who were not interviewed. Thus, the assessment is limited by the information gathered in the interviews we conducted and the interpretation of that information by CBI. All errors, omissions, and factual inaccuracies are the sole responsibility of CBI." Mr. Schlesinger commented that he finds this to be confusing, and he does not understand it. He remarked that in his opinion, this meeting is "the cart before the horse."

Mr. Fairman stated that CBI's task was to develop, by interviewing those who were identified as potential stakeholders in PAVE PAWS issues, a preliminary assessment of key concerns about this proposed working group, as well as possible tasks and goals for the working group. He noted that CBI identified the relationship between the proposed working group and the EIS process as an issue important to many stakeholders. He remarked that it is clear that there are stakeholders who feel strongly that, because the proposed working group would come under the scoping process, they would not participate in such a group until this process is established in a formal and legally clarified way. He further stated that some of those stakeholders even have issues with participating in this meeting because

COMMENT NUMBER

it is not an official scoping meeting. Mr. Fairman acknowledged that those are legitimate concerns. He suggested that the attendees attempt to determine how to establish a process that would satisfy the stakeholders who are concerned about the inclusion of particular issues in the EIS, and the stakeholders who want to move forward on the study of health issues, including exposures and possible health effects. Mr. Fairman stated that the Air Force has indicated that it is open to, and interested in, determining a way to meet those concerns. He said that it is not yet clear exactly how that can be accomplished, and he suggested further discussion about how to satisfy those concerns.

Mr. Cole, a representative of the Friends of the Massachusetts Military Reservation (FMMR) and Patriots Advocating Camp Edwards' Restoration and Survival (PACERS), noted that the chairpersons of those organizations were interviewed, but were unable to attend this evening's meeting. He noted that he himself was not interviewed; however, after doing some reading in preparation for this meeting, had he been interviewed, he would have raised questions about whether there were grounds for thinking that serious health effects were caused by PAVE PAWS. Mr. Cole noted that he is not an expert on pulse radar, but he has found some literature that directly addresses this issue. He said that there have been many different studies of pulsed radar, including studies of various frequencies and powers of non-ionizing radar, which does not cause cell changes.

Mr. Cole stated that, in his opinion, this process is starting from a premise that there is a great deal of evidence of several different kinds of cancers on Cape Cod that are somehow related to the environment on Cape Cod. He said that he thinks that it ultimately must be determined that the kinds of studies described tonight, such as geographic correlation studies or cluster studies, are not regarded by the scientific community as establishing causality. He noted that there is a large population on Cape Cod who have worked elsewhere their entire lives and then retire here, bringing with them past exposures.

Mr. Cole also noted that less than half of the cancers in the country can be explained by attribution to known causes. He mentioned President Jimmy Carter, who lost a father and three siblings to pancreatic cancer, and said that the disease runs in the family. He commented that while there may be interactions between a proclivity and cancer-causing agents in the environment, he thinks that this process is starting from an assumption that there is ample information, and there is not. Mr. Cole stated that he read about some studies on Cape Cod where individuals were not even interviewed; rather cases were tabulated and locations were plotted on a map. He noted that such studies do not take into consideration information such as where the subjects lived all their lives, where they worked, what they might have been exposed to, or their families' medical histories. Mr. Cole reported that the Silent Spring Institute indicated that in the second phase of its breast cancer study, it wanted to spend 35 to 40 minutes with cancer patients or their survivors in order to obtain that kind of background information. He stated that causality cannot be established with some of the studies.

Mr. Cole acknowledged that he does not know what the legal requirements are in this regard. He stated, however, that the Friends of the MMR and the members of PACERS are willing to play by the groundrules that have been proposed, in the spirit of Mr. Vysstotsky's statement that, "there are unanswered questions – maybe there is a way to design a study to answer them." He mentioned the Framingham heart study, which is a longitudinal study that goes on forever, and noted that it might cost less to move the base than to fund that kind of a study. Mr. Cole remarked that he does not know how open-ended the commitment to the health study is, but his impression is that it would be enormously expensive.

Ms. Teegan introduced herself as a Manomet resident, an attorney, a former selectman and a former state representative. She said that she is not familiar, legally, with the term stakeholder, and therefore, will not claim to be one. Ms. Teegan stated that she is a citizen with a stake in, among other things, national defense. She also noted that she is unfamiliar with this debate, and suggested that these types of

COMMENT NUMBER

meetings should begin with background information of the issue, which in this case, is PAVE PAWS. Ms. Teegan remarked that she thinks that the average citizen needs an introduction to this issue in terms of the pros and cons of missile defense. For example, while China is threatening to drop a missile on Los Angeles may not be relevant to the Town of Sandwich, it is important for the average citizen to have an idea of that and to understand where PAVE PAWS fits in. Ms. Teegan stated that although she does not understand where PAVE PAWS fits in, she thinks that there must be a rational explanation for the facility, and this needs to be explained.

Ms. Teegan stated that she is a citizen with a stake in the fact that she would like to see her country defended in the healthiest possible way. She also noted that someone mentioned a risk analysis, and she believes that this is a risk/reward situation. Ms. Teegan stated that she thinks that the PAVE PAWS facility might be crucial, and if it is, there will always be tradeoffs; however, background information is needed to give "the American citizen a fighting chance."

Mr. Appleton, a member of PACERS, stated that he too is a citizen stakeholder. He remarked that the first two words that come to mind are *sincerity* and *integrity*, and he questions the truth in the earlier statement that "we all want the same thing." Mr. Appleton also referred to the comment that "we are putting the cart before the horse," and remarked that the cart already was put before the horse by the group whose purpose is to decommission PAVE PAWS. He noted that the Coalition to Decommission PAVE PAWS already has decided that it wants – to decommission PAVE PAWS – and therefore he questions all the uproar about studies and health given that the group already has decided that PAVE PAWS is no good. Mr. Appleton again remarked that the Coalition to Decommission PAVE PAWS already has decided that it wants to eliminate PAVE PAWS, and yet that group is going through the motions of delay, and it has a strategy, and it is so disappointed that some people felt the need to walk out of this meeting tonight. He added, "I can just see it in the *Cape Cod Times* tomorrow." Mr. Fairman reminded Mr. Appleton to remain focused on the issues and not on particular groups.

Mr. Appleton emphasized that nothing has been said about the need for the PAVE PAWS facility. He stated that it is his understanding that PAVE PAWS radar is the United States' only radar protection from incoming missiles, planes, or rockets from the East, and some people already have decided that the facility should be decommissioned. He remarked, "this is ridiculous." Mr. Appleton said that he wishes that the military would stand up and explain the need for this facility. He also stated that if information about facts and figures, in terms of the type of frequency, the ionization-type of radar, and so forth, is being withheld or is unknown, then the Air Force is "in tough shape." He remarked that he does not believe that this is the case and reminded those in attendance that, in reality, there are enemies of this country who are willing to bomb us.

Agenda Item #5. Possible Tasks for the Working Group

Mr. Fairman proposed that the attendees discuss possible goals for the working group. Mr. Judge interjected that because the working group has not been established, the goals for the group should be done under a legal and binding process, and under no other process. Mr. Judge stated that he would be interested in hearing about every goal for the working group, but only when they are put under the legal and binding process. He emphasized that until that is done, and until people have an opportunity to decide what they want in the EIS, arranging any type of goals tonight is.... Mr. Fairman clarified that one thing the people in attendance can do tonight is address the question "What would the right next step be to address the concerns that have been raised?" He then proposed as a next step a formal scoping meeting.

Ms. Judge asked for an extension of the comment period on the ballistic missile defense supplement to the draft EIS that currently ends April 17, 2000. She reiterated that the Air Force has stated that the

COMMENT NUMBER

findings of the final EIS will be incorporated into the Air Force EIS. She again implored that the comment period be extended so that the procedural challenges and the conflict of interest situation can be settled.

Ms. Hunter-Ross emphasized that she does not want Mr. and Mrs. Judge to leave without providing the Air Force the opportunity to help them make this happen. She stated that the Air Force cannot extend the BMDO comment period, but it probably can help individuals contact the appropriate people to whom these concerns and comments should be expressed.

Mr. Judge noted that Capt. Sacra, who now represents the Air Force, was representing BMDO, so there are people at this meeting who have direct connections with BMDO. He asked if there were any current BMDO members in attendance. Mr. Crate identified himself as a BMDO member. Mr. Judge asked Mr. Crate to extend the comment period. Mr. Crate replied that he does not have the authority to do that; however, he agreed to convey this message to the appropriate people at BMDO.

Ms. Judge referred to an article in the *Upper Cape Codder*, from November 4, 2000, which was approximately the same time that she and her husband went to Washington, D.C. to comment on the programmatic EIS. She said that the gist of the article was that everyone should settle down, because there will be plenty of time before the supplement is done." Ms. Judge quoted Capt. Sacra in the November 4, 2000 article as saying "it is important to note it will be a draft EIS. That means it is subject to change. One of my main objectives is to bring people from the community into the process. We are at the ground level of building a community involvement program." She further quoted from the article, "After they publish their EIS at the end of December there will be a 45-day public comment period. At that time we will invite people from the missile defense program to speak and answer questions." Ms. Judge stated that there have been no public meetings on either EIS; instead the citizens have been educating each other and their legislators.

Mr. Fairman stated that two issues that have been raised are extending the BMDO comment period, and holding meetings on Cape Cod where the community can provide input. He also noted that a BMDO representative, Mr. Crate, indicated that although he does not have the authority to make a commitment on behalf of BMDO, he will relay these comments to the appropriate people at BMDO. Mr. Fairman asked Mr. Crate what people could expect in terms of a timeframe for a response. Mr. Crate replied that he expects that a response would be provided within two to three weeks.

Ms. Bough introduced herself as a Marstons Mills resident and concerned citizen. She commented that although she thinks that the Air Force representatives genuinely want to help and are doing their best, she does not trust them, and this is why the process cannot go forward. Ms. Bough noted that she likes that the military knows where the missiles and satellites are, and PAVE PAWS provides that information. She quoted a statement made by a teacher, "in our ignorance, sometimes we cause more harm than anything." Ms. Bough agreed that the Air Force's focus should be on defense; however, what the Air Force does not focus on, and what she and the local residents do focus on, are the effects of PAVE PAWS. Ms. Bough stated that after 21 years, there have been no studies and there is no information about PAVE PAWS. She said that she has friends who have lived on Cape Cod for more than 30 years, and too many of them are sick. She remarked that this is like saying that the operation was a success but the patient died. She questioned the need for a defense system if there is nobody here to defend.

Ms. Bough questioned how the citizens could regain their trust in what the military says it will do. She referred to Mr. McCall's letter that indicated, "if it is not legal, we are not doing it," and said that she finds this insulting. She added that she resents the remarks made in that letter, and she expects more from someone who is trying to protect her.

psw010at_g12

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Lt. Col. Hutto stated that the purpose of the proposed working group is not to replace the EIS. He explained that his intention is to determine a way to educate the public in terms of what Air Force Space Command does and why it does it, and he is looking for a forum to accomplish that. He remarked that while it would be great if that forum also supports the EIS, the bottom line is that there are many questions, and a forum to answer those questions is needed.

Ms. Judge asked Lt. Col. Hutto to answer her Freedom of Information Act request, and questioned why she still has not had a response after four months. Mr. Fairman acknowledge Ms. Judge's comment, but suggested that the meeting continue because it is important that people leave tonight with a sense of what is needed to move forward.

Mr. Vysstotsky stated that since 1965 he periodically has worked with the government of the United States on problems of ballistic missile defense. He said that he believes that if BMDO wants to, it can develop an unclassified presentation that explains why PAVE PAWS is needed on Cape Cod, and explains the role of PAVE PAWS in ballistic missile defense. He said that he would like to see that done, and acknowledged that generating such a statement could not be done overnight because of the many classified issues involved.

Mr. Fairman noted that there has been a suggestion to extend the BMDO comment period with public meetings on Cape Cod, and a suggestion that BMDO generate a statement about the possible future role of this PAVE PAWS facility and the NMD system.

A member of the audience commended those who organized tonight's meeting. He also noted that EISs were being addressed back in 1950, and he has worked for 36 years with the Natural Resource Conservation Service. The audience member then asked if the EIS has begun officially. Lt. Col. Hutto replied that it has, as of January 27, 2000. The audience member stated that in addition to factual meetings before an EIS is started, there may be a need for meetings before initiating a working group. He said that this must be done in order to "work with those who are trying to work the studies." The audience member further stated that he thinks tonight's meeting is necessary. He stated that PAVE PAWS is an important function of the United States' defense system, as are the MMR and the 102nd Fighter Wing at Otis Air Force Base. He remarked, that in his opinion, they are intricate factors in the United States' "insurance policy" for children to be able to receive their education. He reiterated that factual meetings, similar to tonight's meeting, are necessary before a working group can be initiated.

Mr. Fairman again posed the question of the relationship of the EIS process and a possible working group, and a set of tasks for that group.

Mr. Kleecamp remarked that the purpose of the concerned citizens here tonight is not necessarily to decommission PAVE PAWS. Rather, the question is why PAVE PAWS is needed here. He said that although measurement studies can be done accurately from a technical standpoint, the medical studies are inaccurate. He stated that because answers regarding the effects of PAVE PAWS are not likely to be provided within the next two to twenty years, there may be more prudent decisions to make. Mr. Kleecamp suggested that before getting engrossed in these detailed questions, the citizens should ask who decides who will interpret the data. He questioned whether the working group would have a majority-vote rule in terms of interpreting the conclusions or whether the biggest stakeholder, BMDO, could simply thank the working group for its input, but then do things its own way.

Mr. Fairman asked if it is correct that Mr. Kleecamp is suggesting that there be clarification in terms of how the exposure data would be interpreted, and how decisions would be made in response to that data. Mr. Kleecamp indicated that this is correct.

COMMENT NUMBER

Mr. Muhlebad suggested that there is a need for a glossary of terms to clarify, for example, the definition of "scoping meeting," which at this point is unclear.

Mr. Perkins, a Mashpee resident, asked who would chair the working group if it were formed. He commented that it is his understanding that the BMDO holds the responsibility for the EIS, and the working group would be a mechanism to help the Air Force do the EIS, while forming an interface with the community.

Mr. Fairman stated that logistical questions for this group would be: who would the members of the working group be, and what would the groundrules be. He reported that CBI, based on input that it received from people during the convening process, offered initial thoughts on those two questions in the text of the draft convening report. Those two questions certainly need to be further discussed.

Mr. Judge asked if the list of suggestions Mr. Fairman is generating will be presented to the Air Force, from the proposed working group. He reiterated that this working group is not part of a legal and binding process. Mr. Fairman asked Mr. Judge for a suggestion in terms of how to make this working group part of the process. Mr. Judge stated that the next meeting held should be a scoping meeting for the EIS. Once the scoping meeting has been established this community working group can be formed and provide comment. Mr. Judge remarked that he expects such a scoping meeting to be held sooner than later. He referred to Mr. Spears statement that in two to three weeks BMDO will respond to the extension request; Mr. Judge noted that only 20 days remain in the 45-day comment period.

Ms. Judge emphasized that the conflict of interest issue with Ms. Erdright must be resolved. She stated that the supplement to the draft EIS for the NMD deployment is a great example of what the Air Force EIS should not be. She explained that the draft EIS for the NMD deployment basically says that the measurements are so far below the existing safety standards that there is no problem – the summary gives PAVE PAWS a clean bill of health.

Mr. Fairman asked if it is correct that Ms. Judge's main concerns are the conflict of interest, and the substance of the findings themselves. Ms. Judge remarked that the findings are critical to this group because they are being incorporated. She quoted the Air Force Space Command's three-page news release as saying, "the findings of the final EIS will be incorporated into the Air Force's EIS." Ms. Judge stated that BMDO cannot proceed with upgrading its equipment and putting it at PAVE PAWS, until it gets permission from the Air Force EIS. In the meantime, the Air Force will incorporate the findings. Ms. Judge emphasized that she is not happy with the supplement.

Mr. Fairman summarized Ms. Judge's suggestion that there be additional public comment on the supplement to the EIS.

Ms. Larkin remarked that there is a lot of confusion about the two EISs, and suggested that an explanation be provided of the BMDO EIS, the supplement, and how to receive a copy of it and comment on it.

Ms. Hunter-Ross stated that she has been involved with both the deployment EIS and the Air Force EIS. The deployment EIS is the programmatic EIS that BMDO is preparing, which will address all of the elements of the NMD system. The upgraded early-warning radar (UEWR) is a single element of the NMD. Ms. Hunter-Ross stated that the NMD is proposing to use the PAVE PAWS radar as the platform for the UEWR system. BMDO, which is a DoD organization that encompasses all the services, is preparing the deployment EIS. Ms. Hunter-Ross stated that BMDO started the EIS, and into the process of the EIS, finalized its thoughts on the UEWR element of NMD. At that time, BMDO supplemented

psw010at_g13

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

the deployment EIS, with the supplement analysis for the UEWR system, which is proposed for use with the PAVE PAWS system. Ms. Hunter-Ross explained that a supplement indicates that it was not in the original document. She further explained that because new information was encountered during the preparation of the original document, a supplement to the document was prepared. This is referred to as the supplement to the deployment EIS.

Ms. Caffyn inquired about the new information. Ms. Hunter-Ross clarified that it was not really new information; rather, during this time, it was finalized that the PAVE PAWS system would be the platform for the UEWR. Therefore, it needed to be analyzed as part of the programmatic deployment EIS for the NMD system.

Mr. Judge remarked that, in his opinion, if BMDO gives PAVE PAWS a clean bill of health, the Air Force is going to reference that clean bill of health in its EIS. The Air Force will use one EIS against the other. Mr. Judge stated that although the Air Force says that it is not so, the reality is that one EIS is being used to reinforce the other EIS. He said that BMDO also used the health assessment done by the state to bolster its opinion that there is no problem. Mr. Judge emphasized that the chairperson of that health assessment is being investigated both on a state and federal level. He emphasized that the Air Force needs to be very careful when it references BMDO giving a clean bill of health to PAVE PAWS.

Ms. Hunter-Ross stated that because the modernization project must be conducted by the Air Force, it considers it a separate action that requires a separate analysis. She noted that there is the possibility that the national missile defense may decide to deploy NMD, and once that decision is made, the PAVE PAWS systems could eventually be used for the UEWR. Consequently, at the end of this entire process, there will not only be the current Air Force mission, but also potentially the mission that NMD envisions. Mr. Judge stated, "You are incorporating them." Ms. Hunter-Ross clarified that the Air Force has decided that part of its EIS, which requires cumulative impact analysis, will include the investigation of any reasonably foreseeable future action. The Air Force also will try to analyze the potential impacts of that future action. Ms. Hunter-Ross stated that the Air Force has seen that the NMD system is a reasonably foreseeable future action and intends to incorporate into its EIS an analysis of foreseeable impacts of the entire system when both are put into place, if that happens.

Mr. Judge asked if Ms. Hunter-Ross's previous comment is true or not. Mr. Fairman replied that the answer was that the results of the BMDO system-wide EIS will be incorporated as part of the analysis of possible cumulative impacts associated with the PAVE PAWS facility at MMR. He then asked if this is a fair statement about how it will be done. Lt. Col. Lindquist replied that this is not entirely correct, and introduced himself as the Director of Environmental Law for Air Force Space Command. He encouraged the attendees to review the handouts available tonight that explain the NEPA process. He noted that the handouts include all the references to the NEPA statute, and the federal regulations to implement NEPA, which are the Council on Environmental Quality statute regulations, and the Air Force regulations. Lt. Col. Lindquist stated that those regulations and the law specify how the NEPA process must be conducted.

Lt. Col. Lindquist referred to an earlier statement, "you just did the NOI for this EIS in January, and now in April the report is coming out," and clarified that this is incorrect. He explained that the April deadline is for the comment period. A request to extend that comment period would have to be made to BMDO. Lt. Col. Lindquist further explained that the Air Force EIS has just started – the April date is not related to the Air Force EIS. He stated that the Air Force will be analyzing current operations in order to compare that to its proposed action, the maintenance and sustainment action, to determine if there is any difference between current and proposed operations. He noted that all the effects will be assessed.

COMMENT NUMBER

Lt. Col. Lindquist referred to the EIS and the NEPA regulations, which list all the health effects, environmental effects, and any effects to endangered species, and noted that the Air Force has to investigate those effects. He also stated that the Air Force has to incorporate the NMD EIS into its own EIS. The NMD EIS will be incorporated and referenced, and the Air Force still will have to investigate current operations and any possible change through its proposed action.

Mr. Fairman summarized Lt. Col. Lindquist's remarks as follows: the BMDO's EIS findings would be reviewed as part of the PAVE PAWS MMR EIS, but not taken as given; and, whatever BMDO had initially concluded about the EIS for system-wide, the Air Force conceivably could re-examine as part of this EIS process for PAVE PAWS MMR. He asked if those summaries are correct. Lt. Col. Lindquist clarified that the Air Force would reference BMDO's EIS because it would not analyze what BMDO is proposing as the change to the system. The Air Force is analyzing what it is proposing as the change to the system. The Air Force could question anything it thinks is suspect or a conclusion that it does not agree with, in terms of BMDO's proposal.

Mr. Fairman commented that, due to the late hour, people may either leave if they choose to, or continue this discussion directly with other stakeholders in the room and/or via CBI. He stated that CBI will carry forward any additional stakeholder comments received tonight.

Ms. Hunter-Ross stated that there will be a scoping meeting at the next meeting, as was requested by Mr. and Mrs. Judge. Ms. Judge asked if there would be a 30-day notice. Ms. Hunter-Ross replied that there would. Mr. Judge asked if it is correct that there will not be another community meeting until that scoping meeting. Ms. Hunter-Ross replied that the next meeting the Air Force Space Command has with the citizens will be the scoping meeting. Mr. Judge again asked Ms. Hunter-Ross to confirm that the next meeting the Air Force Space Command has with the public will be a scoping meeting. Ms. Hunter-Ross confirmed that it will be a scoping meeting.

Lt. Col. Hutto noted that Air Force Space Command representatives, including legal, environmental, and medical individuals, will be at the Falmouth Library tomorrow, from 2:00 p.m. to 4:00 p.m., by appointment for the media, and from 4:00 p.m. to 7:30 p.m., to answer any additional questions for the public.

Mr. Patrick stated that he has three suggestions to be included in the list Mr. Fairman is generating: (1) agreement by the Air Force to do a retrospective health study, (2) citizen input in selection of stakeholders, and (3) an analysis of alternative sites.

A member of the audience reported that last week he listened to a group of people who spent three hours "shooting down" a number of professionals who were at a meeting to give a report. He said that he was embarrassed and disturbed by the attitude of those citizens and added that he thinks that all of these people in "blue suits" are citizens. He remarked that it is wrong to say, "we don't trust you." The audience member stated that he believes that it is imperative to develop a feeling of trust within a working group, or it is doomed to failure.

Mr. Fairman summarized that whether referring to the Air Force or other stakeholders, follow-through on initial commitments needs to be demonstrated, so that the trust, which is lacking, can be rebuilt. The audience member commented that he thinks there is as much integrity in the "blue uniforms" here as there is in the rest of the attendees put together.

Another member of the audience inquired about the number of PAVE PAWS facilities. Lt. Col. Hutto replied that there are two operational facilities and one in development. The audience member asked if a cancer survey has been conducted in the areas of the two operational facilities. Maj. Ruscio replied that

psw010at_g14

COMMENT NUMBER

cancer studies have been conducted on Air Force bases. The audience member asked if it is correct that the military has people working around the same radio waves for 21 years. Maj. Ruscio replied that this is correct. The audience member then asked if there were any problems with those individuals in close proximity to those radio waves. Lt. Col. Hutto replied that there have been none. The audience member referred to the statement "I don't trust you," and remarked that he heard the same sentiments in 1939, and in 1941 there was the attack on Pearl Harbor. He stated that half a million of his comrades died so citizens could be here tonight, and could have the opportunity to express their opinions and concerns. The audience member emphasized that he "left 275 comrades buried in the Pacific Ocean, and to hear people attacking the military tonight – the military who saved this country..."

Mr. Laine said that he thinks there is a communication problem, which could be overcome by the provision of a unified database where people could obtain reference documents. He noted that, like many other individuals, he does not understand the EIS process. Mr. Laine again stated that there is a need for a unified database or web site, given the documents that are associated with medical studies and Air Force requirements for RFR hazards.

Maj. Ruscio noted that he has published literature on pulse and continuous wave studies, which he can provide to anyone interested. He also noted that while the information he has is not in a database, it is available.

Mr. Vysstotsky suggested that people visit the Peterson Air Force Base web site to access certain related information via the Alta Vista search engine.

Mr. Fairman asked if it would be possible for the Air Force to mail the attendees who signed in the sign-in-sheet directions on how to get more information on the EIS process and on health issues related to MMR. An Air Force representative indicated that this is possible.

Mr. Fairman stated that stakeholders who want to provide information to other stakeholders about any of the issues discussed tonight can contact Capt. Sacra or CBI. Capt. Sacra noted that she would leave a stack of her business cards on the table in the back of the meeting room, and she encouraged people to call, e-mail, or write her. She stated that she too has RFR research material that can be provided, and if she does not have answers to particular questions, she will contact the appropriate people who can provide those answers. Capt. Sacra and Mr. Fairman provided their respective contact information.

Mr. Fairman noted that after the meeting, there will be further discussion among stakeholders about next steps. He also stated that there is a commitment from Ms. Hunter-Ross to hold a scoping meeting – with notice – when the community can provide input on the scoping process. Ms. Hunter-Ross agreed.

Agenda Item #6. Adjourn

Mr. Fairman adjourned the meeting at 9:45 p.m.

COMMENT NUMBER

TABLE OF CONTENTS

PART 1

COMMENT NUMBER

T-2

COMMENT NUMBER

T-3

COMMENT NUMBER

psw010at_g16

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

T-4

COMMENT NUMBER

PART 2
(Bound Separately)

Attachment, Public Comment on the Draft Environmental Impact Statement and Air Force Response.

T-5

COMMENT NUMBER

psw010at_g17

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

"of the PAVE PAWS Radar System" Navy Research Council, 1979 !!

Attachment I

CHAPTER 3

SUMMARY AND CONCLUSIONS

On the basis of available information, the maximal instantaneous microwave-field intensities anticipated in areas of public access in the vicinity of PAVE PAWS during normal operation of the existing radar should be about 100 $\mu W/cm^2$. The corresponding time-averaged intensities as measured under normal operating conditions have been found to be lower by at least two orders of magnitude. A comparison of these time-averaged potential exposures with exposures resulting from other commercial, private, and military sources of microwave and radiofrequency radiation does not indicate any substantial variation from power densities to which segments of the general public are routinely exposed in some localities. PAVE PAWS, therefore does not appear to present unique exposure conditions with respect to the anticipated time-averaged field intensities.

Although no overt deleterious health effects have been documented to result from such low-intensity exposure of the public, statistically designed epidemiologic studies have not been conducted. It is therefore not possible to conclude, on the basis of a comparison of time-averaged exposure intensities, that effects will or will not be induced by exposure to the radiation from PAVE PAWS.

A review of experimental and epidemiologic studies of occupationally exposed workers indicates that both humans and experimental animals have been reported to be sensitive to microwave exposure intensities of about 1 mW/cm^2 or greater, the nature of the effects depending on a large number of physical and biologic factors, most of which are inadequately understood. Documented effects on morbidity or mortality, most of which have been observed in experimental animals, are generally associated with exposure intensities over 10 mW/cm^2 and attributed to excessive thermal stress. Possible exceptions, however, are alterations in central-nervous-system function and immunologic status, in both experimental animals and humans, that have reportedly occurred at about 1 mW/cm^2. Alterations in CNS function include objective findings, such as changes in EEG patterns that have been reported to occur from occupational exposure of humans for periods of years or from acute microwave exposure of experimental animals at intensities of 1 mW/cm^2 or greater. Subjective alterations in mood and behavior have also been reported in occupationally exposed microwave workers, and specific behavioral end points in experimental animals have reportedly been affected by microwave exposure at intensities of 1 mW/cm^2 or greater. The subtle and subjective nature of the reversible effects in humans makes it difficult to establish quantitative relationships to exposure conditions.

In vitro and *in vivo* exposures of nervous tissue have provided additional evidence of sensitivity to low-intensity microwave fields. Effects have been reported to occur in specific ranges ("windows") of

COMMENT NUMBER

intensity and pulse repetition rate, whose existence suggests that alterations in nervous tissue may not depend solely on exposure intensity or duration; i.e., such effects do not follow monotonic dose-response relationships. Although the physiologic significance of *in vitro* findings has not been established, their existence, with the *in vivo* findings of sensitivity of the mammalian CNS to microwave and weak electric and magnetic fields, suggests altered CNS function as a subject of greatest potential concern with respect to low-intensity microwave exposure from PAVE PAWS. Owing to the limited scope and extent of studies of the biologic effects of chronic low-intensity microwave exposure, it is not possible to conclude that other types of physiologic effects will not be induced in humans. But there is no evidence to suggest that other types of physiologic alterations should be anticipated as a result of exposure to PAVE PAWS radiation in areas of public access.

There are no data on the biologic effects of microwave radiation with the specific characteristics of the PAVE PAWS radar, which, because of its rather unusual function, differs from more commonly encountered sources of microwave and RF radiation. The inherent problems of interspecies, interfrequency extrapolation limit the extent to which existing data may be used to assess the effect of PAVE PAWS radiation. Data from both *in vivo* and *in vitro* studies suggest maximal sensitivity of neural systems to fields modulated at mammalian brainwave frequencies (i.e., 1-20 Hz), which include the predominant PAVE PAWS modulation frequency at 18.5 Hz. Because of the aforementioned possibility of field-intensity windows and the lack of adequate data on mammalian systems, it is not known whether such effects will be induced in humans under the anticipated exposure conditions. During normal operation of PAVE PAWS, the direction of the radar beam will be continuously varied in the scanning mode, so exposure at a given location will be intermittent and at low time-averaged intensities, relative to the intensities associated with irreversible biologic damage. The effects of such exposures of members of the public, if they occur, will, on the basis of available data and the known interaction mechanisms with biologic systems, be reversible or transient. Thus, the possible exposure effects of PAVE PAWS should be restricted to transient, reversible functional alterations in the CNS that may or may not be perceived by the exposed persons.

Whatever the effects of exposure on the human central nervous system are, it is not known whether the effects are deleterious to health. It has not been established, for example, that such effects involve impairment of judgment or alterations in mood that would impose psychologic or physiologic burdens on those affected.

The microwave radiation from PAVE PAWS may present interference problems with electronic devices in the vicinity of the radar site. The design characteristics of device like electromagnetically shielded cardiac pacemakers are such that their operation should not be adversely affected by PAVE PAWS exposure intensities, but some pacemakers currently in use may be affected by exposure. There should not be any important deleterious consequences due to exposure of persons with surgical implants

psw010at_g18

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

or other prosthetic devices. Interference with other electronic devices, such as television and radio receivers, is beyond the scope of this report, but obviously must be taken into account. Special attention should be given to the evaluation of the effects of PAVE PAWS radiation on electronic devices used for medical monitoring or health evaluation, because there is evidence that such devices may be sensitive to such exposure.

In conclusion, the PAVE PAWS radar may be anticipated to expose a limited number of members of the general public intermittently to low intensities of pulse-modulated microwave fields with maximal instantaneous intensities of 100 $\mu W/cm^2$ or less and time-averaged intensities lower by two orders of magnitude. There are no known irreversible effects of such exposure on either morbidity or mortality in humans or other species. Thus, it is improbable that exposure will present any hazard to the public. In view of the known sensitivity of the mammalian CNS to electromagnetic fields, especially those modulated at brainwave frequencies, the possibility cannot be ruled out that exposure to PAVE PAWS radiation may have some effects on exposed people. Because these effects are still hypothetical, it is not feasible to assess their health implications. Such assessment will require additional research and surveillance and must be addressed in future evaluations of the potential exposure effects of PAVE PAWS and other high-power-output radar systems.

-81-

COMMENT NUMBER

Attachment J

lar-17-00 12:23P P.02

Mar MAR 14 2000 11 26AM 5089689305 P 2/3

DEPARTMENT OF THE AIR FORCE
21ST SPACE WING (AFSPC)

NEWS RELEASE

Date
March 13, 2000

Contact
Captain Barbara Sacre, USAFR
6[th] Space Warning Squadron Public Affairs
508-968-3235
508-968-3291 (after hours)

FOR IMMEDIATE RELEASE

PAVE PAWS Stakeholder Working Group is Established; Kickoff Meeting to be held March 28[th] in Bourne

CAPE COD AIR FORCE STATION, Mass. – The first meeting of a newly established PAVE PAWS Stakeholder Working Group convenes Tuesday, March 28 at 7 p.m. at the Best Western in Bourne. The meeting is open to the public.

The Stakeholder Working Group was initiated by the United States Air Force to facilitate discussions related to the continued operation of the PAVE PAWS radar at Cape Cod AFS. PAVE PAWS is a radar site that detects sea and ground-launched ballistic missile attacks against the United States, as well as conducts space surveillance.

At the first working group meeting, participants will develop a charter for their goals and objectives, will discuss a set of ground rules for productive discussions, and will work to ensure all stakeholders are represented at future meetings.

The Air Force Center for Environmental Excellence (AFCEE) has contracted with the Consensus Building Institute (CBI) to serve as a neutral facilitator for these stakeholder meetings.

GUARDIANS OF THE HIGH FRONTIER

psw010at_g19

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

2

Start-up members of the Working Group are comprised of a wide spectrum of individuals with an interest in PAVE PAWS. Earlier this year, OBI conducted a series of interviews with stakeholders at the local, state and federal levels to explore their concerns, and from those interviews, generated an initial list of participants.

Information gathered by the working group will be used to direct community involvement in all issues related to PAVE PAWS. To date, this includes the Environmental Impact Analysis Process (EIAP) and an assessment of the current Radio Frequency Radiation environment of PAVE PAWS.

As a part of the EIAP, the Air Force is developing an Environmental Impact Statement (EIS) on the PAVE PAWS Service Life Extension (SLEP) Program. This process kicked off January 27 when a Notice of Intent was published, signaling the service's intention to prepare an EIS to examine potential present and future environmental effects of its proposed action to modernize PAVE PAWS radar sites at three U.S. locations, including Cape Cod.

To be prepared by Earth Tech, Colton, Calif., the EIS will examine the potential impacts of the proposed modernization action and identified alternatives on issues such as health and safety, air quality, airspace, biological resources, environmental justice, geology and soils, hazardous materials and waste, land use and aesthetics, noise, socioeconomics, transportation, utilities, water resources and subsistence.

Public scoping meetings, an important part of the EIS designed to seek citizen input, will begin this Spring.

Concurrently, another EIS, prepared by a joint Department of Defense Agency, the Ballistic Missile Defense Organization (BMDO), addresses potential impacts of the proposed National Missile Defense (NMD) system. Part of the proposed NMD system is an upgrade to early warning radars across the U.S., including PAVE PAWS at Cape Cod AFS. The BMDO has issued a supplement to its NMD Deployment Draft EIS, with the final document scheduled for public release in May. No

COMMENT NUMBER

3

decision has been made to deploy a NMD system. Findings from the NMD EIS will be incorporated into the Air Force's PAVE PAWS modernization EIS.

Lieutenant Colonel Cal Hutto, 6th Space Warning Squadron Commander, Cape Cod Air Force Station, stressed that by design, the work of the Stakeholder Group is large in scope, providing input to the EIS, but not serving as a substitute for it. "We are committed to addressing all public concerns about PAVE PAWS at the Massachusetts Military Reservation, and that's why we created the Stakeholder Working Group," Lt. Col. Hutto said. "The working group's concerns and outcomes will be provided to the EIS, but because the EIS is, by federal law, highly regulated and formal, we need another, more flexible method to gather, and act on, public comments and concerns about PAVE PAWS.

"Also, the format of EIS public scoping meetings isn't designed for the more informal give-and-take dialogue a working group would engage in," he said. "In the course of open, honest, on-going discussion among all stakeholders, this group will not only be another public voice in the EIS process, but will also be a community forum in which we can come together to discuss and collaborate on actions to address all issues related to PAVE PAWS, past, present and future."

For further information, please contact Captain Barbara Sears, 6th Space Warning Squadron, Community Liaison at Cape Cod Air Force Station, 508-968-3235.

- 30 -

Related Web Sites:

- PAVE PAWS Radar System Fact Sheet:
  http://www.spacecom.af.mil/hqafspc/library/facts/pavepaws.htm
- Notice of Intent (Jan 27, 2000) to Prepare an Environmental Impact Statement (EIS) for actions to sustain operability of Air Force Space Command PAVE PAWS radar sites at: Cape Cod Air Force Station, Massachusetts; Beale Air Force Base, California, and Clear Air Force Station, Alaska: http://www.access.gpo.gov/su_docs/aces/aces140.html
- Upgraded Early Warning Radar Supplement to the National Missile Defense Deployment Draft Environmental Impact Statement (Jan. 21, 2000):
  http://www.acq.osd.mil/bmdo/bmdolink/pdf/uewr.pdf

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

ATTACHMENT K

DEPARTMENT OF HEALTH AND HUMAN SERVICES — Public Health Service

National Institute for Occupational Safety and Health
Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati OH 45226-1998

June 17, 1999

Mr. Richard Tell
Chair, IEEE SCC28 (SC4)
Risk Assessment Work Group
Richard Tell Associates, Inc.

Dear Mr. Tell:

The members of the Radiofrequency Interagency Work Group (RFIAWG) have identified certain issues that we believe need to be addressed to provide a strong and credible rationale to support RF exposure guidelines. I am writing on behalf of the RFIAWG members to share these ideas with you and other members of the IEEE SCC28, Subcommittee 4 Risk Assessment Work Group. Our input is in response to previous requests for greater participation on our part in the SCC28 deliberations on RF guidelines. The issues, and related comments and questions relevant to the revision of the IEEE RF guidelines, are given in the enclosure. No particular priority is ascribed to the order in which the issues are listed.

The views expressed in this correspondence are those of the members of the Radiofrequency Interagency Work Group and do not represent the official policy or position of the respective agencies.

The members of the RFIAWG appreciate your consideration of our comments and welcome further dialog on these issues. Feel free to contact me or any member of the RFIAWG directly. A list of the members of the RFIAWG is enclosed, with contact information for your use.

Sincerely yours,

W. Gregory Lotz

W. Gregory Lotz, Ph.D.
Chief, Physical Agents Effects Branch
Division of Biomedical and
Behavioral Science

Enclosures (2)

cc: N. Hankin
J. Elder
R. Cleveland
R. Curtis
R. Owen
L. Cress
J. Healer

COMMENT NUMBER

RF Guideline Issues
Identified by members of the federal RF Interagency Work Group, June 1999

Issue: Biological basis for local SAR limit

The C95.1 partial body (local) exposure limits are based on an assumed ratio of peak to whole body SAR; that is, they are dosimetrically, rather than biologically based. Instead of applying a dosimetric factor to the whole body SAR to obtain the local limits, an effort should be made to base local SAR limits on the differential sensitivity of tissues to electric fields and temperature increases. For example, it seems intuitive that the local limits for the brain and bone marrow should be lower than those for muscle, fat and fascia; this is not the case with the current limits which implicitly assume that all tissues are equally sensitive (except for eye and testicle). If no other data are available, differential tissue sensitivity to ionizing radiation should be considered.

If it is deemed necessary to incorporate dosimetric factors into the resulting tissue-specific SAR limits these should be based on up-to-date dosimetric methods such as finite-difference time-domain calculations utilizing MRI data and tissue-specific dielectric constants. For certain exposure conditions FDTD techniques and MRI data may allow better simulation of peak SAR values. Consideration should be given to the practical tissue volume for averaging SAR and whether this volume is relevant to potential effects on sensitive tissues and organs.

Issue: Selection of an adverse effect level

Should the thermal basis for exposure limits be reconsidered, or can the basis for an unacceptable/adverse effect still be defined in the same manner used for the 1991 IEEE guidelines? Since the adverse effect level for the 1991 guidelines was based on acute exposures, does the same approach apply for effects caused by chronic exposure to RF radiation, including exposures having a range of carrier frequencies, modulation characteristics, peak intensities, exposure duration, etc., that does not elevate tissue temperature on a macroscopic scale?

Selection criteria that could be considered in determining unacceptable/adverse effects include:

a) adverse effects on bodily functions/systems
b) minimal physiological consequences
c) measurable physiological effects, but no known consequences

If the adverse effect level is based on thermal effects in laboratory animals, the literature on human studies (relating dose rate to temperature elevation and temperature elevation to a physiological effect) should be used to determine if the human data could reduce uncertainties in determination of a safety factor.

COMMENT NUMBER

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

RFIAWG Issues, June 1999, page 3

Issue: Acute and chronic exposures

There is a need to discuss and differentiate the criteria for guidelines for acute and chronic exposure conditions. The past approach of basing the exposure limits on acute effects data with an extrapolation to unlimited chronic exposure durations is problematic. There is an extensive data base on acute effects with animal data, human data (e.g. MRI information), and modeling to address thermal insult and associated adverse effects for acute exposure (e.g., less than one day) For lower level ("non-thermal"), chronic exposures, the effects of concern may be very different from those for acute exposure (e.g., epigenetic effects, tumor development, neurologic symptoms). It is possible that the IEEE RF radiation guidelines development process may conclude that the data for these chronic effects exist but are inconsistent, and therefore not useable for guideline development. If the chronic exposure data are not helpful in determining a recommended exposure level, then a separate rationale for extrapolating the results of acute exposure data may be needed. In either case (chronic effects data that are useful or not useful), a clear rationale needs to be developed to support the exposure guideline for chronic as well as acute exposure.

Issue: One tier vs two tier guidelines:

A one tier guideline must incorporate all exposure conditions and subject possibilities (e.g., acute or chronic exposure, healthy workers, chronically ill members of the general public, etc.). A two tier guideline, as now exists, has the potential to provide higher limits for a specific, defined population (e.g., healthy workers), and exposure conditions subject to controls, while providing a second limit that addresses greater uncertainties in the data available (about chronic exposure effects, about variations in the health of the subject population, etc.). A greater safety factor would have to be incorporated to deal with greater uncertainty in the scientific data available Thus, a two-tier guideline offers more flexibility in dealing with scientific uncertainty, while a one-tier guideline would force a more conservative limit to cover all circumstances including the scientific uncertainties that exist.

Issue: Controlled vs. uncontrolled (applicability of two IEEE exposure tiers)

The current "controlled" and "uncontrolled" definitions are problematic, at least in the civilian sector, particularly since there are no procedures defined in the document to implement the "controlled" condition. The new guidelines should offer direction for the range of controls to be implemented and the training required for those who knowingly will be exposed (e.g. workers), along the lines of the existing ANSI laser safety standards. This essential element needs to be included for whatever limits are defined, be they one-tier or two-tier.

For example, the OSHA position is that the "uncontrolled" level is strictly an "action" level which

COMMENT NUMBER

RFIAWG Issues, June 1999, page 4

indicates that there is a sufficiently high exposure (compared to the vast majority of locations) to merit an assessment to determine what controls and training are necessary to ensure persons are not exposed above the "controlled" limit. Many similar "action" levels are part of OSHA and public health standards. Should this interpretation be incorporated into the IEEE standard as a means to determine the need to implement a safety plan? [The laser standard has a multi-tiered (Class I, II, III, IV) standard which similarly requires additional controls for more powerful lasers to limit the likelihood of an excess exposure, even though the health effect threshold is the same.]

On the other hand, if it is determined that certain populations (due to their health status or age) are more susceptible to RF exposures, then a multi-tiered standard, applicable only to those specific populations, may be considered.

The ANSI/IEEE standard establishes two exposure tiers for controlled and uncontrolled environments. The following statement is made in the rationale (Section 6, page 23): "The important distinction is not the population type, but the nature of the exposure environment." If that is the case, consideration should be given to providing a better explanation as to why persons in uncontrolled environments need to be protected to a greater extent than persons in controlled environments. An uncontrolled environment can become a controlled environment by simply restricting access (e.g., erecting fences) and by making individuals aware of their potential for exposure. After such actions are taken, this means that the persons who previously could only be exposed at the more restrictive uncontrolled levels could now be exposed inside the restricted area (e.g., inside the fence) at controlled levels.

What biologically-based factor changed for these people? Since the ostensible public health reason for providing greater protection for one group of persons has historically been based on biological considerations or comparable factors, it is not clear why the sentence quoted above is valid.

Issue. Uncertainty factors

The uncertainties in the data used to develop the guideline should be addressed. An accepted practice in establishing human exposure levels for agents that produce undesirable effects is the application of factors representing each area of uncertainty inherent in the available data that was used to identify the unacceptable effect level. Standard areas of uncertainty used in deriving acceptable human dose for agents that may produce adverse (but non-cancer) effects include

(1) extrapolation of acute effects data to chronic exposure conditions,
(2) uncertainty in extrapolating animal data to humans in prolonged exposure situations,
(3) variation in the susceptibility (response/sensitivity) among individuals,
(4) incomplete data bases,
(5) uncertainty in the selection of the effects basis, inability of any single study to adequately address all possible adverse outcomes.

psw010at_g22

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

RFIAWG Issues, June 1999, page 5

If guidelines are intended to address nonthermal chronic exposures to intensity modulated RF radiation, then how could uncertainty factors be used; how would this use differ from the historical use of uncertainty factors in establishing RF radiation guidelines to limit exposure to acute or sub-chronic RF radiation to prevent heat-related effects?

There is a need to provide a clear rationale for the use of uncertainty factors.

Issue. Intensity or frequency modulated (pulsed or frequency modulated) RF radiation

Studies continue to be published describing biological responses to nonthermal ELF-modulated and pulse-modulated RF radiation exposures that are not produced by CW (unmodulated) RF radiation. These studies have resulted in concern that exposure guidelines based on thermal effects, and using information and concepts (time-averaged dosimetry, uncertainty factors) that mask any differences between intensity-modulated RF radiation exposure and CW exposure, do not directly address public exposures, and therefore may not adequately protect the public. The parameter used to describe dose/dose rate and used as the basis for exposure limits is time-averaged SAR; time-averaging erases the unique characteristics of an intensity-modulated RF radiation that may be responsible for producing an effect.

Are the results of research reporting biological effects caused by intensity-modulated, but not CW exposure to RF radiation sufficient to influence the development of RF exposure guidelines? If so, then how could this information be used in developing those guidelines? How could intensity modulation be incorporated into the concept of dose to retain unique characteristics that may be responsible for a relationship between exposure and the resulting effects?

Issue: Time averaging

Time averaging of exposures is essential in dealing with variable or intermittent exposure, e.g., that arising from being in a fixed location of a rotating antenna, or from moving through a fixed RF field. The 0.1 h approach historically used should be reassessed, but may serve this purpose adequately. Time averaging for other features of RF exposure is not necessarily desirable, however, and should be reevaluated specifically as it deals with modulation of the signal, contact and induced current limits, and prolonged, or chronic exposure. These specific conditions are discussed in a little more detail elsewhere.

If prolonged and chronic exposures are considered to be important, then there should be a reconsideration of the time-averaging practices that are incorporated into existing exposure guidelines and used primarily to control exposure and energy deposition rates in acute/subchronic exposure situations.

COMMENT NUMBER

RFIAWG Issues, June 1999, page 6

Issue: Lack of peak (or ceiling) limits for induced and contact current

A recent change in the IEEE guidelines allows for 6 minute, rather than 1 second, time-weighted-averaging for induced current limits. This change increases the concern about the lack of a peak limit for induced and contact currents. Will the limits for localized exposure address this issue, i.e., for tissue along the current path?

Issue: Criteria for preventing hazards caused by transient discharges

The existing IEEE recommendation states that there were insufficient data to establish measurable criteria to prevent RF hazards caused by transient discharges. If specific quantitative criteria are still not available, can qualitative requirements be included in the standard to control this hazard (e.g., metal objects will be sufficiently insulated and/or grounded, and/or persons will utilize sufficient insulating protection, such as gloves, to prevent undesirable transient discharge)?

ISSUE: Limits for exposure at microwave frequencies

Concerns have been expressed over the relaxation of limits for continuous exposures at microwave frequencies above 1500 MHz. The rationale provided in the current guideline (Section 6.8) references the fact that penetration depths at frequencies above 30 GHz are similar to those at visible and near infrared wavelengths and that the literature for skin burn thresholds for optical radiation "is expected to be applicable." The rationale then implies that the MPE limits at these high frequencies are consistent with the MPE limits specified in ANSI Z136.1-1986 for 300 GHz exposures. This is apparently the rationale for "ramping up" to the MPE limits for ***continuous*** exposure of 10 mW/cm^2 at frequencies above 3 GHz (controlled) or 15 GHz (uncontrolled). The rationale should be given as to why this ramp function has been established at relatively low microwave frequencies (i.e., 1500 MHz and above), rather than being implemented at higher frequencies that are truly quasi-optical. For example, one option could be two ramp functions, one beginning at 300 MHz, based on whole- or partial-body dosimetry considerations, and another at higher frequencies (say 30-100 GHz) to enable consistency with the laser standard. Such a revision should help reduce concern that the standard is not restrictive enough for continuous exposures at lower microwave frequencies where new wireless applications for consumers could make this an issue in the future.

Issue: Replication/Validation

Published peer-reviewed studies that have been independently replicated/validated should be used to establish the adverse effects level from which exposure guidelines are derived. The definition of "replicated/validated" should not be so restrictive to disallow the use of a set of reports that

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

RFIAWG Issues, June 1999, page 7

are scientifically valid but are not an exact replication/validation of specific experimental procedures and results.

Peer-reviewed, published studies that may not be considered to be replicated/validated, but are well done and show potentially important health impacts provide important information regarding uncertainties in the data base used to set the adverse effect level (e.g., incomplete data base)

Issue: Important Health Effects Literature Areas:

Documentation should be provided that the literature review process included a comprehensive review of the following three areas:

1) long-term, low-level exposure studies (because of their importance to environmental and chronic occupational RFR exposure);
2) neurological/behavioral effects (because of their importance in defining the adverse effect level in existing RFR guidelines); and
3) micronucleus assay studies (because of their relevance to carcinogenesis).

Issue: Compatibility of RFR guidelines

Compatibility of national and international RFR guidelines remains a concern. It is important for the IEEE Committee to address this issue by identifying and discussing similarities and differences in a revised IEEE guideline and other RFR guidelines. Compatibility/noncompatibility issues could be discussed in the revised IEEE guideline or as a companion document distributed at the time the revised IEEE guideline is released to the public.

COMMENT NUMBER

Radiofrequency Interagency Work Group Members

Alphabetical Listing

Cleveland, Robert
Senior Scientist
Federal Communications Commission
Office of Eng & Technology, Room 230

Cress, Larry
US FDA, CDRH
Radiation Biology Branch, DLS, OST

Curtis, Robert A.
OSHA
Dir-U.S. Dept. of Labor/OSHA
OSHA Health Response Team

Elder, Joseph A.
US Environmental Protection Agency
U.S. EPA, NHEERL (MD-87)

Hankin, Norbert N.
U.S. Environmental Protection Agency
Mailcode 6604J
U.S. EPA

Healer, B. Janet
NTIA
Department of Commerce (H-4099)

Lotz, W. Gregory
Chief, Physical Agents Effects Branch
National Institute for Occupational Safety and Health

Owen, Russell D.
U.S. FDA/CDRH (HFZ-114)
Chief, Radiation Biology Branch (HFZ-114)

psw010at_g24

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

Universität Wien University of Vienna

Project Team: Mobile Phones and Health, Symposium, October 25-28, 1998, University of Vienna, Austria

Workshop on possible biological and health effects of RF electromagnetic fields

Vienna EMF-Resolution

For Biomedical and Risk Research:
Carl Blackman, Environmental Protection Agency, USA, Blackman.Carl@epamail.epa.gov
Neil J. Cherry, Lincoln University, New Zealand, cherry@kea.lincoln.ac.nz
G. Käs, Bundeswehrhochschule Neubiberg, Deutschland
Lebrecht von Klitzing, Universität Lübeck, Deutschland, klitzing@medinf-mu-luebeck.de
Wolfgang Kromp, Inst. f. Risikoforschung, Universität Wien, wolfgang.kromp@irf.univie.ac.at
Michael Kundi, Inst. f. Umwelthygiene, Universität Wien, umwelthygiene@univie.ac.at
Henry Lai, University of Washington, USA, hlai@u.washington.edu
William Leiss, Queen's University, Kanada, leiss@saltspring.com
Theodore Litovitz, Catholic University of America, USA, litovitz@cua.edu
Kjell Hansson Mild, National Institute for Working Life, Sweden, mild@niwl.se
Wilhelm Mosgöller, Inst. f. Histologie u. Embryologie, Universität Wien, wilhelm.mosgoeller@univie.ac.at
Joachim Röschke, Psychiatrische Klinik, Universität Mainz, Deutschland, roeschke@goofy.zdv.uni-mainz.de
Felix Schinner, Inst. f. Risikoforschung, Universität Wien, felix.schinner@univie.ac.at
Stanislaw Szmiegielski, Militärinstitut für Hygiene und Epidemiologie, Polen, szmigielski@wihe.waw.pl
Luc Verschaeve, Div. of Energy and Environm. Research, V.I.T.O., Mol., Belgium, verschal@vito.be
Ulrich Warnke, Universität des Saarlandes, Deutschland, warnke@rz.uni-sb.de

Disclaimer: personal opinion, does not necessarily reflect the views of the associated institution

The preferred terminology to be used in public communication:
Instead of using the terms "athermal", "nonthermal" or "microthermal" effects, the term "low intensity biological effects" is more appropriate.

Preamble: The participants agreed that biological effects from low-intensity exposures are scientifically established. However, the current state of scientific consensus is inadequate to derive reliable exposure standards. The existing evidence demands an increase in the research efforts on the possible health impact and on an adequate exposure and dose assessment.

Base stations: How could satisfactory Public Participation be ensured?
The public should be given timely participation in the process. This should include information on technical and exposure data as well as information on the status of the health debate. Public participation in the decision (limits, siting, etc.) should be enabled.

Cellular phones: How could the situation of the users be improved?
Technical data should be made available to the users to allow comparison with respect to EMF-exposure. In order to promote prudent usage, sufficient information on the health debate should be provided. This procedure should offer opportunities for the users to manage reduction in EMF-exposure. In addition, this process could stimulate further developments of low-intensity emission devices.

For further information: http://www.irf.univie.ac.at/emf/,
Prof. Dr. Michael Kundi, Inst. f. Umwelthygiene, Email: umwelthygiene@univie.ac.at
Dr. Felix Schinner, Inst. f. Risikoforschung, Email: felix.schinner@univie.ac.at
Dr. Wilhelm Mosgöller, Inst. f. Histologie und Embryologie, Email: wilhelm.mosgoeller@univie.ac.at

psw010at_l1

COMMENT NUMBER

PAVE PAWS Azimuth

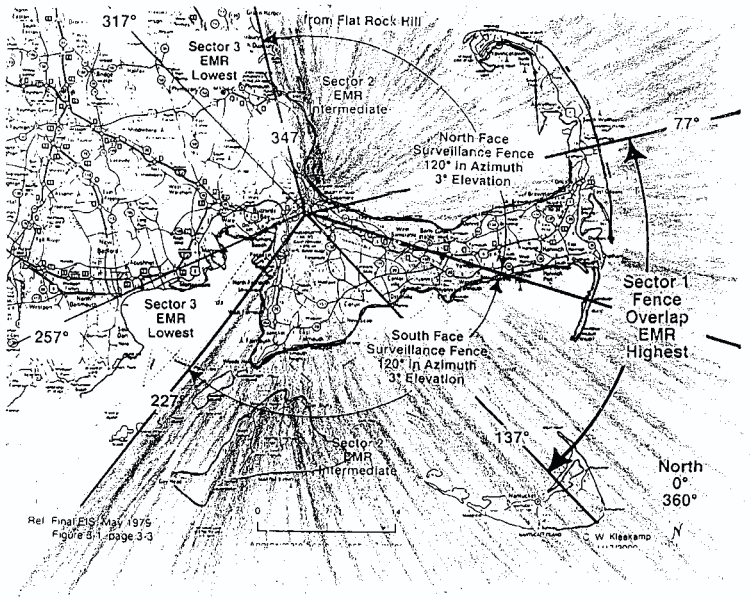
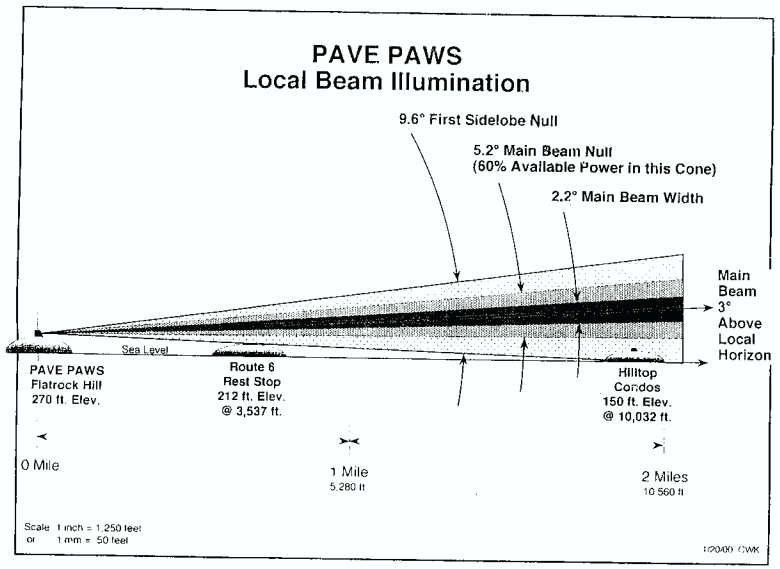


Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)



psw010at_l2

COMMENT NUMBER

MDPH/ATSDR Upper Cape Related Reports as of 11/19/99

- Upper Cape Cod Cancer Incidence Study – Final Report. Boston University for the Massachusetts Department of Public Health, September 1991.
- Upper Cape Cod Cancer Incidence Review, 1982-1990 – Final Report. Massachusetts Department of Public Health, September 1995.
- Upper Cape Cod Cancer Incidence Review, 1986-1994 – Final Report. Massachusetts Department of Public Health, June 1999.
- Assessment of Childhood Cancer Incidence on Cape Cod, Massachusetts 1982-1994. Massachusetts Department of Public Health, September 1999.
- Results of 1998 Survey of Parents whose Children Attended Bourne Public Schools – Full Report. Agency for Toxic Substances and Disease Registry, September 1999.
- Technical Advisors' 2nd year (1998-99) Report to the Community Assistance Panel, Massachusetts Military Reservation. Massachusetts Department of Public Health, October 1999.
- Health Study of Communities Surrounding Otis Air National Guard Base/Camp Edwards. Supplemental Cancer Assessment. Agency for Toxic Substances and Disease Registry, July 3, 1997.
- Health Study of Communities Surrounding Otis Air National Guard Base/Camp Edwards, Falmouth, Massachusetts. Agency for Toxic Substances and Disease Registry, March 1998.
- Analysis of Lung Cancer Mortality in Females and Leukemia Mortality in Males and Females for the towns of Barnstable, Bourne, Falmouth, Mashpee, and Sandwich, 1996-1985. Massachusetts Department of Public Health, April 21, 1988.
- Otis Air National Guard Base/Camp Edwards, Falmouth, Massachusetts, CERCLIS No. MA2570024487. Agency for Toxic Substances and Disease Registry, January 25, 1994.
- Health Risk Assessment – Draft Report. Open Burning of Propellant Bags, Massachusetts Military Reservation. Project No. 30-EJ-6995-97. U.S. Army at the request of the Massachusetts Department of Public Health and Agency for Toxic Substances and Disease Registry, April 1998.
- Silent Spring Institute – Final Report. Cape Cod Breast Cancer and Environment Study, December 1997.
- Silent Spring Institute – Final Report. Cape Cod Breast Cancer and Environment Study, 1999.

COMMENT NUMBER

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

- Series of fact sheets developed by a risk communication work group, co-chaired by MDPH and EPA, June 1998.
- Fact sheet on recreational use of water bodies on or near the Massachusetts Military Reservation, June 1999.
- Fish consumption advisories issued for ponds on the Upper Cape (e.g., Johns and Ashumet ponds) (throughout).
- Technical memorandum regarding estimates of ethylene dibromide (EDB) concentrations in ambient air due to volatilization from surface waters and related correspondence, March 1997.

COMMENT NUMBER

Attachment M

Distribution of 1997 Balloting Committee by Category: University, Consultant, otherwise User, otherwise Producer, Regulatory/Labor union, Other

Name	Company	1997 designation
University position		
Busiberg, Jerrold	University of California, Davis	G
Gandhi, Om P.	University of Utah	G
Lin, James G.	University of Illinois	A
Storm, Kristian A.	University of Wisconsin	G
Ziskin, Marvin	Temple University Medical School	G
Total: 5		
Users:		
E. Adair	USAF Armstrong Laboratory	U
Chiusano, Stephen	Kevric Company	U
Chou, C.K.	City of Hope National Medical Center	U
D'Andrea, John	US Navy Research Department	U
Dommetto, Louis	NISE East	U
George, David	UNISYS Corporation	U
Jordan, Don	HQAFMDA/SGOE, U.S. Air Force	U
Kerschner, Harrison	Pacific Northwest National Lab	U
Klaiienberg, B Jon	USAF Armstrong Laboratory	U
Lamastra, Anthony	American Iron & Steel Institute	U
Lechowich, John A.	Battelle PNL (Pacific Northwest Laboratory)	U
Marmaro, George	NASA/KSC	U
Roberts, Brad J.	US Army Center For Health Promotion & Preventive Med.	U
Rybak, Terence	General Motors Proving Ground	U
Tenforde, Thomas	Pacific Northwest National Laboratory [note that this same company was designated by Kerschner, H., above, as a User]	G
Yacovissi, Robert	US Department of the Navy	U
Total: 16		
Producer		
Balzano, Q.	Motorola	P
Butler, Charles	International Microwave Power	P
Croker, William	Georgia Power Company	U
Koepfinger, Joseph	Duquesne Light Company	U
Moore, Michael	Oak Ridge National Laboratory	P
Petersen, Ronald	Lucent Technologies	P
Swicord, Mays L.	Motorola (Voted Yes. In 1991 with FDA and voted No)	P
Vannalli, Arthur	Raytheon Co. Corp. Safety	P
[note: electric utility companies are classified as Producers even if self designation is user]		
Total: 8		

COMMENT NUMBER

	COMMENT NUMBER

Private Consultants (presumably mainly producing services for RF Users and Producers)

Ashley, Robert	Vector Services Corp, consulting research engineer	G?
Cohen Jules	Consulting Engineer	U
DeLorge, John	no company given. In 1991, his company association was the Dept. of the Navy with designated focus of basic research	G?
Fedro, William	Electric Reasearch and Management, Inc.	G?
Guy, A.W.	Bioelectromagnetics Consulting	G
Herman, Donald	no company given	G?
Maurer, Stewart	no company given	U?
Ort, John	Southwest Research Institute	G?
Osepchuk, John	Full Spectrum Consulting, in 1991 his company association was reported as Raytheon Research (supporting RF applications)	G
Sheppard, Asher	Asher Sheppard Consulting	G
Tell, Richard	Richard Tell and Associates (a RF consulting firm)	G?

Total: 11

[note: If a person is designated as a "User" and includes "consulting" in company name, or has no company, it is presumed the party is a consultant.]

Regulatory or Labor Union (both presumably focused on worker and public safety)

Regulatory

Bassen, Howard	FDA	G
Curtis, Robert	OSHA	G

Union

Paul, William - International Brotherhood of Electrical Workers (did not vote) G

Total: 3

Other

Fastman, Stewart	Amer. Insurance Services Group	G

Total 1

Grand Total: 44

	COMMENT NUMBER

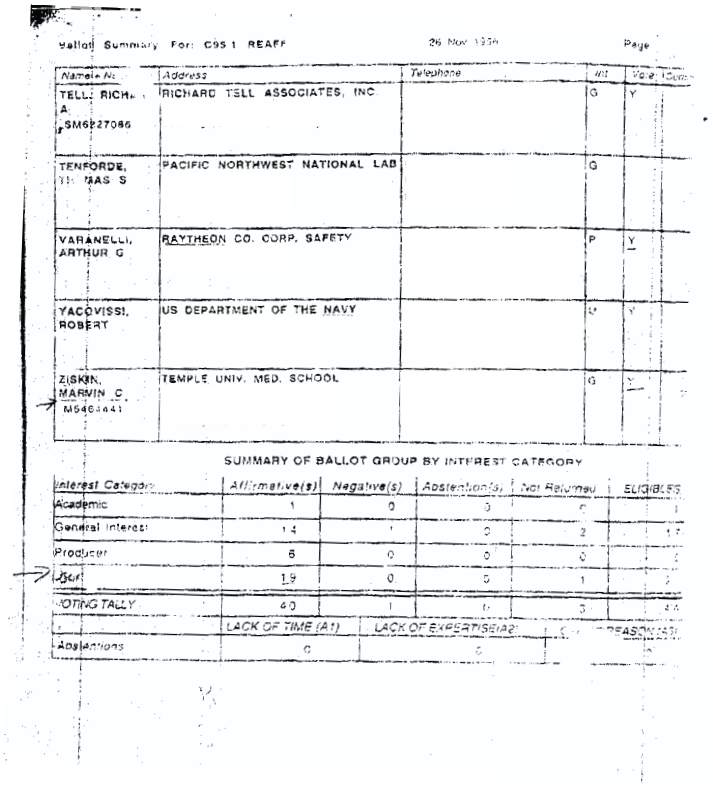
Ballot Summary For: C95.1 REAFF 25 Nov 1994 Page:

Name + Number	Address	Telephone	Ret.	Vote	Cm.
HEIRMAN, DONALD N M6773311			U	Y1	U
J[illegible]AN, DON W			U		
KERSCHNER, HARRISON F	PACIFIC NORTHWEST NATIONAL LAB		U	Y	
KLAUENBERG, B. JON	USAF ARMSTRONG LABORATORY		U	Y	
KOEPPINGER, JOSEPH L M3429602	DUQUESNE LIGHT COMPANY		U	Y	
LAMASTRA, ANTHONY	AMERICAN IRON & STEEL INSTI		U	Y1	C
LEONOWICH, JOHN A	BATTELLE PNL		U	Y	
LIN, JAMES C M5323149	UNIVERSITY OF ILLINOIS AT CHICAGO College of Engineering (MC154)		A	Y	
MARMARO, GEORGE M	NASA/KSC Biomedical Offic		Y	Y	
MAURER, STEWART M0954929			U	Y	

psw010at_m1

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER



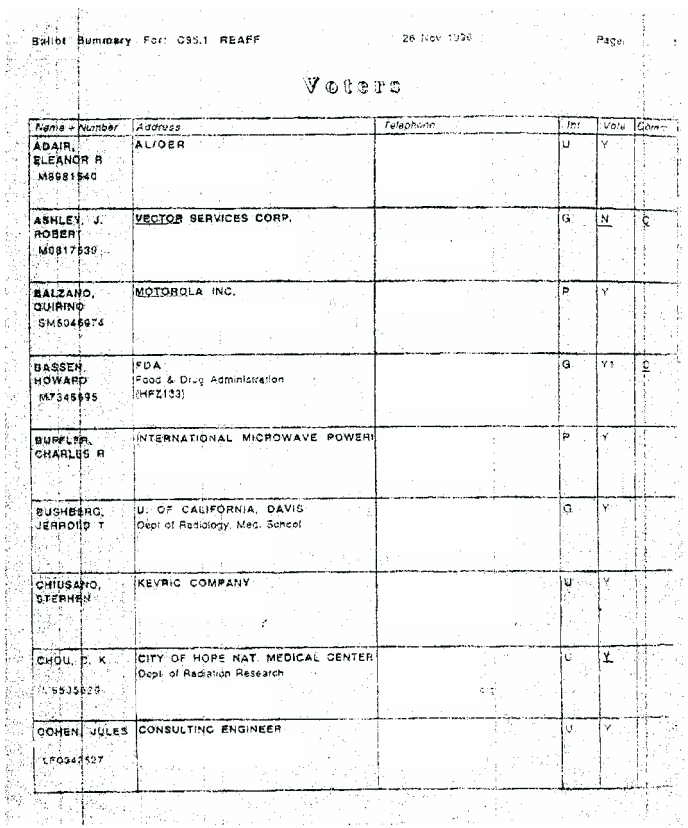
Ballot Summary For: C95.1 REAFF 26 Nov 1998 Page

Name + Nr.	Address	Telephone	Int	Vote	Comm
TELL, RICHARD A SM6227086	RICHARD TELL ASSOCIATES, INC.		G	Y	
TENFORDE, THOMAS S	PACIFIC NORTHWEST NATIONAL LAB		G		
VARANELLI, ARTHUR G	RAYTHEON CO. CORP. SAFETY		P	Y	
YACOVISSI, ROBERT	US DEPARTMENT OF THE NAVY		U	Y	
ZISKIN, MARVIN C. M5465441	TEMPLE UNIV. MED. SCHOOL		G	Y	

SUMMARY OF BALLOT GROUP BY INTEREST CATEGORY

Interest Category	Affirmative(s)	Negative(s)	Abstention(s)	Not Returned	ELIGIBLES
Academic	1	0	0	0	1
General Interest	14	1	0	2	17
Producer	5	0	0	0	5
User	19	0	0	1	20
VOTING TALLY	40	1	0	3	44
	LACK OF TIME (A1)	LACK OF EXPERTISE(A2)		REASON(A3)	
Abstentions	0	0		0	

COMMENT NUMBER



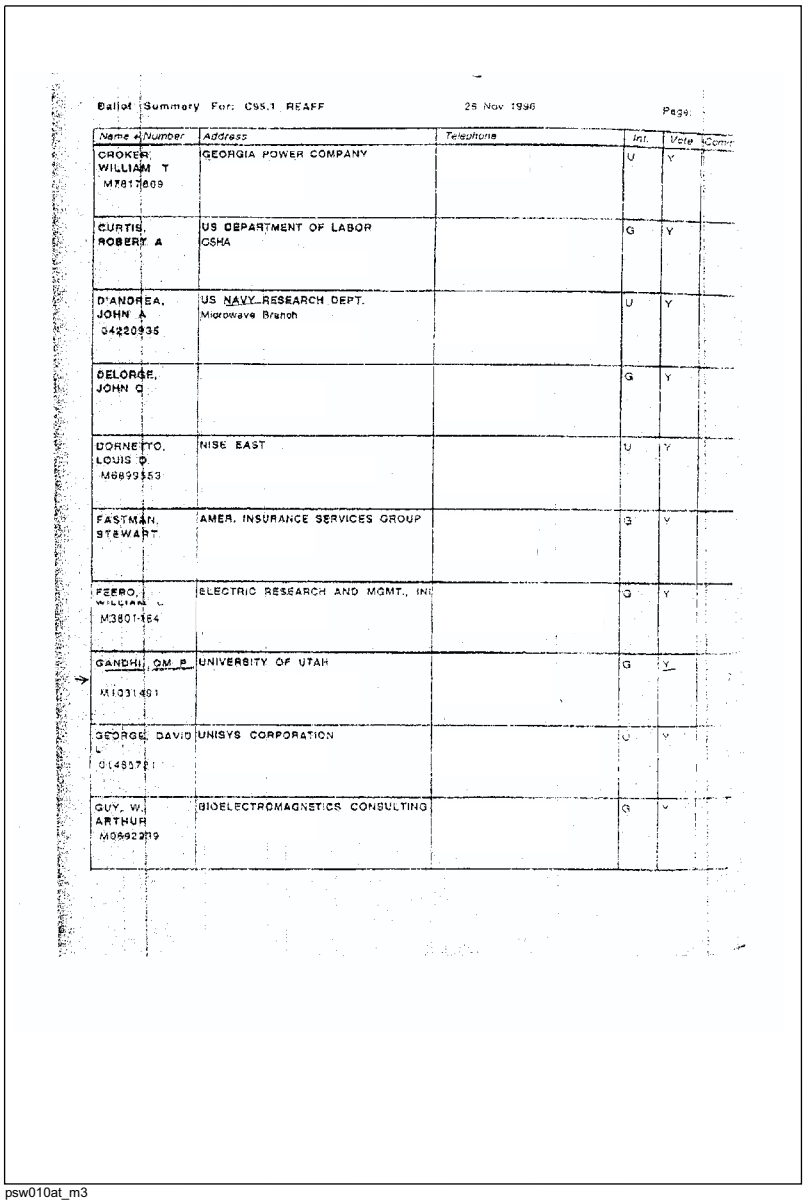
Ballot Summary For: C95.1 REAFF 26 Nov 1998 Page

Voters

Name + Number	Address	Telephone	Int	Vote	Comm
ADAIR, ELEANOR R M8981540	AL/OER		U	Y	
ASHLEY, J. ROBERT M0817539	VECTOR SERVICES CORP.		G	N	C
BALZANO, QUIRINO SM5045974	MOTOROLA INC.		P	Y	
BASSEN, HOWARD M7345995	FDA Food & Drug Administration (HFZ133)		G	Y1	C
BUFFLER, CHARLES R	INTERNATIONAL MICROWAVE POWER		P	Y	
BUSHBERG, JERROLD T	U. OF CALIFORNIA, DAVIS Dept of Radiology, Med. School		G	Y	
CHIUSANO, STEPHEN	KEVRIC COMPANY		U	Y	
CHOU, C. K. M5535828	CITY OF HOPE NAT. MEDICAL CENTER Dept. of Radiation Research		U	Y	
COHEN, JULES LF0341527	CONSULTING ENGINEER		U	Y	

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

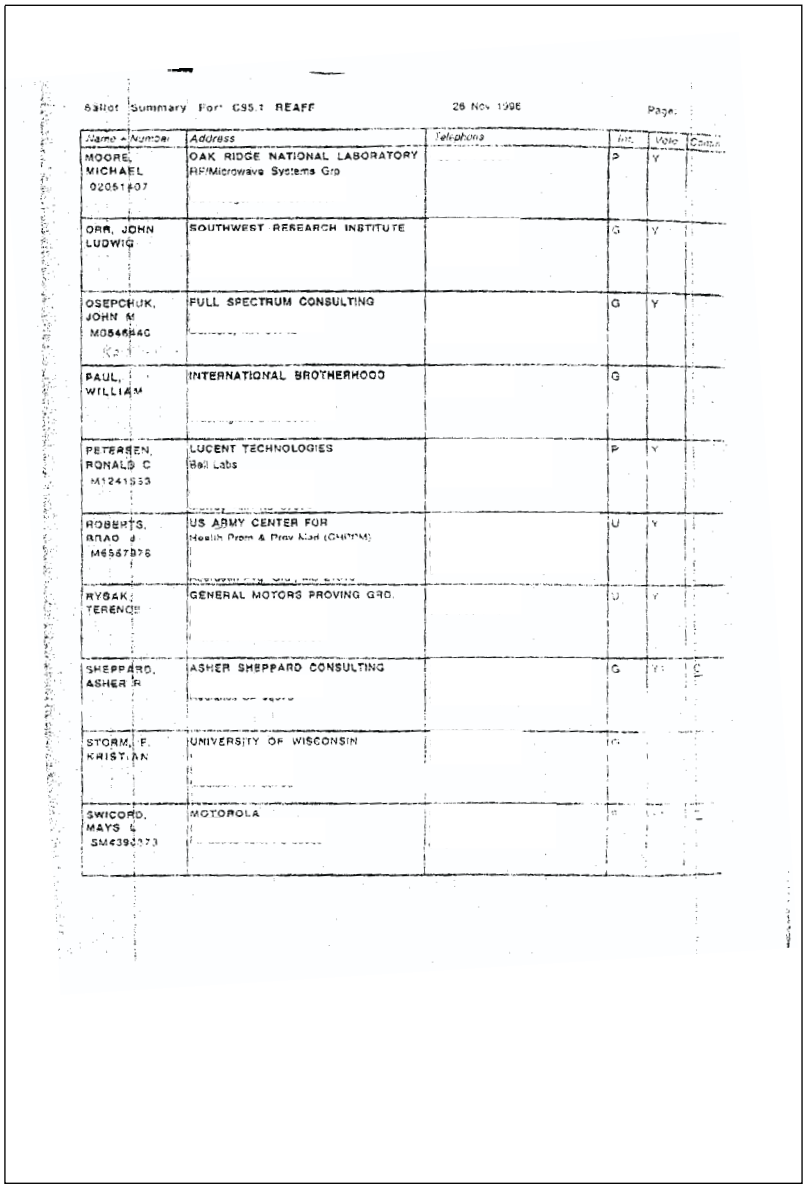
COMMENT NUMBER



Ballot Summary For: C95.1 REAFF 26 Nov 1996 Page:

Name + Number	Address	Telephone	Int.	Vote	Comm
CROKER, WILLIAM T M7617609	GEORGIA POWER COMPANY		U	Y	
CURTIS, ROBERT A	US DEPARTMENT OF LABOR OSHA		G	Y	
D'ANDREA, JOHN A 04220935	US NAVY-RESEARCH DEPT. Microwave Branch		U	Y	
DELORGE, JOHN O			G	Y	
DORNETTO, LOUIS O M6899553	NISE EAST		U	Y	
FASTMAN, STEWART	AMER. INSURANCE SERVICES GROUP		G	Y	
FEERO, WILLIAM E M3801464	ELECTRIC RESEARCH AND MGMT., INC		G	Y	
GANDHI, OM P M1031491	UNIVERSITY OF UTAH		G	Y	
GEORGE, DAVID L 01485781	UNISYS CORPORATION		U	Y	
GUY, W. ARTHUR M0892219	BIOELECTROMAGNETICS CONSULTING		G	Y	

COMMENT NUMBER



Ballot Summary For: C95.1 REAFF 26 Nov 1996 Page:

Name + Number	Address	Telephone	Int.	Vote	Comm
MOORE, MICHAEL 02051407	OAK RIDGE NATIONAL LABORATORY RF/Microwave Systems Grp		P	Y	
ORR, JOHN LUDWIG	SOUTHWEST RESEARCH INSTITUTE		G	Y	
OSEPCHUK, JOHN M M0546840	FULL SPECTRUM CONSULTING		G	Y	
PAUL, WILLIAM	INTERNATIONAL BROTHERHOOD		G		
PETERSEN, RONALD C M1241933	LUCENT TECHNOLOGIES Bell Labs		P	Y	
ROBERTS, ROAD M M6567876	US ARMY CENTER FOR Health Prom & Prev Med (CHPPM)		U	Y	
RYDAK, TERENCE	GENERAL MOTORS PROVING GRD.		U	Y	
SHEPPARD, ASHER R	ASHER SHEPPARD CONSULTING		G	Y	
STORM, F. KRISTIAN	UNIVERSITY OF WISCONSIN		G		
SWICORD, MAYS L SM4393273	MOTOROLA				

psw010at_m3

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER

SUMMARY OF AUDIO/VIDEO TAPES SUBMITTED BY MS. SHARON JUDGE IN SUPPORT OF COMMENTS SUBMITTED ON THE UEWR SUPPLEMENT TO THE NMD DEPLOYMENT DRAFT EIS MAY 12,2000

The audio and video cassettes submitted to support the written comments will be included in the administrative record for the Final Environmental Impact Statement. It was not possible to transcribe the tapes because of their poor quality and that many of the speakers cannot be identified. The information is also largely repetitive of the written comments to which we will direct specific comments. It should also be noted that the instructions at the public hearing specified written comments.

Video Tape #1: Massachusetts Department of Public Health (MDPH) Public Meeting on PAVE PAWS Study, February 16, 1999. The purpose of the meeting was to introduce the expert panel for the study, announce the charge to the panel, ask the public for any additional concerns that should be addressed by the MDPH panel. Several members of the public expressed concerns about the credentials of some of the panel members and the adequacy of the IEEE standard. A list of concerns and materials for review was submitted to the panel for review (included in attachment A of the written comments).

Audio Tape #2A and 2B: Public Meeting addressing the MDPH Expert Panel Report, March 13, 2000. The purpose of the meeting was to discuss and accept comments on the November 1999 MDPH report on PAVE PAWS. There was considerable discussion concerning a conflict of interest with Dr. Linda Erdreich. The Coalition to Decommission PAVE PAWS requested scoping meetings for the Air Force EIS. State Senator Murray requested the Air Force perform a cumulative health assessment. The panel presented a background and summary of the report and considered comments and questions from the public.

Audio Tape #3: "Invitation Only" Meeting with BMDO and MMR concerning PAVE PAWS, September 21, 1999. The meeting began with an introduction on the PAVE PAWS radar system and the NMD system. The plan to conduct a UEWR Supplement to NMD Deployment DEIS was announced. Major concerns expressed at this meeting were the high cancer rates on the Cape and the lack of monitoring of RF exposure from the PAVE PAWS.

Audio Tape #4A and 4B: Air Force Scoping Meeting, May 8, 2000. Major Ruscio gave a public health briefing. Public comments included requests for the Air Force to move the radar and for that alternative to be considered in the EIS. They also questioned the use of the IEEE standard for this "unique" radiation. Several commenters supported the modernization. Some wanted additional measurements and health studies included in the EIS. Several commenters said they didn't get adequate notification of the meeting.

Audio Tape #5A and 5B: Cape Cod Coalition to Decommission PAVE PAWS Meeting, January 22, 2000. The purpose of the meeting was to discuss the MDPH panel report dated November 30, 1999 although members of the MDPH panel were unable to attend. The speakers on the tape brought up the same issues previously discussed at earlier meetings and in Ms. Judge's written comments.

COMMENT NUMBER
PS-W-011

PS-W-011

12 May, 2000

SMDC-EN-VU.S, Army Space and Missile Defense Command
PO Box 1500, Huntsville, AL 35807-3801

COMMENTS ON THE SUPPLEMENT TO THE DRAFT EIS FOR THE NATIONAL MISSILE DEFENSE DEPLOYMENT

The Supplement to the Draft EIS is inadequate for many reasons, among them:

Public participation was inadequate, there was only one meeting on the Cape regarding this program. This, despite the high level of controversy regarding the PAVE PAWS over its 20 year life. The BMDO msde no attempt to educate the public regarding the EIS process The BMDO must combine their process with that of the Air Force. The EIS should address the cumulative effect of the facility, not merely the upgrade. 1 2

The possible long term chronic effects of this unique form of radiation must be taken into account. Also the great changes in the demography of the Cape since 1979. 3

Activities at the facility have already affected the sole source aquifer which lies under the facility. Possible dditional effects must be addressed. 4

The possibility of an alternate site must be addressed. A PAVE PAWS site has already been moved from Texas to Alaska 5

There has never been a study of the effects of the type of radiation from this kind of facility, Heating is not the only possible hazard. 6

The Final EIS must address these. and other important issues

Gilbert K. Woolley

psw010at_m4

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

PS-W-012

Comment Sheet
For the
UPGRADED EARLY WARNING RADAR SUPPLEMENT TO THE NATIONAL MISSILE DEFENSE DEPLOYMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for attending this public hearing. Our purpose for hosting this meeting is to give you an opportunity to comment on issues analyzed in the Supplement. Please use this sheet to comment on any issues that you feel should be clarified. To ensure that your comments are addressed we must receive your comments by May 12, 2000.

Date: 10 MAY 00 Signature: Peter T. Klenert

Thank you for this opportunity to make a statement for the record regarding the upgrade of the PAVE PAWS facility located on Upper Cape Cod, Massachusetts. There are certain unavoidable givens regarding this growing community concern over the proposed PAVE PAWS upgrade:

1st. Old Technology: The existing hardware technology is severely antiquated by more than a dozen upgrades.
2nd. Efficiency Compromised: The overall efficiency of the PAVE PAWS facility requires upgrading assisted in large measure by an upgrade in computer hardware.
3rd. National Security: National security particularly with regard to so called "Rogue Nations" and the potential for hostile Inter Continental Ballistic Missile (ICBM) launch.
4th. Existing Facility: The seventy-nine acre site is currently partially developed, operational and under lease agreement from the Commonwealth of Massachusetts.
5th. Original Site Intent: The original intent for the location of the facility was clearly a site yielding the most opportunistic view of the heavens but also a site which would be situated in a thinly populated area.

The growing community concern, of which I am a part, over the proposed PAVE PAWS upgrade does not revolve around issues of new computer hardware, efficiency and / or national security. Community alarm is galvanized by a single issue: the long term health effects in human beings as a result of being exposed to the type, size and pattern(s) of radiation emitting from PAVE PAWS today. Certain facts are clear:

1. Long term health effects, as of this date, are unclear, unknown and / or unpublished.
2. In terms of commercially developed site, a 79 acre site is medium to small which would curtail future development.
3. Remodeling the house vs. moving to a new location is the perfect time to strongly consider the latter.

We in the beams effected community would like to see PAVE PAWS move to a more safe location. The year round Cape Cod Community is no longer thin, it has grown exponentially since the early 70s. The equation is simple: health effects vs. cost to move. Please reconsider the "move to a new location" option. From where I sit the "Move to a New Location" option has been woefully under investigated. If Cape Cod were being attacked by some foreign enemy, or if we were experiencing widespread damage due to storm surge and tsunami, or biological attack via a type of West Nile Virus, no expense would be spared to try and protect life and property. Can not a fixed amount of money be spent to eliminate a potential, single source human health hazard?

Commentor:
Name: Peter T. Klenert & Family
Street Address:
City, State:
Zip Code:

cc: Senator Ted Kennedy, United States Senate
Senator John Kerry, United States Senate
Governor A. Paul Cellucci, Commonwealth of Massachusetts
Mrs. Sharon Judge, Spokes Person for the Cape Cod Consortium to Decommission PAVE PAWS

Please place form in the drop box or mail to:

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

psw012

COMMENT NUMBER
PS-W-012
1
2
3

PS-W-013

SMDC-EN-V
U. S. Army Space and Missile
Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

Dear Sirs: Re: Comments on UEWR supplement to DEIS of NMD deployment

These comments are in response to your public hearing conducted in Falmouth, MA on May 3, 2000.

- We have only a few years to prepare for a possible missile attack on the United States. Missile technology has been for sale for some time. The proposal to integrate national missile defense into our early warning radar systems is timely. Equipment upgrades are all that is needed for the PAVE PAWS sites of Massachusetts, California and Alaska.
- Since national missile defense operations will occupy less than one-quarter of the operational time of the nation's PAVE PAWS sites, health concerns in the EIS supplement need not be debated. This is because the same health concerns will get a full treatment under the EIS of the equipment upgrade of the PAVE PAWS sites. Nevertheless, the manner in which these concerns were addressed in the NMD EIS supplement is useful to us as a baseline for discussions in the PAVE PAWS upgrade EIS.
- Although we were told that we should be able to download the final NMD EIS from the BMDO web site, our attempts to access that web site have failed and it would appear that such a download is impossible for us. We have for some time had great difficulty linking up with any web site with the ".mil" extension. We don't know why that is, and we have tried to find out but we get no answers about this problem. We have run tracers and complained but have received no help thus far from either our server at MediaOne or the Military. We note that certain .mil sites, where the public has been asked to comment, are addressed without difficulty, such as water.project@mmr.brooks.af.mil, while e-mail to other names at the same address gets bounced. We can't even access the DoD IG website. If you can tell us how to solve this problem we would be grateful. One way to avoid printing the final EIS up is for the BMDO to place a copy of this document on the MMR web site which has a high degree of accessibility. Linkages between the PAVE PAWS, BMDO web sites and the MMR.org site need to be improved.

Sincerely,
Minos Gordy
Minos Gordy, ChE,
Chairman of Patriots Advocating Camp Edwards Restoration and Survival

COMMENT NUMBER
PS-W-013
4
1
2

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER
PS-W-014
1
2
3
4
5

Sue Walker PS-W-014

May 11, 2000

SMDC-EN-V
U.S. Army Space and Missile Defense Command
PO Box 1500
Huntsville, AL 35807-3801

Dear Donna Brock, Deputy Director

Please incorporate my comments into the National Missile Defense (NMD) Deployment Final EIS.

The No Action Alternative for the Supplemental has received inadequate analysis. On page es-3 the supplemental states, " The No-action Alternative has been previously analyzed in National Environmental Policy Act documentation for each EWR." That documentation is over 20 years old and not readily available to the public. This is not a user friendly attitude and calls into question the integrity and sincerity of the entire current analysis.

Under 2.3 "Alternatives Considered but not Carried Forward" there is a flawed assumption that Cape Cod PAVE PAWS will continue in operation. The Cape Cod site was to be operational for 10 – 20 years. It has now exceeded its life span and it should cease to exist. Citizens have repeatedly called for accurate measurements, not time averaged measurements. We have called for federal health studies. All of this was ignored and now PAVE PAWS should be shut down.

The supplemental is flawed, because it does not consider the environmental benefit of dismantling PAVE PAWS. The land would be free of the threat of underground fuel vaults. The reclaimed land could become a positive addition to the proposed 15,000 acre Wildlife Refuge. This alternative needs to be considered by the public.

3.2.3 The Cape Cod Health and safety data is totally unacceptable. The data is from 1978 & 1979 and gives time averaged power density. This is meaningless data from a system that emits pulsed radio frequency radiation. The data needs to be updated and done accurately. We do not accept, "The current estimates of RF power density...." 4-27 Estimates are an insult. We want real, new data of pulsed radiation.

The Supplement lists all organizations contacted in preparing the Supplement. Barnstable County's land use agency is the Cape Cod Commission. They should have been contacted prior to the issuance of the Supplement.

COMMENT NUMBER
6

The entire EIS is based on the mission of NMD which is the identification and precise tracking of ballistic missiles. The NMD once deployed would be an abrogation of the ABM Treaty. This treaty has been the cornerstone of our security for over 25 years. We should not weaken this treaty as that would make us less safe. We need our enemies and ourselves to both feel more secure. If our enemies feel less secure they will build more offensive weapons to overpower the NMD system. We need nuclear disarmament not a new arms race touched off by breaking the ABM Treaty.

Ballistic missiles are not the only way to deliver nuclear weapons. We have seen terrorism delivered in trucks and suitcases. Some choose chemical and biological weapons. The U.S. must improve its non-violent strategies to bring about a safe and peaceful world.

This spring 11 towns on Cape Cod are considering whether to ask Pres. Clinton to initiate an international convention to negotiate a verifiable gradual elimination of nuclear weapons. So far they have been strongly saying, "Yes" to disarmament. The town of Falmouth paved the way last spring. Abolition 2000 is an international campaign.

There should be No Action on the NMD system.

Sincerely,

Susan V. Walker

Susan V. Walker, President
Action for Nuclear Disarmament: Cape Cod

psw014

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

COMMENT NUMBER
PS-W-015
1
2
3

Stephen Seymour PS-W-015

May 12, 2000

SMDC-EN-V
U.S. Army Space and Missile Defense Command
PO Box 1500
Huntsville, AL 35807-3801

Subject: Comments on the Supplemental to the Draft EIS for the National Missile Defense Deployment

To whom it may concern:

I am writing to express by dissatisfaction with the Draft EIS for the subject project:

1. The process was too closed and did not allow for enough public input. The facility affects all of Cape Cod and the one hearing held was in Falmouth at one end of the Cape. The hearing was not well advertised and it was difficult for many people to attend.

2. Before the US Government spends more money on this facility there needs to be serious consideration given to relocating it. The population of Cape Cod has doubled to 200,000 people over the last 20 years (since Pave Paws was originally built). This apparently dangerous installation needs to be relocated to a less populated area.

3. The facility is potentially hazardous to the health of the people and wildlife living in the Cape Cod Community. The discussion of the health issues in the supplement did not take into account the long-term chronic effects of exposure to this unique form of radiation. Studies of the effects of the radiation need to be undertaken before the facility is upgraded. These studies need to be independently conducted. The US Government has had sufficient time over the last 20 years to perform these studies. It is an insult to the people of Cape Cod that these studies have not been undertaken. We should not be the guinea pigs. Especially if no one is even collecting data on us. This is not acceptable

The supplement and the process has mislead the public and these issues need to be addressed. I would like to be copied with any information concerning this process and this facility. Thank-you for a careful consideration of my concerns.

Sincerely,

Stephen Seymour, P.E.
Executive Director GreenCAPE

psw015

COMMENT NUMBER
PS-W-016
1

PS-W-016

Priority Mail

May 12, 2000

SMDC-EN-V
U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

Dear National Missile Defense (NMD) Joint Program Office:

This letter provides my comments on the Upgraded Early Warning Radar (UEWR) Supplement to the NMD Deployment Draft Environmental Impact Statement (DEIS), per the May 3rd Meeting on PAVE PAWS held in Falmouth, MA. I attended that meeting and found it very useful to talk to the various military officers and the senior engineer from Raytheon Corporation. I am a geological oceanographer with a PH.D. in geology. I retired from the U.S. Coast and Geodetic Survey about five years ago, having specialized in ocean surveying and mapping. That surveying aboard ships used multibeam systems for echo sounding, as well as radar and radio systems for positioning.

I live in East Harwich on Cape Cod, about 22 nautical miles ESE of PAVE PAWS. The accompanying map, which apparently was drafted by C. W. Kleekamp based on the Final EIS dated May 1979 (Figure 3-1, Page 3-3), shows the location of that town in Sector 1, an area of fence overlap where the EMR is projected to be highest. The map was picked up from a table at a PAVE PAWS meeting held earlier this Spring. On older television sets, I have heard a very strong PAVE PAWS signal blasting through on Channel 14, wiping out any programming on that 470 MHz channel. Newer cable-ready sets do not allow the capture of the 450 MHz PAVE PAWS signal, or the cable contains a band-pass filter which blocks out the signal.

My basic hypothesis is that much of the elevated cancer rate on the Middle and Lower Cape is due to radiation from PAVE PAWS, either from the main beam or the sidelobes. Most studies of PAVE PAWS radiation, including the UEWR Supplement, assume that the highest radiation on the ground will be found closest to the source. That ignores the fact that the highest source of radiation is concentrated in the main beam, which for the most part is passing overhead in the Upper Cape towns close to PAVE PAWS. An exception would be any objects which project up into that beam, such as the tall stack on the Canal Generating Station in Sandwich. In that case the stack should become a secondary radiation source due to reflected energy.

The 2.2 degree-high main beam is supposed to be centered 3 degrees

COMMENT NUMBER

above the horizon, with the bottom of that beam 1.9 degrees above the horizon (see Figure 1-3, UEWR Supplement). The side lobes are to be found within and beyond that 1.9 degree zone. A "Distance of Visibility" table used by mariners can be used to estimate the distance to the PAVE PAWS horizon. For an object at 321 feet (269' ground elevation plus 52' from Figure 1-3), the horizon at sea level would be at about 20.5 nautical miles out. This falls in the general vicinity of the Brewster/Harwich/Chatham area, where many elevations of bedrooms are on the order of 100 feet above sea level. Thus, if the main beam is not 1.9 degrees above the horizon in that area, but rather is at or close to the horizon, that area will receive radiation on a direct line to the source. To the best of my knowledge, there have never been any measurements of PAVE PAWS radiation out on the horizon. That is the zone, however, that has a higher cancer rate than near PAVE PAWS.

The higher cancer rates on the horizon may result from a basic weakness in PAVE PAWS design or from possible movement of PAVE PAWS after it was installed. As to design, the beams are generated from two flat surfaces, each tilting back 20 degrees from the vertical. While the system may be able to generate a beam exactly 1.9 degrees above the horizon perpendicular to the center of the face, it could be wishful thinking that there is enough precision out at the edges of the face to control the beam at exactly 1.9 degrees above a horizontal plane. The Harwich area is located out on the extreme edges of both faces. The system, which scans in azimuth as well as elevation, may just pump plenty of energy out on the edges, and hope that enough gets through to detect motion of large objects from one ping to the next. If PAVE PAWS had been designed with a third face between the other two, it should have been possible to maintain better control of the beams in an ESE direction. For instance, phased array systems on U.S. Navy ships appear to have an array pointed forward, as well as to port and starboard. If PAVE PAWS engineers and military officers can not guarantee the maintenance of a 2.2 degree main beam that does not strike any populated land areas on or above the horizon to the southeast, the whole system may have a fundamental design weakness that is responsible for the increased rate of cancer in that area. While the system may be suitable for remote areas in Alaska, it never should have been put on Cape Cod if it has that design weakness.

There also is the possibility that PAVE PAWS has tilted a degree or two to the east since it was installed, thus bringing the main beam down to the horizon. The PAVE PAWS complex sits on loose glacial deposits on the highest hill on the Cape. All slopes are in effect slowly flowing downhill in response to the pull of gravity, in a geological process known as "creep". If you place a heavy complex such as PAVE PAWS on the hill, the process could be accelerated, with the flow toward the slopes to the southeast. It also is possible that the two large faces exposed to winds, heating and freezing, etc. may get out of perfect alignment temporarily due to exposure to the elements. Yet another process that can cause the land to tilt is differential withdrawal of ground water. In other words, the PAVE PAWS area has little ground water withdrawal

COMMENT NUMBER

beneath it, but the now heavily-populated area to the southeast may sink in response to heavy water usage. It now is possible to monitor any tilting using the Global Positioning System (GPS) satellites.

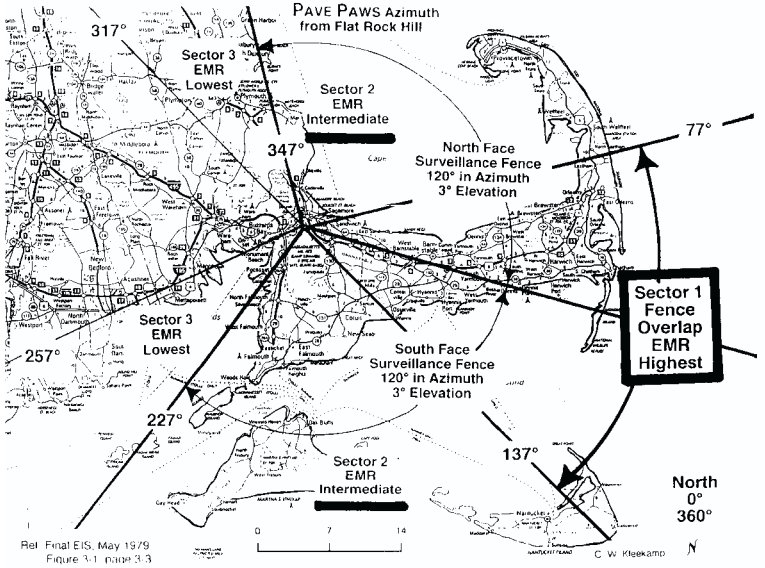
If radiation from PAVE PAWS is causing increased cancer in land areas such as Harwich, out near the radar horizon, how do you sort it out from other causes of cancer? Studying cancer on the Cape is very difficult because there are so many retirees. Many towns have 30-40 percent retirees, who have spent much of their lives living in other areas. When they get sick, many move back to live with relatives off the Cape to spend their final days, thus perhaps confusing mortality statistics. Non-profit organizations such as the Silent Spring Institute are studying possible reasons for breast cancer, but they find nothing in the water, soils, etc. that would account for the increased cancer rates on the Middle and Lower Cape. This brings us to one group of individuals who has spent most of their lives living on the Cape, especially during the time PAVE PAWS has been operating - THE CHILDREN.

In that regard, the answer as to a link between PAVE PAWS radiation and childhood cancer may lie beneath a small tree in the Evergreen Cemetery in East Harwich. There one finds the remains of Sarah, who died of leukemia in 1995, one day after turning 16. Two years ago the graduating Harwich High School class of about 80 was missing two students who had died of cancer, one of whom was Sarah and the other Jimmy, who died in 1994. Jimmy is memorialized at a ballpark near the High School. When the Town of Harwich recently opened a new community center, a room was named for Sarah. Last year there were several fund raising events for a junior at Harwich High School who also was sick from cancer.

One of the reasons that Sarah's cancer may provide us with some answers is that her mother asked the Bureau of Environmental Health Assessment (BEHA), Massachusetts Department of Public Health, to look into reasons for the cancer among children on Cape Cod. The result was a report dated September 1999 entitled "Assessment of Childhood Cancer Incidence on Cape Cod, Massachusetts, 1982 to 1994". The report compares the childhood cancer for each town to what would be expected for people in the state by using Standardized Incidence Ratios (SIRs), where 100 is the expected average. For the entire Cape, the childhood (up through age 19) cancer rate was 119, or 19 percent above normal for the state. For the Upper Cape (Barnstable, Bourne, Falmouth, Mashpee, Sandwich) it was at 103, very close to normal. For the Middle Cape (Brewster, Chatham, Dennis, Harwich, Yarmouth) it was 143. On the Lower Cape (Eastham, Orleans, Provincetown, Truro, Wellfleet) it was 163. When one looks at lymphoma in the Middle Cape area, where Jimmy and Sarah lived, the SIR jumps to 317 for males and 351 for females. There is a statement in Appendix C in the report that says "Ionizing radiation has been shown to induce lymphoma in laboratory animals. Exposure to ionizing radiation from atomic bombs dropped on Japan was associated with an elevation of Non-Hodgkin's Lymphoma in persons who were under 25 years of age at exposure". In other

psw016

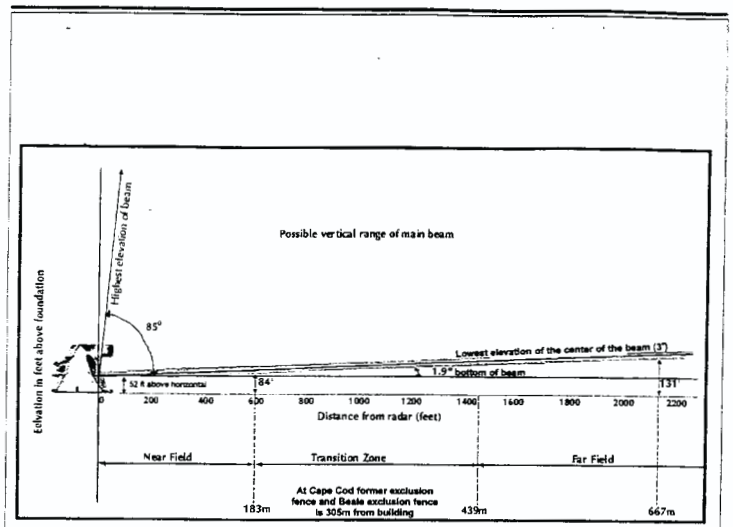
	COMMENT NUMBER
words, not only is the cancer rate up on the PAVE PAWS horizon, it is up with types of cancer that can result from radiation. The Supplement uses time-averaged radiation exposure values for places near PAVE PAWS (where the main beam is far overhead), with assumptions that part of the time the main beam is scanning far above. What probably causes the cancer on the horizon, however, is what I have heard on TV sets in the area. It is a very powerful, steady signal which results from a beam parked on the horizon. It probably is not long-term exposure to just the peak power values of the beam alone that kills the kids and others, but rather a combination of direct beam exposure and local effects. Those local effects include topographic relief (both altitude and shapes), cleared areas oriented toward PAVE PAWS, shapes of buildings that collect and focus energy, size of openings into buildings, and especially reflections off metal buildings or cars. The reflections probably can boost the signal arriving on a house from a factor of one for the main beam alone to a factor of 1.7 when both the direct main beam and the reflection arrive at the same time. The Expert Panel on PAVE PAWS convened by the Massachusetts Department of Public Health does not share your views that just meeting an IEEE standard is the final word on cancer causes. In a report, largely written by Dr. Henry Lai of the University of Washington, the Panel endorsed the standard, but called for measurements of PAVE PAWS radiation and keeping an open mind on whether the type of pulsed radiation from PAVE PAWS might cause cancer at values below the IEEE standard (http://www.state.ma.us/dph/beha/pavepaws/assess.htm). There is no indication that the Panel was aware of the study on cancer in children on Cape Cod. A 1999 study of breast cancer in Newton, Massachusetts by the Silver Spring Institute found a good correlation between an area of high cancer and proximity to radio and TV stations. In summary, I find that the Supplement does not address the issue of radiation and cancer, particularly in children, on the PAVE PAWS horizon in Sector 1. From the 1979 EIS data, you knew that this was the fence overlap area where EMR was expected to be highest. Now that high cancer rates are turning up in that area, you continue to do nothing except recommend that PAVE PAWS be continued in operation (as is) for an indefinite time into the future. Because there are now alternate means of detecting missile launches from satellites, you should consider raising the lowest elevations of the beams during periods of routine defense alert (DEFCON), but just bringing them down to the horizon during tests and high alerts. Sincerely yours, Richard B. Perry	2



COMMENT NUMBER

psw016b

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)



EXPLANATION

Note: The highest (85 degrees) and lowest (3 degrees) elevations above horizontal for which space objects can be tracked by the main radar beam are shown in this figure. The height of the bottom of the main beam (1.9 degrees) above ground level is shown at representative horizontal distances.

Note: At the three PAVE PAWS radar sites the horizontal axis would usually be above the actual ground level. Hence, the elevation of the main beam above ground would be greater than shown in this conceptual drawing.

Note: This drawing does not take into account the topography of the surrounding area.

Note: Lowest elevation of radar beam does not include height of center of radar above sea level.

Note: Height elevations are not to scale.

Maximum and Minimum Vertical Elevation of the Main Radar Beam

Figure 1-3

COMMENT NUMBER

COMMENT NUMBER

PS-W-017

PS-W-017

THE COMMONWEALTH OF MASSACHUSETTS

HOUSE OF REPRESENTATIVES
STATE HOUSE, BOSTON 02133-1054

RUTH W. PROVOST
REPRESENTATIVE
2ND PLYMOUTH DISTRICT

ROBERT BOWES
LEGISLATIVE AIDE

Committees:
Energy
Election Laws

ROOM 26, STATE HOUSE
TEL. (617) 722-2080

May 12, 2000

U.S. Army Space & Missile Defense Command
PO Box 1500
Huntsville, Alabama 35807

To Whom It May Concern:

I am writing in regards to the Environmental Impact Statement relating to PAVE PAWS.

First, I would like to discuss my concerns with the way in which the Massachusetts Department of Public Health study was used in a misleading fashion. The MDPH report did not conclude that the health risks from PAVE PAWS are minimal, the report indicated that in order to determine the risks of PAVE PAWS more studies need to be conducted. **1**

Before any further action is taken on PAVE PAWS, the community should be adequately informed of the immediate health risks of PAVE PAWS. In addition to studying the short-term effects of PAVE PAWS we must adequately study and monitor the long-term health risks of microwave radiation.

Though the health risks and high cancer rates can not be directly attributed to PAVE PAWS at this point, the matter is of great concern to the community. In order to ensure that the community is informed and included in this process, drastic improvements must be made to the public hearing process. **2**

The public hearing process is totally inadequate. The expectation that a person can express their concerns on both, possible health risks and the high-tech intricacies of the subject in just four minutes is unrealistic.

Also, the public notification for the hearings has been unacceptable. In order to ensure community's concerns are heard, advertising and notification must be made more than

COMMENT NUMBER

one day in advance. One small ad buried in one of the local newspapers does not properly alert the public.

Thank you for your attention to my concerns. Should you have any questions, please feel free to contact me.

Sincerely,

Ruth W, Provost
State Representative

psw017

COMMENT NUMBER

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit 9.2.1-1: Reproductions of Written Comment Documents (Continued)

Table 9.2.1-2: Responses to Written Comments

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
Della and Peter Bye	PS-W-001.1	Health and Safety	Appendix H, sections 3.2 and 4.2.1	A Supplement to the NMD Deployment Draft EIS analyzed the potential NMD upgrades to the PAVE PAWS radars. The Air Force has announced that they will prepare an EIS analyzing the modernization, maintenance, and sustainment of operations of the PAVE PAWS radars. An EIS for operation of the PAVE PAWS at Beale AFB was completed in July 1980 (Final Environmental Impact Statement, Operation of the PAVE PAWS Radar System at Beale AFB, California). We have reviewed the Dr. Neil Cherry, Professor Guy, and Dr. John Goldsmith studies listed in your comments to the Massachusetts Department of Public Health. Section 4.1.2 of the UEWR analysis in appendix H describes the methods for assessment of health effects from environmental exposures, and discusses a number of recent published studies that, using standard methods, are relevant for assessing the effects of long term exposure at low levels. Section 4.1.2 also summarizes the results of scientific assessments of the comprehensive research on radiofrequency and health. The International Commission on Non-ionizing Radiation Protection (ICNIRP, 1998), the Institute of Electrical and Electronic Engineers (1991), the National Radiological Protection Board of Great Britain (1993), or the Royal Society of Canada (1999) have concluded that scientific evidence does not show that adverse health effects occur when exposure is to levels of radiofrequency below the recommended exposure limits (standards). Additionally, the U.S. Environmental Protection Agency has not classified radiofrequency as to its carcinogenicity. Rather, the agency participated in the development of the Federal Communication Commission (FCC) regulations, first issued in 1996, and has agreed to the exposure limits. These regulations are based on the guidelines developed by the Institute of Electrical and Electronic Engineers. The electromagnetic radiation levels around Covelo and any other areas of California except those controlled by the Air Force on Beale AFB are below all applicable standards.
Elizabeth J. Shafer	PS-W-002.1	Environmental Justice	4.3.1.13(EIS), 4.3.4.14(EIS), appendix H – 1.5	Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, requires that Federal agencies identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Environmental Justice concerns may arise from impacts on the natural and physical environment and related social, cultural and economic effects. However, this does not include issues relating to determination of national priorities and associated funding levels by other branches of government. Based on the findings of the NMD Deployment EIS and the UEWR Supplement, deployment of the NMD system at any of the locations analyzed would not have a disproportionately high and adverse effect on any minority or low-income populations.
	PS-W-002.2			See response to written comment PS-W-002.1.
Della and Peter Bye	PS-W-003.1	General	Appendix H	Comment noted.
	PS-W-003.2	Health and Safety	Appendix H, sections 3.2 and 4.2.1	See response to written comment PS-W-001.1.
Suzanne K. Condon - Massachusetts Department of Public Health	PS-W-004.1			As stated in section 2.1 of the UEWR analysis in appendix H, an RF energy survey will be conducted within the next year and prior to proposed upgrades being installed to assess potential public exposures. This will provide a valuable foundation for future analyses. Following installation of the proposed upgrade, RF energy measurements would be conducted to verify that emissions are not affected by the upgrade and to confirm the predictions based on computer modeling.

Table 9.2.1-2: Responses to Written Comments (Continued)

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
	PS-W-004.2			In response to the comment, the following additional text from the MDPH report is being added to the UEWR analysis in appendix H: "But at the same time, there is suggestive scientific evidence that RFR produces bioeffects at much lower intensities than previously known. The scientific evidence cannot answer the question conclusively whether the PAVE PAWS radar will or will not cause harmful effects to humans in the community." (See section 4.1.3). On page 13 of their report the Panel also writes "It is the opinion of this panel that the evidence for these "low level" (< 10 microwatt/cm2) effects does not reach a level sufficient to justify claims of any health hazard." (Section 4 of the MDPH Expert Panel, Discussion and Summary) We have also added this information to section 4.1.3.
Gary G. Hayward	PS-W-005.1	General	Appendix H	Comment noted. See response to written comment PS-W-010 (attachment A, response 3b).
Judy Stetson	PS-W-006.1	Program	1.0 (EIS)	The decision to deploy the NMD system will be based on the analysis of the ballistic missile threat to the United States, technical maturity of the NMD system, operational effectiveness, affordability, strategic arms reduction objectives, and other factors including the potential environmental impacts of deploying and operating the NMD system.
	PS-W-006.2	Program	1.0 (EIS)	Comment noted.
David Dow	PS-W-007.1			A 2-week notice was made for the original public hearing scheduled for 27 April. As a courtesy, the meeting date was changed to 3 May in order to resolve local public meeting conflicts. Upon changing the meeting date, a re-notification to the public was made as soon as possible. The notices indicated where further information could be reviewed. In addition, the informal sessions prior to the formal hearing portion of the May 3 hearing were intended to provide an opportunity to those who were interested to obtain more information and get answers to specific questions. See response to written comment PS-W-010(3b).
	PS-W-007.2	Program	1.0 (EIS)	The UEWR Supplement to the Draft Deployment EIS only analyzed the potential NMD hardware and software upgrades to the PAVE PAWS radars. National security policy and the assessment of threats to the United States are outside the scope of the NMD Deployment EIS.
	PS-W-007.3			See response to written comment PS-W-010 (attachment A, responses 2 and 4a).
	PS-W-007.4			See response to written comment PS-W-010 (attachment A, response 11t).
	PS-W-007.5			See response to written comment PS-W-010 (attachment A, responses 4b).
	PS-W-007.6			The total peak power is a measure of the peak power in the direction of the transmit main beam. The operating parameters listed in table 1-1 of the UEWR analysis in appendix H apply to each face. Each array face scans sectors with azimuthal extents of +/- 60 degrees of the array boresights, such that the total azimuthal coverage is 240 degrees. Thus, the radar's two tramsmit beams do not steer to the same locations.
Tony Verderese	PS-W-008.1	Program	1.0 (EIS), Appendix H	See response to written comment PS-W-010 (attachment A, responses 2, 4, 4a, 5, and 9b).
Paul D. Manoli	PS-W-009.1	Program	Appendix H	Comment noted.
Sharon Judge – Cape Cope Coalition to Decommission PAVE PAWS	PS-W-010.1			See attachment A at the end of this table (table 9.2.1.2)

Table 9.2.1-2: Responses to Written Comments (Continued)

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
Gilbert K. Woolley	PS-W-011.1			See response to written comment PS-W-010 (attachment A, responses 1 and 3c).
	PS-W-011.2	Program	1.0 (EIS), Appendix H	See response to written comment PS-W-010 (attachment A, response 2).
	PS-W-011.3			See response to written comment PS-W-010 (attachment A, responses 4a, 6, and 9b).
	PS-W-011.4	Program	1.0 (EIS), Appendix H	See response to written comment PS-W-010 (attachment A, responses 4 and 7).
	PS-W-011.5	Program	1.0 (EIS), Appendix H	See response to written comment PS-W-010 (attachment A, response 5).
	PS-W-011.6			See response to written comment PS-W-010 (attachment A, responses 4a and 9a).
Peter T. Klenert	PS-W-012.1			Comment noted.
	PS-W-012.2			See response to written comment PS-W-010 (attachment A, responses 4, 4a and 5).
	PS-W-012.3	Program	1.0 (EIS), Appendix H	See response to written comment PS-W-010 (attachment A, response 6).
Minos Gordy – Patriots Advocating Camp Edwards Restoration & Survival	PS-W-013.1			See response to written comment PS-W-010 (attachment A, responses 2 and 5).
	PS-W-013.2			A link to the BMDO website has been provided on the MMR website that should improve the accessibility of the Final NMD Deployment EIS.
Sue Walker – Action for Nuclear Disarmament: Cape Cod	PS-W-014.1			See response to written comment PS-W-010 (attachment A, responses 1 and 4c).
	PS-W-014.2			See response to written comment PS-W-010 (attachment A, responses 2 and 4).
	PS-W-014.3			See response to written comment PS-W-010 (attachment A, response 4).
	PS-W-014.4			See response to written comment PS-W-010 (attachment A, responses 4a and 4b).
	PS-W-014.5			Comment noted. The Cape Cod Commission was on the distribution list for the UEWR Supplement and subsequently is on the distribution list for the NMD Deployment Final EIS.
	PS-W-014.6	Program	1.0 (EIS)	Treaty and foreign policy considerations and timing of a decision to deploy an NMD system are political and policy issues that are not within the scope of this EIS or the NEPA process.

Table 9.2.1-2: Responses to Written Comments (Continued)

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
Stephen Seymour – GreenCAPE	PS-W-015.1			See response to written comment PS-W-010 (attachment A, responses 3b and 3c).
	PS-W-015.2	Program	1.0 (EIS), Appendix H	See response to written comment PS-W-010 (attachment A, responses 5 and 6).
	PS-W-015.3	Program	1.0 (EIS), Appendix H	See response to written comment PS-W-010 (attachment A, responses 4, 4a, 4b and 9b).
Richard B. Perry	PS-W-016.1			It is not possible to respond directly to your hypotheses. However, see response to written comment PS-W-010 (attachment A, response 11j).
	PS-W-016.2			See response to written comment PS-W-010 (attachment A, response 4).
State Representative Ruth W. Provost	PS-W-017.1			See response to written comment PS-W-010 (attachment A, responses 4a, 4b, 9a, 9b, and 10).
	PS-W-017.2			See response to written comment PS-W-010 (attachment A, response 3b).

Table 9.2.1-2: Responses to Written Comments, Attachment A

Responses to PS-W-010

1. Objection to the BMDO NEPA Process
Continued use of existing facilities previously analyzed in an EIS does not typically require further NEPA analysis, nor do minor modifications to such facilities that will not result in changes to the environment or human health and safety. Consequently, at the inception of the NMD Deployment EIS process, it was not deemed necessary to have special scoping sessions for the PAVE PAWS Radar upgrades. Many of the details concerning implementation of the proposed upgrades had not been determined at the outset. However, BMDO had determined that the proposed NMD modifications would only involve the replacement of hardware and software components and would not result in changes to the peak or average power levels. In addition, it is anticipated that the radars would operate in support of the NMD mission only a very small percentage of the total operating time.

As a general proposition, controversy over the existence of environmental effects (including safety and health) of government activities may warrant analysis under NEPA in cases that would not otherwise require an analysis. In this situation, however, the original controversy had been over the health and safety effects of continued operation of the PAVE PAWS radars in support of ongoing Air Force missions. Notwithstanding the absence of any indication that the upgrades would result in environmental or health and safety impacts, BMDO decided to prepare a Supplement to the NMD Deployment Draft EIS to provide a mechanism for public involvement and to assist the authorities in their decisions concerning deployment of an NMD System.

2. Dual BMDO/AF EIS Process
Two different agencies within the Department of Defense are planning separate actions, with different decisionmaking timelines, which affect the Cape Cod PAVE PAWS radar. The Ballistic Missile Defense Organization, or BMDO, is a joint service agency (i.e., Air Force, Army, and Navy) that falls under the Office of the Secretary of Defense. It is responsible for development of and deployment planning for the National Missile Defense, or NMD, system designed to protect the entire United States against a limited strategic missile threat. One element of the NMD system is the proposed replacement of portions of the interior electronic hardware and computer software (see section 2.1 of the UEWR analysis in appendix H) at the PAVE PAWS early warning radars at Clear Air Force Station Alaska, Beale Air Force Base California, and Cape Cod Air Force Station in Massachusetts. The NMD Deployment EIS, which includes the UEWR analysis, is being prepared to support a decision by the Administration, which could come as early as this

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

summer, on whether to deploy NMD. The purpose of this EIS is to provide the NMD decisionmakers with an understanding of the environmental impacts of the total NMD system, and for this reason the supplement focuses just on the proposed NMD upgrades.

The U.S. Air Force operates and has real property accountability over the PAVE PAWS radars. Under current plans, the Air Force's early warning and space tracking missions would continue regardless of the decision on NMD deployment, and to support these missions the Air Force needs to take actions to extend the service life of the radars. The Air Force, therefore, recently announced that it will be conducting its own EIS that focuses on modernization, maintenance, and sustainment of current operations at the three early warning radar facilities. The Air Force is just at the beginning of its EIS process, and it anticipates completing its EIS in time to support a decision by fiscal year 2002 on whether to proceed with its service life extension program.

3. Public Involvement
3a. Scoping
The Council on Environmental Quality Regulations, which delineate procedures for conducting an environmental impact statement (EIS), do not require federal agencies to conduct scoping in connection with the preparation of supplements to draft or final EISs. We have, however, had extensive discussions with the Air Force and have met with local Cape Cod leaders and representatives of the Massachusetts congressional delegation. We also received a number of comments last fall on the draft EIS from local residents concerning PAVE PAWS. As a result, we are aware of the concerns that long-term exposure to PAVE PAWS emissions may be contributing to local cancer incidence. We have structured the UEWR analysis to address the health and safety impacts of the proposed NMD upgrades.

3b. How the meetings were publicized
The following methods were used to notify the public of availability of the documents for public comment and of the public hearing.

- Notice Of Availability (NOA) announcement in the Federal Register for March 3, 2000. Official press releases for the NOA announcement were sent on March 3, 2000 to local newspapers, radio, and television stations. A paid legal advertisement of the NOA appeared in the legal sections of the *Boston Globe* and *Cape Cod Times* on March 3, 2000 and in the *Upper Cape Codder* on March 10, 2000.

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

- Official press releases for the April 27, 2000 public hearing were sent on April 13, 2000 to local newspapers, radio, and television stations. Paid display ads for this hearing were published in the *Cape Cod Times* on April 13, 2000, the *Upper Cape Codder* on April 20, 2000, and *The Enterprise* in Falmouth on April 18, 2000, and in Bourne, Sandwich, and Mashpee on April 21, 2000. On April 19, 2000, BMDO changed the public hearing date to May 3, 2000 in order to resolve local public meeting conflicts. Official press releases announcing this change were sent on April 20, 2000 to local newspapers, radio, and television stations. Paid display ads for the May 3, 2000 public hearing were published in the *Cape Cod Times* on April 26, 2000, the *Upper Cape Codder* on April 27, 2000, *The Enterprise* in Falmouth on April 25, 2000, and in Bourne, Sandwich, and Mashpee on April 28, 2000.

3c. Why one public meeting and location
A public hearing was held in Cape Cod upon the request of the public.

The public hearing was held in Falmouth, Massachusetts to accommodate the anticipated number of attendees and was also determined by the availability of meeting facilities. BMDO determined that the location of the hearing provided the opportunity for any interested member of the community to attend without undue inconvenience.

4. Scope of the UEWR Analysis
The scope of the UEWR Supplement to the NMD Deployment Draft EIS corresponds to BMDO's proposed action (software and hardware upgrades to the PAVE PAWS radars to support an NMD system deployment) and decision (whether to implement the upgrades). BMDO use of the existing PAVE PAWS radars will be affected by Air Force decisions relating to their continuing operation. However, the continuation of radar operations is not a BMDO action or decision. The radars primarily support Air Force missions, and only a small, albeit important, fraction of their operation would be to support an NMD system. Consequently, the UEWR analysis does not examine in detail issues that are associated with current or continuing operation of the radars. As noted, the Air Force is conducting an EIS to examine issues related to modernization, maintenance, and sustainment of the radars. The unresolved issues in the 1979 Cape Cod PAVE PAWS EIS (see responses to 4b) are directly related to the long-term continuing operation of the radar and are not addressed in great detail in the UEWR analysis. Nor is there an attempt to fully characterize or evaluate health statistics or profiles in the surrounding areas. These are both issues that

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

are related to the continuing operation of the radars. As stated in section 1.5 of the UEWR analysis, the scope is to analyze the potential environmental impacts of the proposed hardware and software modifications to the existing EWRs. The UEWR analysis also reviews the current state of scientific knowledge concerning the potential for adverse health effects from low level, long-term exposure to EMR of the type emitted by the PAVE PAWS radars. This information will provide our national leadership with sufficient understanding of the issues associated with upgrades to the radars and limited operation in an NMD mode to enable them to make informed decisions on deployment of an NMD system that includes PAVE PAWS radars.

Given the limited scope of the UEWR analysis, it is not essential to an informed decision on NMD Deployment to conduct additional studies specific to the operational parameters of the PAVE PAWS radars. In addition, it is beyond the scope of the UEWR analysis to address all of the issues raised over the past several years concerning the PAVE PAWS radar at Cape Cod, as well as issues relating to environmental concerns at the Massachusetts Military Reservation.

4a. Detailed review of all studies conducted
Environmental analyses prepared in support of the NEPA process typically identify applicable and relevant standards to assess possible impacts on health. In some cases, it may be important to review and evaluate the scientific research regarding the exposure in question. This process follows the weight-of-evidence approach, which focuses on the quality and relevance of the studies, as described in section 4.1.1 of the UEWR analysis in appendix H. The authors of the UEWR analysis, who are experts in the field, have reviewed the scientific research and have considered the vast majority of documents specifically referenced in the comments. It is beyond the scope of this supplement to describe the assessment of every study and report that was considered and reviewed in this process. Because the public has asked specific questions regarding long-term effects, the UEWR analysis described the selection, review, and evaluation of the scientific research regarding long-term effects, particularly cancer, in section 4.1.2.

4b. Address all unresolved issues from '79 EIS (section C.8 in 79 EIS)
This section discusses three points regarding the assessment of effects of RF, extrapolating animal data to humans, data gaps regarding effects of lifespan exposures, and the inadequacy of epidemiological studies in humans.

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

I. Problem of extrapolating experimental results from animals to humans
Many health standards use animal studies as the basis for quantitative aspects of exposure limits, and incorporate safety factors in deference to these data gaps. Standards also rely on human studies where available to verify the type of effects that are likely to occur, because epidemiologic studies can provide a better basis for conclusions about human health. Animal studies can be conducted over a majority of the animals' life span to determine possible effects of long term exposure. This data can then be extrapolated to humans for potential health effects.

Since the publication of the 1979 EIS, several long-term experimental studies have been conducted to examine effects of RF energy at both: (1) the center frequency of PAVE PAWS, and (2) the same body size-to-wavelength ratio as a human being exposed to PAVE PAWS frequencies. This latter subset of experiments allowed the same average energy absorption in animals as that predicted for humans exposed to PAVE PAWS. Other experiments have been performed using an ultra-wide band of frequencies, including all of those used for PAVE PAWS, and much higher peak energy fields than produced by PAVE PAWS.

II. Data gaps regarding effects of lifespan exposures
The data gaps regarding long-term exposures that existed in 1979 have been addressed by a number of studies that exposed the animals over a large portion of their lifespan, as well as the completion of studies regarding effects on genetic material, used to predict the likelihood of cancer. These are reviewed in the UEWR analysis in appendix H, section 4.1.2.

III. Inadequacy of epidemiological studies in humans
This section describes the inadequacies of studies available at the time of the 1979 report, and limitations inherent to epidemiologic studies, particularly with regard to the difficulty of precisely identifying human exposure levels. A number of epidemiologic studies of exposed populations have been completed since the 1979 report, adding to the weight of the evidence. The evidence does not indicate increased cancer or increased mortality from exposure to RF energy.

4c. Extent of related documentation provided to the public (1979 AF EIS, 1994 BMDO EIS, etc)
The comment that various related documents should have been distributed to the public in conjunction with the UEWR Supplement to the NMD Deployment Draft EIS goes far beyond normal NEPA practice and requirements. However, many of the cited documents are available to the public either through public repositories or upon request.

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

5. Treatment of alternatives

The UEWR Supplement to the NMD Deployment Draft EIS assumes that the PAVE PAWS at Clear Air Force Station Alaska, Beale Air Force Base California, and Cape Cod Air Force Station in Massachusetts will continue to remain in operation in support of the U.S. Air Force's ongoing early warning and space-tracking missions, and it does not address the construction of new radar facilities elsewhere in the United States. The three early warning radars are geographically located in areas of the nation suitable for performance of their proposed NMD mission, and they are readily adaptable to this mission through the replacement of interior electronic equipment and associated software.

As is discussed in the UEWR analysis in appendix H, the modifications do not affect current radiofrequency emission levels or pose health or safety risks to the public. Construction of new radar facilities to support NMD is not cost effective in view of the availability of suitable existing facilities and in view of the very short duration of the NMD mission (which is approximately 17 minutes per NMD event, with a total NMD usage of just several hours per year) in comparison with overall year-round Air Force early warning radar operations. Furthermore, radio frequency radiation emission from operation of any new facilities would be essentially identical to the current, safe levels from the existing radars, while the direct impacts associated with new facilities construction (e.g., site clearing, construction of buildings, power plants, and roads, and associated increases in personnel and traffic density) at any new location would cause more environmental impacts than the proposal to use the existing radars.

6. Increased population

We acknowledge the increased population in the Cape Cod area compared to previous years. The radiofrequency energy emitted by the facility is well below exposure limits recommended in the standard. The changes in population in the area are not relevant, because when there is no known risk there is no increase in adverse effects related to the size of the population.

7. Discussion of cumulative impacts

We are not aware of any evidence that RF energy produced by the facility interacts with or alters environmental contaminants to increase their effect. RF energy is not a cause of cancer or other chronic illnesses. Since RF energy is not a cause of illnesses and does not modify existing contaminants, it is not plausible that the combination of

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

RF energy and environmental contaminants increases the potential risks associated with any environmental contaminants.

8. Timing of upgrades in relation to NMD decision
The commenter raised questions regarding the BMDO's long-term plans for the Cape Cod PAVE PAWS site. More specifically, what would occur in the event of a decision to not deploy an NMD system, and does BMDO plan to site the In-flight Interceptor Communications System (IFICS) and X-band radar (XBR) on Cape Cod.

BMDO has no plans to site IFICS or XBR elements on Cape Cod. As noted in section 2.3 of the non-UEWR portion of the draft EIS, if the decision made by the national leadership is to not deploy NMD at this juncture, the program office would use the additional time to continue to enhance the existing technologies of the various system elements. Such an effort would include additional research and development of the UEWR technology. BMDO, however, has no plans to implement the proposed upgrades to the PAVE PAWS independent of a decision to deploy the overall NMD system.

9. Reliance on IEEE Standards
9a. Only address heating effects
The IEEE standard was based on hundreds of studies that have been conducted regarding the effects of radiofrequency energy on health. Heating effects serve as the basis of the standard because, based on the scientific research, no other potential harmful effect on human health besides tissue warming has been substantiated at or below the levels at which thermal effects occur. This is addressed in the IEEE and in other health-based standards. This concept is reviewed briefly in the discussion in the UEWR analysis regarding the standards (section 4.1.1 and table 4-1). Although non-thermal biological responses have been reported in some studies, the weight of scientific opinion supports tissue heating as the only substantiated human health effect.

9b. Don't consider effects of long term low level exposure
The issue of long-term low-level exposure and possible effects is discussed in section 4.1.2 of the UEWR analysis in appendix H.

10. Characterization of MDPH report
In response to the comment, the following additional text from the MDPH report is being added to the UEWR analysis: "But at the same time, there is suggestive scientific evidence that RFR produces bioeffects at much lower intensities than previously known. The scientific evidence cannot answer the question conclusively whether the PAVE PAWS radar will or will not cause harmful effects to humans in the community." (See

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

section 4.1.3). On page 13 of their report the Panel also writes "It is the opinion of this panel that the evidence for these "low level" (< 10 microwatt/cm^2) effects does not reach a level sufficient to justify claims of any health hazard." (Section 4 of the MDPH Expert Panel, Discussion and Summary) We have also added this information to section 4.1.3.

In addition, section 4.1.3 of the UEWR analysis in appendix H refers to several other reports prepared in the last 3 years that reach a similar conclusion regarding the basis of the standard. These reports are the standard written by Health Canada, the review by the Royal Society of Canada, the report from the National Radiological Protection Board of Great Britain, and the standard from the International Commission on Non-Ionizing Radiation Protection.

11. Specific technical comments
11a. Comment: 60 degree overlap sector where one is exposed to both beams

Response:
The overlap sector refers to the region where the sidelobes from the north face overlap with the sidelobes from the south face, which for the PAVE PAWS radar at Cape Cod is from 77 to 137 degrees relative to 0 degrees North. The two main beams do not point in the same direction. The two radar beams scan regions +/- 60 degrees from the array boresights, which are separated by 120 degrees, for a total radar coverage of 240 degrees (see section 1.3.2 of the UEWR analysis in appendix H). The time average power density in the overlap sector is the sum of power densities from each face due to the sidelobes, and the calculations presented in section 4.2 of the UEWR analysis in appendix H include the RF emission contributions from by both array faces in the overlap sector.

11b. Comment: "What is the effective radiated power (ERP) of the two main beams? Has the ERP ever changed in 21 years?"

Response:
The ERP at the peak of the antenna beam is 3,608 MW or 95.57 dBW (the peak transmit power multiplied by the antenna gain in linear units) and has not changed for either radar face since the radar was constructed. The ERP can only increase if there is a power aperture upgrade to the radar, which is not planned for the NMD system upgrades.

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

11c. Comment: "Page 1-7, Table 1-1 is misleading because it gives the power for one face only. Is this information taken from the 1979 EIS? Has there ever been any changes to not only the power levels but the pulse repetition rate, waveform, etc. in twenty-one years? What changes are planned for the PAVE PAWS radar for NMD?"

Response:
The operating parameters listed in table 1-1 of the UEWR analysis in appendix H apply to each array face. The two main beams do not overlap and the peak radiated power is not additive. As mentioned above in response 11a, only the sidelobes overlap and since they do not simultaneously illuminate the area in the overlap region, only the average power is additive. There have been no changes to the peak or average transmitted power.

There have been no changes to the pulse repetition rate, pulse patterns, or waveform. Any changes in pulse repetition rates, pulse patterns, and waveforms do not increase peak or average radiated power as the radar is still limited to a maximum 25% duty factor (the amount of the time the radar is actually transmitting).

For NMD upgrades, the antenna patterns would not change. The scan pattern, consisting of the search fence and track beams, would be similar to the existing pattern. The search fence would not change. The track beam pattern would be similar to the current EWR function for PAVE PAWS.

11d. Comment: "According to a Radio-Frequency Survey, it allows PAVE PAWS to operate in a more powerful configuration. Explain how this changed the radar's exposure parameters, such as where the sidelobes intersect the ground."

Response:
The document referred to was actually a request for an RF survey to be performed and not the survey itself. The request mistakenly characterized operational changes which in fact were very minor. The actual RF survey confirmed that radar emissions had not changed significantly.

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

11e. Comment: "Who operates the electronic components of the radar itself and are the operators aware of the changes to the system in 1996?"

Response:
The electronic components of a PAVE PAWS radar are operated by computers controlled by military personnel. Contractor personnel maintain all the different types of equipment required to support the radar functions and maintain the entire facility. There was no upgrade to the PAVE PAWS facility at Cape Cod in 1996, nor were there any major modifications to the facility or to the radar at that time.

11f. Comment: "Are the sidelobes used to perform missions?"

Response: No.

11g. Clarify different components of the radar equipment.

1. Comment: "The equipment that generates the RF signals and then analyzes the reflected signals is housed inside the radar building. Are these the radiating elements?"

Response:
No. The radiating elements are on the exterior of the radar building covering the two array faces. This paragraph refers to the receiver/exciter and signal data processor equipment, which is used to generate transmit waveforms which are radiated by the elements, convert RF signals received at the elements to digital information, and process the digital information. RF is only radiated and received by the radiating elements.

2. Comment: "What is meant by 'certain interior changes'? Does it mean the equipment that generates the RF signals? Does this mean the radiating elements?"

Response:
The interior changes include replacing the receiver/exciter and signal data processor, and any AC power (cabling, connectors, circuit breakers, voltage/current levels), cooling (venting, removal of freon based computer cooling system), and minimal mechanical support changes required to support the upgrades. The radiating elements and Transmit /Receive Modules would not change. The changes would not affect the radiation characteristics of the radar (antenna patterns, peak and average radiated power).

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

3. Comment: "It is stated in the UEWR Supplement that 'The active portion of the array resides in a circle 22.1 meters (72.5 feet).' Is this the antenna aperture? Has the aperture of PAVE PAWS ever changed in 21 years? Will it change with the proposed upgrades?"

Response:
Yes, this refers to the antenna aperture, which has not changed for either radar face since the radar was constructed. No change to the aperture is planned for the NMD upgrades.

4. Comment: "It is stated that 'Each radiating element is connected to a solid state transmit/receive solid state module that provides 325 watts of power.' What is the effective radiated power (ERP) of each transmit module?"

Response:
The ERP refers to the radiated power of the entire antenna array or face. There is one transmit module for each active radiating element on each radar face. Each active element transmits a fraction of the total power.

11h. Comment: "Does the beam width change from the 2.2 degree width as it leaves the face of the radar? For instance, what is the width of the beam at points in the town of Harwich on Cape Cod?"

Response:
At boresight the beam width is 2.2 degrees and slightly broadens as it scans away from the boresight. The actual beam width for a radar beam at 3 degrees elevation pointing over Harwich would be 2.23 degrees vertically and 3.65 degrees horizontally. However, Harwich is below the radar's horizon and is blocked from emissions by the radar.

11i. Comment: "Has the antenna gain ever increased?"

Response:
The antenna gain has not changed for either radar face since the radar was constructed. The antenna gain can only increase if there is a power aperture upgrade to the radar, which is not planned for NMD or any system upgrades.

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

11j. Comment: "Has the radar scanned the main beam below 3 degrees in the last 21 years? Would there ever be a need to go below the 3-degree limit? Does PAVE PAWS track 'splashdowns'?"

Response:
The radar design does not allow the center of the main beam to scan below 3 degrees above horizontal. Both the software and the hardware will independently not allow it. There are no plans to change the radar design to allow this. PAVE PAWS does not track splashdowns.

11k. Comment: "Isn't it beneficial to be able to scan below 3 degrees?"

Response:
There are benefits and disadvantages to scanning below 3 degrees. The advantage is the potential of being able to see objects sooner, the disadvantage would be increased ground clutter leading to false targets. The risk of false targets far outweigh the benefits, therefore there are no plans to scan below 3 degrees.

11l. Comment: Radiation characteristics of GWEN tower

Response:
GWEN terminals were removed in 1993. GWEN is not operational at Cape Cod.

11m. Comment: Change or upgrade to the PAVE PAWS cooling system

Response:
There has never been any change or upgrade to the radar cooling system since it was installed. However, the equipment, which chills the cooling water for the entire facility including the radar, has been replaced once since it was installed. This replacement was normal maintenance of equipment that reached the end of its economic life. There were no upgrades to capabilities, just replacement of equipment, which essentially included the same cooling capabilities. There are no plans to increase cooling capacity in the future.

11n. Comment: "Did the Air Force increase the power around 1986 as they were planning? Did they ever increase the power in twenty-one years? Did they ever increase the strength of the beam without the input of more power? If so how?"

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

Response:
The transmit power and antenna gain have not changed for either radar face since the radar was constructed. The power in the main beam can only increase if there is a power aperture upgrade (power increase and/or antenna gain increase) to the radar, which is not planned for the NMD or any system upgrades.

11o. Comment: HEMP

Response:
There are currently no further plans to do any additional HEMP hardening.

11p. Comment: "Will the SBIRS satellites currently being developed by the U.S. Air Force replace or duplicate the PAVE PAWS mission? Is PAVE PAWS part of Theater Missile Defense?"

Response:
The NMD Program has determined that the SBIR Satellites would not eliminate the need for the UEWRs. SBIR Satellites are not expected to be fully operational until 2010. PAVE PAWS will not be part of the Theater Missile Defense.

11q. Comment: Who estimated the total amount of time for NMD missions? Could the amount of time the NMD operations are used change? And if so why?

Response:
BMDO establishes the mission and training needs for the radar for NMD missions. BMDO and the Air Force have jointly determined that NMD training would consist of less than 1% of PAVE PAWS total usage. The training percentage could change depending on future world events and their effects on our national security.

11r. Comment: How do the hardware and software upgrades provide enhanced capabilities?

Response:
The existing equipment uses obsolete technology. Compared to today's technology, it is too slow in processing data and controlling the radar. Using faster equipment allows the electronics to perform the upgraded mission without having to increase the power output of the radar. This can be accomplished through signal processing gains that increase the sensitivity of the radar without changing the power output.

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

11s. Comment: Does NMD change the EM environment (propagation, reflections, hot spots)?

Response:
As noted in the UEWR analysis and as explained at the public hearing, the PAVE PAWS upgrades do not affect the peak or average power and will not result in significant changes to the radiofrequency levels. Any slight variation in physical measurements would still be below consensus safety standards.

11t. Comment: Characterize the radar as a unique pulse-modulated microwave frequency. "The Supplement 'glosses over' the issue of uniqueness of the PAVE PAWS radiation patterns. Page 1-9 Section 1.3.2 PAVE PAWS RADAR: A SOURCE OF RADIOFREQUENCY RADIATION states, 'The proportion of time that the radar...' The Final EIS must explain this in greater detail. How can you apply the IEEE standard to this unique and complex radiation? What about high peak pulses'?"

Response:
The analysis accurately describes the emissions and operational characteristics of the PAVE PAWS radar. There is nothing unique about a pulse-modulated RF source; many RF sources including other types of radar and mobile phones produce pulse-modulated RF. All characteristics of the RF field produced by this radar antenna are covered by the ANSI/IEEE standard. The proposed use of the PAVE PAWS facilities in Cape Cod, Beale, and Clear by NMD will not change the intensity of the RF fields generated during current Air Force operations (see section 4.2.1 of the UEWR analysis in appendix H).

A more detailed explanation of the statement, "The proportion of time that the radar is allocated to each activity varies considerably." found on p. 1-9 of section 1.3.3 is also requested. This more detailed explanation can be found on pp. 4-13 and 4-14 in section 4.2.1. In addition, detailed specifications about the proportion of time that the radar resources are operating in track and search mode are given for all analyses of calculated power densities at the Beale (sections 3.2.2, and 4.2.1.2), Cape Cod (section 3.3.3 and 4.2.1.3), and Clear sites (section 4.2.1.1).

The question, "what about high peak pulses?" is appropriately addressed in the analysis and is also addressed by the ANSI/IEEE standard. There are several reasons why more attention was not given to pulse characteristics in the UEWR analysis:

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

- The purpose of an Environmental Impact Assessment is to evaluate the effect of the changes to the existing environment by the proposed action; hence the supplement focused on aspects of the radar operation that potentially could be affected by the NMD mission (scanning and tracking scenarios); those that are not changed by the NMD mission such as maximum pulse duration and intensity are given less attention.

- Considerable data were drawn from the FEIS reports for Beale and Cape Cod. These reports contain voluminous and detailed descriptions and characterizations of the RF fields produced by the PAVE PAWS antennas, including pulse characteristics such as peak pulse intensity. The 1979 Cape Cod EIS estimated the peak pulse power at 76 meters (250 feet) from the radar face to be 1.2 mW/cm^2 (at p. 3-20). The 1980 Beale EIS estimated the peak pulse power at 101 and 305 meters (330 and 1,000 feet) from the radar face to be 0.70 and 0.46 mW/cm^2, respectively (at p. 3-18). These values are well below the applicable ANSI/IEEE standards.

- The focus of public concern about the PAVE PAWS radars, particularly at Cape Cod, has been on the possibility of health effects of long-term exposures to RF energy. Our present scientific knowledge points to the average power density as being the exposure parameter most closely linked to biological responses, and so to health. Except for the sensory response of the auditory system to very high power RF pulses, biological tissues have an extremely limited capability to respond to stimuli of very short duration (micro to milliseconds). Therefore any responses observed reflect time-averaged exposures. In fact, epidemiological and most biological studies only identify the time averaged power density and the specific absorption rate (SAR) of energy deposition as relevant exposure parameters. Several prominent exposure guidelines including those published by the International Commission on Non-ionizing Radiation Protection (ICNIRP, 1998) and the National Radiological Protection Board (NRPB, 1993) of Great Britain (and listed in the supplement) recommend no specific limitation on maximum peak pulse power. The lack of importance ascribed to peak pulse power density is further reflected in the most recent review of the potential health effects of exposure to RF from mobile phones (Stewart et al, 2000). This expert panel of scientists from Great Britain did not mention a single health effect, or even a hypothesized health effect, that was linked to peak pulse power density even though the antennas of these telephones can produce maximum

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

exposures of up to 2,000 mW/cm^2 at a user's head 2 centimeters (0.8 inch) from the antenna (Stewart al, 2000).

- The rationale for the ANSI/IEEE standard's recommendation of a secondary restriction on the peak power exposure is to "prevent unintentionally high exposure and to preclude high SA [specific absorption] for decreasingly short widths of RF pulses" that still might meet the standard for average power density. However, for the PAVE PAWS radars this condition is not relevant to potential public exposure under uncontrolled far field conditions.

However, the UEWR analysis in appendix H does specify that, "Limits specifically recommended by ANSI/IEEE for peak intensity of RF pulses would not be exceeded . . ." (p. 4-28).

To provide documentation for this conclusion, table 4-10 from the UEWR analysis in appendix H has been modified below in table 11t to show the calculated maximum peak power per pulse and the maximum peak power density in any 100 millisecond (ms) period at the same locations where time-averaged power densities were calculated. The values are to be compared to the ANSI/IEEE standard Maximum Permissible Exposure (MPE) limits calculated in appendix C of the supplement for any single RF pulse (6,300 mW/cm^2) and for the maximum power density in any 100 ms period (100.8 mW/cm^2).

As shown in the table, both the peak power per pulse and the peak power density in any 100 ms period are tens of thousands and thousands of times lower, respectively, than the secondary standards for peak power exposures. This further underscores the conclusion that the time-averaged standard is the more relevant controlling criterion for demonstrating compliance of this radar with the ANSI/IEEE standard. At the locations where peak power density was estimated in the Cape Cod and Beale EIS reports, the values calculated by the current methodology are similar to, but lower, than these previous estimates. (At Cape Cod, the 1979 calculated peak power per pulse at 76 meters (250 feet) from the radar face was 1.2 mW/cm^2; the current calculated value is 0.184 mW/cm^2. At Beale, the 1980 calculated peak power per pulse at 101 meters (330 feet) from the radar face was 0.70 mW/cm^2 and 0.46 mW/cm^2 at 305 meters (1,000 feet) from the radar face; the current calculated values are 0.41 mW/cm^2 and 0.35 mW/cm^2, respectively.)

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

Table 11t: Far-Field Ground Level Peak Power Densities Calculated for Locations Specified in Table 4-10 Compared to ANSI/IEEE Standard

PAVE PAWS Site	Distance from Radar meters (feet)	Maximum Peak Power Density per Pulse (mW/cm^2)	Comparison to ANSI/IEEE Standard (6,300 mW/cm^2)	Maximum Peak Power Density per 100 ms (mW/cm^2)	Comparison to ANSI/IEEE Standard (100.8 mW/cm^2)
Clear AS	439 (1,440) (1)	0.1644	38,321 times lower	0.0533	1,891 times lower
	4,850 (15,912)(2)	0.0069	913,043 times lower	0.0022	45,818 times lower
Beale AFB	439 (1,440) (1)	0.1574	40,025 times lower	0.0504	2,000 times lower
	1,859.3 (6,100) (2)	0.0638	98,746 times lower	0.0204	4,941 times lower
Cape Cod AS	439 (1,440) (1)	0.1606	39,228 times lower	0.0514	1,961 times lower
	1,051.6 (3,450)2	0.0226	278,761 times lower	0.0072	14,000 times lower

Note: The current calculations assume that the radar is operating with a maximum pulse width of 16 ms.

(1) On-base-beginning of far field exposures

(2) One of nearest locations with likely opportunity for public exposure

To provide additional information to the reader of the main body of the UEWR analysis in appendix H, additional discussion of the perspective on pulsed RF fields is provided in sections 4.1.1 and 4.2.1.4. In addition, the calculations provided in table 11t above have been incorporated into table 4-10 in section 4.2.1.4.

11u. Comment: Exposure to pilots / birds

Response:
The 1979 EIS (paragraph 3.1.2.2.1.1) addressed effects of PAVE PAWS on migratory birds. The NMD upgrades would not result in any changes to this analysis.

FAA rules prohibit pilots from flying any closer than 1.9 kilometer (1 nautical mile) at 1,372 meters (4,500 feet) above mean sea level to the PAVE PAWS facility. These restrictions are clearly delineated on the NEW YORK—Sectional Aeronautical Chart (prepared by NOAA). These

Table 9.2.1-2: Responses to Written Comments, Attachment A (Continued)

limits are set due to the sensitivity of flight instruments, and not because of direct human safety concerns from the radar emissions. The same safety concerns to instrumentation on airlines require that computers, cell phones, and calculators to be turned off for take off and landings.

11v. Comment: Impacts of PAVE PAWS effects on visitors

Response:
Cape Cod AFS has established protocols to protect the safety of all visitors.

12. Transcripts/Tapes/Attachments
In support of her written comments, the commentor submitted various written attachments, as well as a videotape and audiotapes of several local meetings pertaining to the PAVE PAWS radar. The written attachments have been incorporated into the final EIS immediately behind the submitter's written comment. The audio and video cassettes will be included in the administrative record for the final EIS. It was not possible to transcribe the tapes because of their poor quality and our inability to identify the numerous individual speakers; however, the information is largely repetitive of the commentor's written comment. We have included, immediately behind the submitter's written comments, a short summary of the tapes, which provides a description and dates of the various meetings.

9.2.2 E-MAIL COMMENT DOCUMENTS—UEWR SUPPLEMENT

Individuals who commented on the UEWR Supplement to the NMD Deployment Draft EIS in e-mail form are listed in table 9.2.2-1 along with their respective commentor ID number. This number can be used to find the e-mail document that was submitted and to locate the corresponding table on which responses to each comment are provided.

9.2.2.1 E-Mail Comments

Exhibit 9.2.2-1 presents reproductions of the e-mail comment documents that were received in response to the UEWR Supplement to the NMD Deployment Draft EIS. Comment documents are identified by commentor ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

9.2.2.2 Response to E-Mail Comments

Table 9.2.2-2 presents the responses to substantive comments to the UEWR Supplement to the NMD Deployment Draft EIS that were received in e-mail form. Responses to specific comments can be found by locating the corresponding commentor ID number and sequential comment number identifiers.

Due to the nature and extent of the comments contained in written comment PS-W-010, these comments were consolidated and summarized and their responses have been provided in attachment A to table 9.2.1-2. Many of the other written, e-mail, and transcript comments raised the same or similar points as raised in PS-W-010. For this reason, the responses to these comments refer to the responses in attachment A, which is located at the end of table 9.2.1-2.

Table 9.2.2–1: Public Comments on the UEWR Supplement (E-Mail Documents)

Commentor and Affiliation	ID Number
Martin V. Hippie	PS-E-001
Ellen Thomas	PS-E-002
Frances Vandal	PS-E-003
Paul Zanis	PS-E-004
Don Woodland	PS-E-005
N/A	PS-E-006
Mary Zepernick—Women's International League for Peace and Freedom	PS-E-007
Mary Zawoysky	PS-E-008
Juliet R. Bernstein	PS-E-009
Celine Gandolfo	PS-E-010
Vicky Uminowicz	PS-E-011
Freda Diamond	PS-E-012
Mary E. McLaughlin	PS-E-013
Susan Walker—Action for Nuclear Disarmament: Cape Cod	PS-E-014
David Heard	PS-E-015

COMMENT NUMBER
PS-E-001

PS-E-001

The Pentagon is now in the process of building a modern version of a medieval castle. By testing and deploying an anti-missile system they hope to create a shield or barrier around the United States- in effect castle walls- while still maintaining our ability to launch an attack against unprotected populations. This from a government that recently rejected the Nuclear Test Ban Treaty.
The proposed anti-missile system will further destabilize a fragile global nuclear balance and is in direct violation of existing anti-ballistic missile treaties. Even if successfully developed the United States will still be vulnerable. There are many ways to breach a castle wall. The safety of a castle is only an illusion.

The intent of a castle is never benign. The romantic castle of European lore was in truth a fortress of domination over the surrounding land, a weapon of war designed to oppress and control an impoverished peasant population. The high-tech castle envisioned by the Pentagon is no less oppressive. Behind our computer guarded walls the U.S. war makers can attack, dominate, and plunder other nations- with nuclear weapons if necessary- and a long, horrible siege will begin. The inevitable end of this siege is ruin and destruction, not of mere castles but entire nations, entire populations of human beings.

Within the next few weeks President Clinton will most likely propose spending over two billion dollars to continue development of an anti-missile system- to begin building our castle walls. It is a dangerous game our government is playing, an act of aggression that will not go unchallenged. The subjugated "peasant nations" will most certainly storm the castle walls, and those walls will eventually fall.
We need to look no further than the castle ruins of Europe to see such a future, but the ruins we leave behind for our descendants will be the radioactive ashes of a dying world.

The only way to avoid this agony is to reduce and eliminate weapons of mass destruction, to tear down the walls between people and nations. We need a Nuclear Test Ban Treaty. We need a global effort to wage peace and turn away from the folly of war. The United States can lead this effort. We can truly become the peace makers, and not the tyrants in the castle.

Sincerely,

Martin V. Hippie
Hippie for Congress

COMMENT NUMBER
1

COMMENT NUMBER
PS-E-002

PS-E-002

Re: NATIONAL MISSILE DEFENSE; your web page
http://www.acq.osd.mil/bmdo/bmdolink/html/pubcomm.html
"<http://www.acq.osd.mil/bmdo/bmdolink/html/pubcomm.html>

I would like to add more explicit comments, and would appreciate if you would
(1) provide the addresses for html or txt files (pdf is awkward), or

(2) mail or e-mail the Environmental Impact Statement and all related documents, to

Proposition One Committee, Att: Ellen Thomas

My off-the-cuff comment is that we shouldn't be taking weapons to space; we should be de-weaponizing, and developing a much better utilization of energy.

See http://prop1.org/convert/convpro.htm
"<http://prop1.org/convert/convpro.htm> , and
http://www.globenet.free-online.co.uk/
"<http://www.globenet.free-online.co.uk/> .

Sincerely,

Ellen Thomas, ExDir
PROPOSITION ONE COMMITTEE
***

BAN AND BURY ALL RADIOACTIVE BOMBS
* depleted uranium, fission, neutron *

Sign the Petition Online!:
http://www.PetitionOnline.com/prop1/petition.html
"<http://www.petitiononline.com/prop1/petition.html>
Write Letter to Congress about HR-2545 - http://prop1.org/prop1/letter.htm
"<http://prop1.org/prop1/letter.htm>
Depleted uranium keeps on killing!: http://prop1@prop1.org/2000/du/dulv.htm
"<http://prop1@prop1.org/2000/du/dulv.htm>
NucNews: http://prop1.org/nucnews/briefslv.htm
"<http://prop1.org/nucnews/briefslv.htm>

COMMENT NUMBER
1

pse001

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents

COMMENT NUMBER
PS-E-003

PS-E-003

From: Frances E. Vandal
Sent: Saturday, April 01, 2000 1:02 AM
To: external.affairs@bmdo.osd.mil
Subject: X-Band Radar and Ozone Depletion

Are there any studies completed on the effects of high energy X-band or RF radar upon the ozone layer? **1**

Is there sufficient radiation emitted from our Early Warning radars to effect the ozone layer by depleting it? **2**

Is there any adverse affect to humans if they are in direct line of sight of RF, X-band, Ku-band, Microwave radars? Does it cause cancer or sterilization?

What intensity/duration/power levels are considered harmful to humans and wildlife within the path of these radar emitters?

Frances Vandal

COMMENT NUMBER
PS-E-004

PS-E-004

COMMENTS ON THE SUPPLEMENT TO THE DRAFT EIS FOR THE NATIONAL MISSILE DEFENSE

DEPLOYMENT;
I fly in the beam! I don't like it. My family doesn't like it. My friends don't like it. **1**

Say what you want, its there it effects us. You can't prove it doesn't harm us. We can't prove it does, but if it wasn't there the issue would be moot. Enough, stop the discussion, save face and move it.

Paul, Regina, Timothy and Christopher Zanis

pse003

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

COMMENT NUMBER
PS-E-005
1

PS-E-005

From: Don Woodland
Sent: Thursday, May 11, 2000 6:45 PM
To: nmdeis@smdc.army.mil
Subject: PAVE PAWS

Dear Sirs,

If the military brass insists on ignoring the expressed wishes of the public it is sworn to protect, that Pave Paws be considered a public health hazard for Cape Codders, than it is engaging in the foolish notion that public opinion is independent of the tremendous recruitment problems it is having. Such being the case, we are doomed as Cape Codders to in the future endure both friendly (microwave) fire from the military as well as have a perpetually understaffed military--all due to the incredible ignorance, arrogance and stupidity of those who are making the decisions. If you insist on continuing on this course, we have no recourse but to consider the military an enemy domestic. Being so, its very existence will surely become repugnant to the American people.

THINK, please! Every revolution in history has been against the kind of behavior government is now displaying--indifference to the governed. We'd all rather live in peace. Wouldn't you?

COMMENT NUMBER
PS-E-006
1
2

PS-E-006

From: rohrbach
Sent: Friday, May 12, 2000 9:38 AM
To: nmdeis@smdc.army.mil
Subject: Comment on Supplement to DEIS for National Missile Defense Program--PAVE PAWS, Cape Cod

I would like to register my concern about the upgrade to the PAVE PAWS system here on Cape Cod. While this facility is clearly important to the nation's defense system, it is not at all clear to me that it is necessary for this facility to be located here. There has been very little public information about the program and its effects, both short and long term. There has not been adequate public involvement in either the EIS process or the decision to continue use of this facility.

Given the high level of controversy over military actions in the past which have produced the need for massive remediation of pollution here on the Cape, it would seem prudent to be as cautious as possible about future military development. We have many examples of activities which did not seem harmful at the time they were taken, but which have proven to be costly to both the military and to us here on the Cape. The distrust engendered from the years of stonewalling on cleanup issues has produced a lack of trust; this means that it is critically important for you to both increase public involvement, use the very best information possible to make decisions, and use the Precautionary Principle.

We have high cancer rates here, we are a much more populated area than we were 21 years ago, and we've suffered the effects of pollution from other military activities. Given the concern in the past about locating PAVE PAWS near populated areas, it's time to consider realistic alternatives so that the people of Cape Cod can be safe from harm while our country is being protected.

pse005

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

PS-E-007

From:
Sent: Friday, May 12, 2000 8:37 AM
To: nmdeis@smdc.army.mil
Subject: comment on PAVE PAWS

TO: SMDC-EN-V U.S. Army Space & Missile Defense Command
FROM: Women's International League for Peace & Freedom
RE: Comments on the Supplement to the Draft EIS for the national Missile Defense Deployment

We 200 members of the Cape Cod chapter of the Women's International League for Peace & Freedom are currently celebrating WILPF's 85 years as an organization seeking to have security defined by "we the people." Believing that our personal and national security rests on wide involvement in informed democratic discussions, we strongly object to the inadequate public process established for the Missile Defense project in general and the upgrading of PAVE PAWS in particular. 1

The supplement to the draft Environmental Impact Statement is woefully inadequate on many counts, and thus ignores or dismisses the very real security issues of we citizens of Cape Cod. Our fruitless efforts to get accurate and up-to-date measurements, federal health studies and other inputs to the continued operation of PAVE PAWS indicate a lack of concern for the physical well being and democratic inclusion of Cape Codders in issues that directly affect us. 2

Given all this, especially the long inattention to our health and security concerns, we strongly urge that PAVE PAW be shut down.

Mary Zepernick, for the WILPF

COMMENT NUMBER
PS-E-007
1
2

PS-E-008

From: Mary Zawoysky
Sent: Friday, May 12, 2000 2:15 PM
To: nmdeis@smdc.army.mil
Subject: Comments to the supplement to the draft EIS for the National Missile defense deployment

To whom it may concern:
There was inadequate public involvement in the Environmental Impact Statement (EIS) process for the PAVE PAWS on Cape Cod. This is unacceptable given the controversy here surrounding this 21 year old facility. There were no public informational meetings on Cape Cod for people to learn about the program. There was just one public hearing, which was not properly announced, so most people never even knew about it. There should only be one EIS going on for this facility instead of two. PAVE PAWS has a unique radiation which has not been studied. PAVE PAWS should be moved off-Cape! 1 2

Mary Zawoysky

COMMENT NUMBER
PS-E-008
1
2

pse007

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

COMMENT NUMBER
PS-E-009

PS-E-009

From: Juliet Bernstein
Sent: Thursday, May 11, 2000 8:19 PM
To: nmdeis@smdc.army.mil
Subject: Re:Public hearing on National Missile Defense Deployment

Dear Sirs:

After 40 years of research and more than $120 billion we still don't have a missile defense system. How much more of the taxpayers' money will be spent for this senseless system? 1

If we want true security, let us spend the money on health care for all, child care for all children, education, decent nutrition so that no child must go to bed hungry, ending homelessness and improving public transportation.

Why don't we join China and Russia in signing an international ban on weapons in space? Space must be weapons-free; it belongs to everyone.

BMD deployment would circumvent the 1972 ABM treaty that outlaws development of such weapons.

Juliet R. Bernstein

pse009

COMMENT NUMBER
PS-E-010

PS-E-010

From: CG
Sent: Monday, May 15, 2000 7:44 AM
To: nmdeis@smdc.army.mil
Subject: Pave Paws

To: U.S. Army and Missile Defense Command
P.O. Box 1500
Huntsville, Al 35807-3801

To Whom this may concern,

I am very concerned about the upgrade to the Pave Paws system. I realize this system is very important to the nation's defense system, but it is not clear to me that it is necessary for this system to be located here especially with the immense increase of population on Cape Cod. There has been very little public information about the program and it's effects, both short and long term. There has not been adequate public involvement in either the EIS process or the decision to continue use of this facility. 1

Given the high level of controversy over the military actions in the past which have produced the need for massive remediation of pollution here on the Cape, it would seem prudent to be as cautious as possible about future military developments. We have many examples of activities which did not seem harmful at the time they were taken, but which have proven to be costly to both the military and to us here on the Cape. The distrust engendered from the years of stonewalling on cleanup issues has produced a lack of trust; this means that it is critically important for you to both increase public involvement, use the very best information possible to make decisions, and use the Precautionary Principle.

We have very high cancer rates on Cape Cod. We are a much more populated area than we were 21 years ago, and we've suffered the effects of pollution from other military activities. Given the concern in the past about locating PAVE PAWS near populated areas, it's time to consider realistic alternatives so that the people of Cape Cod can be safe from harm while our country is being protected. 2

Celine Gandolfo

Cape Cod Resident for 25 Years

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

COMMENT NUMBER
PS-E-011
1
2

PS-E-011

From: VUminowicz
Sent: Friday, May 12, 2000 11:11 AM
To: nmdeis@smdc.army.mil
Subject: Comment on Supplement to DEIS for National Missile Defense Program

To: nmdeis@smdc.army.mil
Date: Friday, May 12, 2000 2:37 PM
Subject: Comment on Supplement to DEIS for National Missile Defense Program--PAVE PAWS, Cape Cod

I would like to register my concern about the upgrade to the PAVE PAWS system here on Cape Cod. While this facility is clearly important to the nation's defense system, it is not at all clear to me that it is necessary for this facility to be located here. There has been very little public information about the program and its effects, both short and long term. There has not been adequate public involvement in either the EIS process or the decision to continue use of this facility.

Given the high level of controversy over military actions in the past which have produced the need for massive remediation of pollution here on the Cape, it would seem prudent to be as cautious as possible about future military development. We have many examples of activities which did not seem harmful at the time they were taken, but which have proven to be costly to both the military and to us here on the Cape. The distrust engendered from the years of stonewalling on cleanup issues has produced a lack of trust; this means that it is critically important for you to both increase public involvement, use the very best information possible to make decisions, and use the Precautionary Principle.

We have high cancer rates here, we are a much more populated area than we were 21 years ago, and we've suffered the effects of pollution from other military activities. Given the concern in the past about locating PAVE PAWS near populated areas, it's time to consider realistic alternatives so that the people of Cape Cod can be safe from harm while our country is being protected.

Sincerely,
Vicky Uminowicz

COMMENT NUMBER
PS-E-012
1
2
3
4

PS-E-012

From: freddie diamond
Sent: Friday, May 12, 2000 3:42 PM
To: nmdeis@smdc.army.mil
Cc: judges@capecod.net
Subject: Comments on the Supplement to the draft EIS for the NMDF

Comments on the Supplement to the Draft EIS for the National Missile Defense

Deployment

I wish to register my opposition to the proposed upgrade of the Pave Paws Radar Installation on the Massachusetts Military Reservation in Bourne. Twenty one years ago the US Air Force built Pave Paws without adequately assessing risk to human and environmental health. The public was told that the installation would be for short term use and now 21 years later little, if anything, is known about long term effects.

It is totally unacceptable that the public has received so little information about the EIS process and that there are two EIS' going on at the same time. They should be combined and should address the cumulative impact that the facility is having on Cape Cod.

Meanwhile, the Cape's population has soared and the area contains dangerously high cancer rates at a time when pollution from other military activities has been well documented, producing the need for massive remediation costing the taxpayers millions of dollars. Any upgrades should be suspended until it is proven that Pave Paws is not contributing to adverse health effects on Cape Cod.

It is time to consider realistic alternatives to the proposed upgrade such as moving the installation off of Cape Cod to an unpopulated area where the health of local residents will not be compromised. It is unconscionable to talk about national security when the health and safety of local people is being jeopardized.

Sincerely,
Freda Diamond

pse011

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

COMMENT NUMBER
PS-E-013

PS-E-013

From:
Sent: Friday, May 12, 2000 9:22 PM
To: nmdeis@smdc.army.mil
Subject: PAVE PAWS Cape Cod

Dear Sir/Madam:

I am writing to you as a concerned citizen of Sandwich, Cape Cod, Massachusetts. My concerns are related to the PAVE PAWS facility and future upgrades. My list of concerns are as follows:

1) Lack of public notification of the ONE meeting addressing the Ballistic Missile Defense Organization's Supplement to the Draft of the Environmental Impact Statement. (Why was it only a supplement, it fails to address the full scale of issues that need to be studied.)I learned of this meeting which was held on May 3rd today. At the same time, I learned that today was the last day for the public comment period for The Air Force's EIS. I am confused as to why there are two separate studies related to the same facility. The public needs to be better informed and educated. There is so little information being provided by the Air Force. Why was only one meeting held and why was the public so poorly informed of this meeting. To me, it raises a red flag. **1**

2)The elevated cancer rates on Cape Cod have me very concerned. Otis Air Force Base is the largest superfund site in the country and PAVE PAWS sits above our sole aquifier. (I'm only comfortable drinking bottled water). This is a great concern. **2**

3)I am concerned that our burgeoning population on Cape Cod is at risk. I understand from the January 20th meeting in Sandwich that when first looking for an East Coast site Westover Air Force Base was eliminated as a site due to its proximity to a population center. Given that rationale, Cape Cod would not even be considered as a site if that decision were to be made today. Our population has exploded since 1979 and all studies should use current statistics. **3**

4)Before spending more tax dollars on this facility we, Cape Cod residents, need to be assured that the radar pulsating from this facility is safe. To my knowledge, there are NO studies giving this assurance. Why place a growing population at risk (remember there was enough concern about population size when eliminating Westover AFB for the site) when no one can honestly say, with backing research and studies, that this facility and its radar is safe. If these assurances cannot be made with supporting unbiased studies this facility should be moved to a remote site. **4**

Thank you for your time.

Sincerely,

Mary E. McLaughlin

pse013

COMMENT NUMBER
PS-E-014

PS-E-014

From: Susan Walker
Sent: Thursday, May 11, 2000 7:49 PM
To: nmdeis@smdc.army.mil
Subject: NMD EIS Comments

Sue Walker
May 11, 2000

SMDC-EN-V
U.S. Army Space and Missile Defense Command
PO Box 1500
Huntsville, AL 35807-3801

Dear Donna Brock, Deputy Director

Please incorporate my comments into the National Missile Defense (NMD) Deployment Final EIS. **1**

The No Action Alternative for the Supplemental has received inadequate analysis. On page es-3 the supplemental states, " The No-action Alternative has been previously analyzed in National Environmental Policy Act documentation for each EWR." That documentation is over 20 years old and not readily available to the public. This is not a user friendly attitude and calls into question the integrity and sincerity of the entire current analysis.

Under 2.3 "Alternatives Considered but not Carried Forward" there is a flawed assumption that Cape Cod PAVE PAWS will continue in operation. The Cape Cod site was to be operational for 10 - 20 years. It has now exceeded its life span and it should cease to exist. Citizens have repeatedly called for accurate measurements, not time averaged measurements. We have called for federal health studies. All of this was ignored and now PAVE PAWS should be shut down. **2**

The supplemental is flawed, because it does not consider the environmental benefit of dismantling PAVE PAWS. The land would be free of the threat of underground fuel vaults. The reclaimed land could become a positive addition to the proposed 15,000 acre Wildlife Refuge. This alternative needs to be considered by the public. **3**

3.2.3 The Cape Cod Health and safety data is totally unacceptable. The data is from 1978 & 1979 and gives time averaged power density. This is meaningless data from a system that emits pulsed radio frequency radiation. The data needs to be updated and done accurately. We do not accept, "The current estimates of RF power density...." 4-27 Estimates are an insult. We want real, new data of pulsed radiation. **4**

The Supplement lists all organizations contacted in preparing the Supplement. Barnstable County's land use agency is the Cape Cod Commission. They should have been contacted prior to the issuance of the Supplement. **5**

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

COMMENT NUMBER
6

The entire EIS is based on the mission of NMD which is the identification and precise tracking of ballistic missiles. The NMD once deployed would be an abrogation of the ABM Treaty. This treaty has been the cornerstone of our security for over 25 years. We should not weaken this treaty as that would make us less safe. We need our enemies and ourselves to both feel more secure. If our enemies feel less secure they will build more offensive weapons to overpower the NMD system. We need nuclear disarmament not a new arms race touched off by breaking the ABM Treaty.

Ballistic missiles are not the only way to deliver nuclear weapons. We have seen terrorism delivered in trucks and suitcases. Some choose chemical and biological weapons. The U.S. must improve its non-violent strategies to bring about a safe and peaceful world.

This spring 11 towns on Cape Cod are considering whether to ask Pres. Clinton to initiate an international convention to negotiate a verifiable gradual elimination of nuclear weapons. So far they have been strongly saying, "Yes" to disarmament. The town of Falmouth paved the way last spring. Abolition 2000 is an international campaign.

There should be No Action on the NMD system.

Sincerely,

Susan V. Walker, President

Action for Nuclear Disarmament: Cape Cod

pse015

COMMENT NUMBER
PS-E-015
1
2
3
4

PS-E-015

From: Heard, David
Sent: Friday, May 12, 2000 10:09 AM
To: 'missle defense'
Cc: Heard, David
Subject: comments on the supplement to the draft EIS for the National Miss le Defense Deployment

Gentlemen.
Please record my concerns regarding your efforts to develop an EIS for Pave Paws on Cape Cod

1. You need to ensure there is adequate public involvement in the EIS process for Pave Paws. There was minimal publicity and consequently very few of my friends even knew they had an opportunity to comment. They don't even realize what you are doing!!

2. Your "Supplement" to the original EIS must include all the commitments made by Pave Paws following it's original installation 20 years ago. That includes monitoring, epidemiological studies (sp?) water impact, wildlife and most importantly PEOPLE.

3. Since the original installation, the population has increased significantly in the vicinity of the installation (I was here then). Any EIS supplement will be flawed unless it considers EVERYTHING that a full blown EIS should encompass. In the past 20 years we have developed a greater understanding of everything from the effects of tobacco smoke (witness recent legal decisions and Congressional hearings) to red dye #7. And sunburn!! 20 years ago everyone wanted a dark tan- now government studies recommend SUNBLOCK. We, no YOU need to incorporate all this new information in the EIS on PAVE PAWS. Of course in the last 20 years you HAVE developed a lot of information on the effects of PAVE PAWS radiation on PEOPLE- Right?? Or does the Government just study sunlight?

4. Your EIS must follow the precautionary principle- we are talking about people's lives here. Cape Cod is a high cancer area and nobody has come up with a good reason for it. The studies I have seen leave the cause "indeterminate" which leaves the military and PAVE PAWS suspect.

5. I know the tobacco industry spent millions researching the effects of tobacco smoke, the electric utilities have spent years researching electromechanical fields from power lines and our government licenses drugs and legislates everything from the number of toilets on a jobsite (OSHA) to how fast we can drive to protect it's citizens. Yet I have not seen any studies on the long term effects of PAVE PAWS pulsing radiation fields on humans (ie US citizens). Recent studies of low level ionizing radiation have determined there is no level at which SOME effect does not occur. So I must assume that even LOW LEVELS of PAVE PAWS radiation will also cause some effects. These effects must be discussed in any EIS.

6. Lastly why are the Missile Defense Program and the Air Force both conducting their own EIS processes. We could SAVE MONEY (I do pay taxes and

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

	COMMENT NUMBER
reducing waste is important to me and most Americans), and both of your programs would get a more complete study if the two programs were combined. Think about it what happens if your supplemental study says everything is OK, and the Air Force study identifies some issues. Someone will have egg on their faces. (conversely if they look the same you might be accused of collusion) Thank you, David Heard	

	COMMENT NUMBER

pse015b

Exhibit 9.2.2-1: Reproductions of E-Mail Comment Documents (Continued)

Table 9.2.2-2: Responses to E-Mail Comments

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
Martin Hippie	PS-E-001.1	Program	Appendix H	Treaty and foreign policy considerations and timing of a decision to deploy an NMD system are political and policy issues that are not within the scope of this EIS or the NEPA process.
Ellen Thomas	PS-E-002.1	Program	Appendix H	Treaty and foreign policy considerations and timing of a decision to deploy an NMD system are political and policy issues that are not within the scope of this EIS or the NEPA process.
Frances Vandal	PS-E-003.1			Radiofrequency radar fields do not contain sufficient energy to break chemical bonds that could affect ozone production.
	PS-E-003.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 9a).
Paul Zanis	PS-E-004.1			Comment noted.
Don Woodland	PS-E-005.1			Comment noted.
N/A	PS-E-006.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a and 3b).
	PS-E-006.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 5 and 6).
Mary Zepernick - Women's International League for Peace and Freedom	PS-E-007.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a, 3b, and 3c).
	PS-E-007.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4, 4a, 4b, and 5).
Mary Zawoysky	PS-E-008.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a, 3b, and 3c).
	PS-E-008.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 2, 5, and 11t).
Juliet R. Bernstein	PS-E-009.1			Treaty and foreign policy considerations and timing of a decision to deploy an NMD system are political and policy issues that are not within the scope of this EIS or the NEPA process.
Celine Gandolfo	PS-E-010.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a and 3b).
	PS-E-010.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 5 and 6).
Vicky Uminowicz	PS-E-011.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a and 3b).
	PS-E-011.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 5 and 6).
Freda Diamond	PS-E-012.1			An EIS was prepared for operations of the PAVE PAWS radar in 1979.
	PS-E-012.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 2).
	PS-E-012.3			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4a, 4b, and 6).
	PS-E-012.4			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 5).
Mary E. McLaughlin	PS-E-013.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 2, 3a, 3b, 3c, and 4).
	PS-E-013.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 4).
	PS-E-013.3			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 6).
	PS-E-013.4			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4a and 4b).

Table 9.2.2-2: Responses to E-Mail Comments (Continued)

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
Susan Walker - Action for Nuclear Disarmament: Cape Cod	PS-E-014.1			See response to written comment PS-W-014.
David Heard	PS-E-015.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a and 3b).
	PS-E-015.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 4).
	PS-E-015.3			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4, 4a, 4b, and 6).
	PS-E-015.4			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 2).

9.2.3 TRANSCRIPT COMMENT DOCUMENTS—UEWR SUPPLEMENT

Individuals who commented on the UEWR Supplement to the NMD Deployment Draft EIS at the public hearing are listed in table 9.2.3-1 along with their respective commentor ID number. This number can be used to find the transcript document and each speaker's comments and to locate the corresponding table on which responses to each comment are provided.

9.2.3.1 Transcript Comments

Exhibit 9.2.3-1 presents reproductions of the transcript comment documents that were received in response to the UEWR Supplement to the NMD Deployment Draft EIS. Comment documents are identified by commentor ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

9.2.3.2 Response to Transcript Comments

Table 9.2.3-2 presents the responses to substantive comments to the UEWR Supplement to the NMD Deployment Draft EIS that were received in transcript form. Responses to specific comments can be found by locating the corresponding commentor ID number and sequential comment number identifiers.

Due to the nature and extent of the comments contained in written comment PS-W-010, these comments were consolidated and summarized and their responses have been provided in attachment A to table 9.2.1-2. Many of the other written, e-mail, and transcript comments raised the same or similar points as raised in PS-W-010. For this reason, the responses to these comments refer to the responses in attachment A, which is located at the end of table 9.2.1-2.

Table 9.2.3–1: Public Comments on the UEWR Supplement (Transcript Documents)

Commentor and Affiliation	ID Number
Joshua Mant—Senator Murray's Office	PS-T-001
State Representative Ruth W. Provost	PS-T-002
Sue Walker—Action for Nuclear Disarmament Cape Cod	PS-T-003
Charles Kleekamp	PS-T-004
Peter Schlesinger	PS-T-005
Sharon Judge—Cape Cod Coalition to Decommission PAVE PAWS	PS-T-006
David Williams	PS-T-007
Minos Gordy	PS-T-008
Richard Judge	PS-T-009

COMMENT NUMBER

NATIONAL MISSILE DEFENSE
DEPLOYMENT DRAFT EIS
PUBLIC HEARING

In RE: PAVE PAWS

Holiday Inn
Jones Road
Falmouth, MA 02540
Wednesday, May 3, 2000
7:30 p.m.

PANEL:

Sue Estes, Moderator
Thomas DeVanney
Sharon Mitchell

MARY E. PHILLIPS
Registered Professional Reporter
P.O. Box 160
Sagamore Beach, Massachusetts 02562
508.888.6717

COMMENT NUMBER

P R O C E E D I N G S

THE HEARING MODERATOR: Let's go ahead and get started. Good evening ladies and gentlemen. Thank you for coming tonight. This is a public hearing on the Upgraded Early Warning Radar or UEWR Supplement to the Draft Environment Impact Statement or EIS for the deployment of the National Missile Defense or NMD system. I am Sue Estes. And I will be your meeting moderator tonight.

This hearing is being held in accordance with provisions of the National Environmental Policy Act and implementing regulations. This Act requires Federal agencies to consider the potential environmental impacts of their activities in their decision-making processes and ensures that environmental information is available to public officials and citizens before decisions are made and actions are taken.

The purpose of tonight's meeting is to receive your comments on the information and analysis in this Supplement.

Let's begin tonight by looking at the agenda. Hopefully everyone here has had an opportunity to talk to the technical experts and program representatives who were staffing the

pst001

Exhibit 9.2.3-1: Reproductions of Transcript Documents

COMMENT NUMBER

exhibits during the past hour.

After I finish the introduction, Mr. Tom DeVanney of the Ballistic Missile Defense Organization will present an overview of the NMD program and describe the proposed action contained in the Supplement.

Then missile Sharon Mitchell, an Environmental Engineer from the U.S. Army Space and Missile Defense Command, will describe the environmental impact analysis process and summarize the results reported in the Supplement.

The last item on the agenda is the most important. You will have an opportunity to provide information and comments on the record.

This will enable decision-makers to benefit from any insights you are able to provide concerning the proposed radar upgrades and environmental analysis provided in the Supplement.

Keep in mind that the Supplement is intended to ensure that decision-makers will be fully informed about the environmental impacts associated with the radar upgrades before deciding on a course of action.

Many of you have been involved with other environmental issues or forums to address your

COMMENT NUMBER

concerns relating to continuing operations of the PAVE PAWS at Cape Cod which is part of the Early Warning Radar system.

The purpose of this hearing is to give you an opportunity to help make sure that the decision-makers are fully aware of any environmental concerns that may be associated with the NMD deployment as they relate to the proposed radar upgrades.

As many of you are also aware The Air Force has begun a separate EIS to analyze current PAVE PAWS operations. This is being done to address community concerns over maintenance and sustainment of its Early Warning Radars including the PAVE PAW radars here at Cape Cod.

Our purpose here tonight is to accept your comments concerning the proposed radar upgrades for use with the NMD system.

To speak tonight, please fill out a verbal comment card available at the registration table and turn it in to us. After the presentation, we will take a short break to collect the remaining cards. Then I will start calling on speakers in the following order:

First, I will recognize elected officials.

pst003

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

Then I will call members of the public in the order in which the cards were handed in. If you do not wish to provide comments tonight, you have until May 12th of this year to submit your written comments for consideration in the final EIS.

The address shown on the slide is also in the hand out and on the comment sheets you received as you entered the hall.

Keep in mind that written comments are given the same consideration as the verbal comments offered here tonight. I want to make sure that everyone who wishes to speak has a fair chance to be heard.

We have a stenographer here who will be making a verbatim record of everything that is said tonight. And the verbatim record will become a part of the final EIS.

Now it is my pleasure to introduce Mr. Tom DeVanney who will describe the NMD program.

MR. DeVANNEY: Thank you, Sue. It's my pleasure to be here tonight. My name is Tom DeVanney. And I am the Deputy Program Manager, Program Executive Officer for the National Missile Defense Program. (Coughing) Pardon me. National Missile Defense Program is part of the Ballistic

COMMENT NUMBER

Missile Defense Organization. The Ballistic Missile Defense Organization or BMDO is the agency responsible for developing and deploying when directed the National Missile Defense system.

In my presentation, I will review the threat that is driving the development of the NMD system, provide an overview of the program and how it works and address the decision to be made.

However, before doing so I want to try to clear up any confusion that may exist regarding the relationship of the NMD program and the ongoing Air Force Early Warning Radar tracking mission.

As you are all aware, the Air Force has begun holding meetings in the Cape Cod area to address community concerns relating to the safety of operating the PAVE PAWS radar.

As I understand those concerns, they relate primarily to the belief that long-term exposure to low level radiation from the radar may be contributing to a higher than normal cancer incidence in Cape Cod.

In addition, the Air Force has committed to prepare an Environmental Impact Statement to support its planning and decision to process relating maintenance and sustainment of its Early Warning

pst005

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

Radar at the Beale Air Force Base, California; Clear Air Force Station, Alaska and Cape Cod Air Force Station here in Massachusetts.

Parallel to the Air Force public involvement and EIS processes to support its early warning mission, the NMD Program Office is engaged in planning the support, the proposed deployment of a National Missile Defense system.

As part of that planning process, we are preparing an EIS to support a National Missile Defense deployment decision that could come as early as this summer.

Our national leadership will consider five factors in making that decision. Those factors include threat, technological readiness and operational effectiveness, cost and implications for the overall strategic environment, arms control objectives and environmental issues.

The NMD Deployment EIS evaluates the potential environmental impacts of deploying an NMD system with major elements at a number of alternative sites.

One element of the proposed NMD deployment architecture would be upgraded Early Warning Radars on the East and West coasts and in Alaska. The

COMMENT NUMBER

proposed upgrades would involve replacing some of the electronic hardware and computer software to support a National Missile Defense system.

The National Missile Defense Program has prepared a supplemental to its draft deployment EIS to evaluate the potential effects of upgrading the Early Warning Radars and operating the radars in a National Missile Defense mode for limited periods of time each year.

Information needed to document the potential environmental effect of Early Warning Radar modifications was not available for incorporation in the original NMD Draft EIS. The Supplement was prepared to address public concerns that were raised following preparation of the draft deployment EIS.

The purpose of the hearing tonight is to present the findings in the Supplement and to obtain your comments and input concerning those findings and to assist in our decision process.

Our national leadership must make some difficult decisions concerning whether and how to deploy a National Missile Defense system. I want to emphasize that no decision has been made at this time concerning deployment, including the upgrades to the PAVE PAWS radars.

pst007

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

The National Missile Defense system is being developed to protect the United States from ballistic missile attacks. The emerging threats as depicted on this chart are driving a Congressional desire for a viable NMD system to be prepared for deployment as soon as technologically feasible.

The current program guidance is to develop, demonstrate and deploy when directed a system to defend the United States against a limited strategic ballistic missile threat by a rogue nation.

Last summer, President Clinton signed into law The National Missile Defense Act of 1999. To reflect the Government's intent to deploy an NMD system as soon as technologically feasible.

I'd like to review the list of NMD system elements. The NMD would consist of the elements shown on this slide. Those elements are the Ground-Based Interceptor, which is the weapon of the system. It carries a non-nuclear, non-explosive vehicle, which is intended to destroy the incoming ballistic missile by force of impact.

The Battle Management Command and Control System is the central communication and control point and the brains of the system.

The In-Flight Interceptor Communication

COMMENT NUMBER

System or IFICS transmits commands to the Ground-Based Interceptor while in flight.

The X-Band Radar assists in tracking incoming missiles. Existing early warning satellites will be used in the NMD system.

And finally, the upgraded Early Warning Radars which are phased-array surveillance radars used to detect and track ballistic missiles targeted at United States. The software upgrades to these existing Early Warning Radars would provide the capability to support NMD surveillance requirements.

In a simplified form, this is how the system works. When a ballistic missile is launched from a rogue nation, the satellites in space detect the launch and provide information to the ground.

On the ground the existing Early Warning Radars detect and track the incoming ballistic missiles and provide specific locations to the Battle Management Command and Control. The Battle Management Command and Control would pass the information to the X-Band Radar for more precise tracking.

This information gives the people controlling the system the ability to launch the Ground-Based Interceptor to destroy by force of

pst009

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

impact incoming ballistic missile in outerspace.

A little more detail on the upgraded Early Warning Radar.

The NMD system would make use of these existing Early Warning Radars to assist in the detection of the incoming missiles.

These Early Warning Radars are proposed to be upgraded by making software and hardware modifications. I will elaborate on those modifications later in my presentation.

This map shows the locations that are under consideration for the National Missile Defense system elements. As you can see, the NMD program is proposing to locate Ground-Based Interceptors and an X-Band Radar in Alaska, and/or in North Dakota.

The locations of the Early Warning Radar sites where the proposed upgrades would occur are Beale Air Force Base in California, Cape Cod Air Force Station in Massachusetts, and Clear Air Force Station in Alaska.

Early Warning Radars must be located on both the East and West coasts and in Alaska in order to provide the coverage necessary to protect the entire United States.

This slide shows more specifically Cape Cod

COMMENT NUMBER

Air Force station here in Massachusetts. And you can see the location of the Early Warning Radar.

For the Supplement, two alternatives were considered. The No-action Alternative and the Proposed Action.

For the No-action Alternative, there would be no hardware and software modifications to the Early Warning Radars for the National Missile Defense Program.

For the Early Warning Radar sites being considered for NMD, the No-action Alternative would be a continuation of the missile early warning and space tracking currently occurring at those locations.

Under the proposed alternative the electronic hardware and computer software would be replaced in existing Early Warning Radars to enhance acquisition and tracking in support of the NMD mission.

The hardware modifications would consist of replacing existing computers, graphic displays, communication equipment and other electronic equipment.

The Early Warning Radar software would be rewritten to allow the acquisition tracking and

pst011

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

classification of small objects near the horizon.

The Upgraded Early Warning Radars would be able to search for different types of missiles, distinguish hostile objects; such as, warheads from other objects and provide this data to other NMD elements using improved communications.

The radiated peak and average power, radar antenna patterns, on operating bands of the Early Warning Radars would remain unchanged from current operations.

The software modifications would result in a very slight increase in the time the radar would listen for return signals of about 1.5 milli-seconds with a corresponding small decrease in the time the radar would transmit the beam.

Once upgraded, the Early Warning Radar operations would continue with the addition of conducting NMD missions and training exercises.

Training for NMD program is expected to represent less than one percent of the total Early Warning Radar usage, approximately several hours per year.

At all other times the Radars would continue to perform the Early Warning missions. And in either case radar outputs would be unchanged from

COMMENT NUMBER

current levels.

At this time I would like to introduce Ms. Sharon Mitchell who will discuss the environmental impact analysis process and the potential environmental impacts that could occur with the Proposed Action.

Thank you for your attention.

MS. MITCHELL: Thank you, Mr. DeVanney. My name is Sharon Mitchell. I'm with the U.S. Army Space and Missile Defense Command. Our organization is preparing the Environmental Impact Statement on behalf --

UNIDENTIFIED PERSON: Put the mike a little closer.

MS. MITCHELL: I'm too short. Tonight I will present the schedule for this process and show how you the public are involved. I will also discuss the scope of the study and present the results of our analysis.

The National Environmental Policy Act or NEPA requires that Federal agencies consider the environmental consequences of the Proposed Action in the decision-making process.

We have prepared a Draft Environmental Impact Statement or EIS to analyze the potential

pst013

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

environmental consequences of deploying an NMD system.

NEPA also requires a public input be considered in the decision-making process.

The NMD Deployment Draft EIS made available to the public on October 1, 1999 for public and agency review and comment.

A Supplement to the NMD Deployment Draft EIS was prepared to support the environmental analysis of the NMD system.

The Supplement was released on March 3, 2000. The public hearing this evening is a formal meeting where we present the results contained in the Supplement and most importantly to receive your comments on the document.

Before proceeding further in explaining the results contained in the Supplement, let me expand somewhat on what was previously said concerning the distinction between the Deployment Draft EIS and Supplement and the Air Force EIS.

Information needed to document potential environmental effects of the Early Warning Radar modification was not available for inclusion into the NMD draft EIS.

Based on concerns expressed by members of

COMMENT NUMBER

the public here at Cape Cod we felt that the National Missile Defense decision-makers should be aware of any potential environmental effects of upgrading the existing Early Warning Radars.

Consequently, the decision was made to prepare a Supplement to the Draft EIS to evaluate these potential effects.

In preparing the Supplement, the Program Office commissioned a review of current scientific literature concerning the effects of electromagnetic radiation and validated existing data concerning the operation of the Early Warning Radars.

Then the program calculated the power densities that would result from the proposed radar upgrades.

I will present the results of the analysis later in my presentation. Our Draft Supplement was nearing completion prior to a decision by the Air Force to conduct a comprehensive EIS to evaluate maintenance and sustainment of the Early Warning Radars.

Our Supplement was completed and released for public review and comment on March 3, 2000.

This chart shows the respective timelines of the NMD Deployment EIS and Supplement and the Air

pst015

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

Force EIS.

In addition to tonight's hearing, written comments on the Supplement will continue to be accepted at the address shown on the slide until May 12, 2000. Equal consideration will be given to all comments, whether they are presented here tonight or mailed to us.

Once the public --

UNIDENTIFIED PERSON: Just leave that for a second so we can get the e-mail address, because it's not written on these.

MS. MITCHELL: It should be on the brochure.

MR. SCHLESINGER: What's the brochure?

MS. MITCHELL: There was a brochure at the registration desk.

UNIDENTIFIED PERSON: Like this?

MS. MITCHELL: Yes, sir, inside.

Once the public review process is complete, we will incorporate the Supplement into the final EIS, scheduled for release in July of this year.

MR. SCHLESINGER: It's not on mine.

MS. WALKER: (Indicating.) Right above my thumb.

UNIDENTIFIED PERSON: (Indicating.) Oh.

COMMENT NUMBER

THE HEARING MODERATOR: Excuse me, could you let her finish her presentation. And we will get you the e-mail address.

MS. MITCHELL: We will mail the Final EIS to all of those on the original distribution list for the Draft EIS and Supplement.

If you are not already on our mailing list, you can request a copy by mailing to the address given in the hand-out or by filling out a card at the registration desk.

You may also request the document at the e-mail address provided in the hand-out. The Final EIS will include all comments received during the public review period and our response to those comments.

If appropriate, we will group comments into categories and respond accordingly. All comments received will be printed in their entirety in the Final EIS.

Comments and findings of the EIS will be considered by the decision-maker in determining whether and how to deploy the NMD system.

For the Draft EIS and Supplement the environment was analyzed in 15 resource areas as shown on the slide.

pst017

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

It was determined that upgrades to the Early Warning Radars would have potential effects on two of these resource areas.

For those of you who have not had the opportunity to review the draft EIS, you may want to read the summary of major findings in the hand-out available at the registration table.

Chapter 4 of the Supplement describes potential environmental impacts that may occur to the affected environment as a result of implementing the proposed radar upgrades. The effects of upgrading the radars are compared to the existing conditions at each location.

The environmental areas we identified as a potential for impacts were cultural resources and health and safety.

The PAVE PAWS Radar at Cape Cod Air Force Station became operational in 1979 and is considered part of the cold war military mission and as such is eligible for the National Register of Historic Places. Historic American Building Survey and Historic Engineering Report documentation have been provided to the Massachusetts State Historic Preservation Officer.

Such documentation is generally considered

COMMENT NUMBER

appropriate mitigation for alterations to historic facilities such as the PAVE PAWS Radar.

In evaluating impacts on health and safety, the exposure potential to radio frequency emissions from the Upgraded Early Warning Radar was analyzed. This analysis used worst case assumptions about the operation of the radar to determine the maximum exposure potential.

The results of the analysis have shown that exposure levels outside the installation boundary of the site would be well below established public exposure guidelines.

This slide provides the results of calculations to determine the maximum exposure potential from the proposed modifications.

The map locates the sites that are found in the table. The table provides the calculated 30-minute average power density for the proposed modifications. These calculated values at Cape Cod are at least 40 times lower than the National and Massachusetts safety standards. Copies of this information are provided at the registration table.

This slide shows the level of public exposure versus the American National Standards Institute or Institute of Electrical and Electronics

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

Engineers, otherwise known as the ANSI/IEEE standards.

The ANSI/IEEE standard is the recommended exposure limit to ensure public safety.

The Commonwealth of Massachusetts also uses the same standards. The exposure limits proposed by the standard are 50 times lower than the estimated radio frequency exposure intensity associated with reversible effects on animals and humans associated with heating.

Based on calculations conducted in 1999, exposure to the general public would be well below exposure limits recommended by ANSI/IEEE, the Commonwealth of Massachusetts, and other organizations.

Average radio frequency power density values in the area surrounding Cape Cod PAVE PAWS Radar will be at least 40 times lower than the standard. For most areas around the Radar, the levels are lower by a factor of 100 or more.

Several studies have been published subsequent to the ANSI/IEEE 1992 Standard.

Overall, the results of laboratory studies routinely used to assess the effects on human health do not suggest adverse effects from long-term

COMMENT NUMBER

exposures at low levels.

Reviews of recent scientific literature by other international organizations have reached the same conclusion.

The upgrade would not change the radio frequency exposure levels in the surrounding human environment from existing levels, nor would it involve changes to the physical facilities or increase the power output of the Radar.

In closing, please keep in mind our goal is to provide the decision-makers with accurate information on the environmental consequences of this proposal.

To do this we are here to accept your comments on the Supplement. This information will support informed decision-making.

I will now turn the meeting back over to Sue Estes.

THE HEARING MODERATOR: We're going to take about a five-minute recess to move the equipment around a little bit. And then we're going to start the public comment period.

If you would like to make a public comment and have not signed up, please go to the registration table and fill out a card for us. Thank you.

pst021

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

MR. DeVANNEY: Let me make one comment. Sir, did you get the e-mail address.

UNIDENTIFIED SPEAKER: (Nods head affirmatively.)

(Short break was taken.)

THE HEARING MODERATOR: If everyone will take their seats we'll get started with the next portion of the meeting, which is the comment portion.

Before we start, I would like to establish the ground rules. Your comments must be limited to four minutes so that everyone will have an equal opportunity to comment.

Also please state your name clearly for the stenographer before you make a statement for the record.

Please remember that no decision is being made tonight. The main purpose for the Government representatives being here tonight is to learn of your concerns and suggestions firsthand.

We will now begin the comment period. To indicate when your four minutes are up, I have a simple way of indicating times. When you have one minute left, I will put up my index finger allowing you to find a comfortable to place to wrap up your

COMMENT NUMBER

comments.

After four minutes, I will raise my hand indicating it is time for me to call the next speaker.

Our first speaker will be Richard Judge.

MR. JUDGE: Can I defer my comments? Can I defer my comments? I'd like to go later on in the evening. Can you put me at the end of the list please?

THE HEARING MODERATOR: Okay.

MR. JUDGE: Thank you. PS-T-001

PS-T001

THE HEARING MODERATOR: The next one is Joshua Mant. He's from Senator Murray's office.

MR. MANT: My name again is Joshua Mant and I represent Senator Murray down here on the Cape.

The Senator apologizes for not being here but she would have like to have this letter read for the record.

Dear General Franklin, I write to you today to request that the public hearing for the Ballistic Missile Defense Organization Supplement to the Draft Environmental Impact Statement on May 3rd either be rescheduled to May 24 or changed into a public information meeting.

1

It is my opinion that in the long run,

pst023

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

everyone involved would benefit from better notification of this final public hearing and all future public meetings.

The citizens of Cape Cod have lived with the PAVE PAWS facility for over 20 years and deserve to be properly notified and fully involved as required by the EIS process.

The upper Cape community has lung cancer rates close to 40 percent higher than the rest of the state. And there is a legitimate concern within the community over the PAVE PAWS facility's impact on the health and safety of our local residents.

The lack of public notification and consequent public involvement has tarnished the BMDO's EIS process up until this point and an informational meeting would go a long way towards clarifying the community's concerns.

Thank you in advance for your consideration of this important request. Sincerely, Therese Murray. Thank you.

THE HEARING MODERATOR: Thank you.

Next will be Representative Ruth -- I can't read your writing.

REPRESENTATIVE PROVOST: Provost.

THE HEARING MODERATOR: Provost. That's

COMMENT NUMBER

PS-T-002

what I thought it was but I wasn't sure. PS-T-002

REPRESENTATIVE PROVOST: Thank you. It's State Representative Ruth Provost. I am the State Representative for both the towns of Sandwich and Bourne who are most nearly affected. And I myself live in the town of Sandwich.

I just would want, first of all, reiterate what Senator Murray's aid had to say. I, too, have been in touch with General Franklin's office requesting a change of the date, this be a public hearing or an informational -- I mean, an informational session, and have the public hearing with at least 30 days' notice.

Frankly, I find it outrageous, absolutely outrageous. And I don't know how it's done around the rest of the country, but here on the Cape we have come to expect a higher level of communication, notification to the public.

The ad that I saw was dated April 26th for a meeting on May 3rd. The one I saw on April 13th was advertising a meeting on the 27th, which had been changed, and I do appreciate the consideration for DPH in particular for the reason for changing that meeting from the 27th.

However, we are used to a little bit more

COMMENT NUMBER

PS-T-002

1

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

notification when a public hearing, which is being read into the official record, takes place down here.

And I asked actually that the meeting be moved. Instead of here in Falmouth, which is a lovely community, but frankly, the citizens in Bourne and Sandwich are most nearly affected by this installation. And this hearing absolutely should have taken place in Bourne and Sandwich.

And I would further ask, since this is going ahead against the wishes of many here in the community including Senator Murray and myself, that another hearing be scheduled, a public hearing be scheduled in the Town of Bourne or Sandwich.

I apologize because I left my folder on this at work, I mean, at home. I have been in session all day. And I don't have all my notes here on the Supplemental to the Draft Environmental Impact Statement on the National Missile Defense Deployment, but would I like to make this comment, because I found it to be significantly worth commenting on the way the Massachusetts Department of Public Health Study was used in this Draft Environmental -- the Supplement to the Draft of the Environmental Impact Statement.

COMMENT NUMBER

2

Specifically, included in the Draft, the Supplement is a reference on Page 412 to the Mass. Department of Public Health Study, the Assessment of Public Health Concerns Associated With PAVE PAWS Radar Installation.

And it says that, In the face of scientific uncertainty, it is prudent to limit PAVE PAWS exposure according to -- that's not it. Hold on. Too many pieces of paper, my apologies.

We conclude that there is no definitive -- (indicating). Sorry about this. I just downloaded it.

The Draft Environmental Impact Statement says that, We conclude that there is no definitive scientific evidence to claim that anticipated low RF levels of PAVE PAWS cause any harmful effects to the public.

But what it doesn't say and conveniently doesn't say was that the studies from the Mass. Department of Public Health said that there is suggestive scientific evidence that RFR produces bio effects at much lower intensities than previously known.

The scientific evidence cannot answer the question conclusively whether PAVE PAWS Radar will or

pst027

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

will not cause harmful effects to the humans in the community.

And I think -- I think that the way that the DPH Study was used in this, particularly since this is being rolled over into the Draft Environmental Impact Statement for the improvements proposed by the PAVE PAWS facility itself, it creates an unfair bias and unconclusive bias, and it certainly is not what this Mass. Department of Public Health Study concluded.

I am going to be submitting written comments as well on a number of areas. But I think this is the most egregious problem for me as a Representative of the Commonwealth of Massachusetts is the misuse of the DPH Study. Thank you.

(Clapping.)

THE HEARING MODERATOR: Mr. Judge, would you like to go now or do you want to be the last one.

MR. JUDGE: I'll be last. Thank you.

THE HEARING MODERATOR: Next we have up Ms. Sue Walker. PS-T-003

MS. WALKER: My name is Susan Walker. I'm the President of Action For Nuclear Disarmament Cape Cod.

I agree with Senator Murray and

COMMENT NUMBER

PS-T-003

1

Representative Provost that the notification for this meeting was poor to confusing. In the large ad with big headline PAVE PAWS, there wasn't even an address for the Holiday Inn and this Inn has changed names several times. It was confusing for people.

I would like tonight to be a public hearing and for there to be a public meeting and for the future to be a public hearing.

The No-action Alternative for this Supplement has received inadequate analysis.

On Page E5-3 the Supplement states, quote, "The No-action Alternative has been previously analyzed in National Environmental Policy Act documentation for each EWR."

That documentation is over 20 years old and not readily available to the public. This is not a user-friendly attitude and calls into question the integrity and sincerity of the entire present analysis.

Under 2.3, Alternatives considered, but not carried forward, there is a flawed assumption that Cape Cod PAVE PAWS will continue in operation.

The Cape Cod site was to be operational for 10 to 20 years. It has now gone beyond that point and it should cease to exist. Citizens have

COMMENT NUMBER

2

3

pst029

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

31

repeatedly called for accurate measurements, not time averaged. We have called for Federal health studies. All of this was ignored and now PAVE PAWS should be shut down.

The Supplement is flawed because it does not consider the environmental benefit of dismantling PAVE PAWS. The land would be free of the threat of underground fuel vaults and could become a positive addition to the proposed 15,000 acre wildlife refuge. This alternative needs to be considered by the public and added to the Supplement. **4**

3.2.3, The Cape Cod Health and Safety data is totally unacceptable. This data is from 1978 and 1979 and gives time average power density. This is meaningless data from a system that limits pulse -- excuse me -- emits pulse radio frequency. **5**

Even the Air Force now realizes that the data they have collected is inadequate and is making plans for improving that kind of data.

We do not accept what they state in the document quote "current estimates of radio frequency power density". I object to the word estimates. Estimates are an insult. We need new data of pulse radiation. The type of information that the Air Force is considering gathering.

MARY E. PHILLIPS, RPR

COMMENT NUMBER

32

Therefore this should not go forward until we have that data, and we can analyze it.

You have a section where you have contacted organizations. There is a very important organization you did not contact. It's Barnstable County's land use agency called The Cape Cod Commission. **6**

The entire EIS is based on the mission of the National Missile Defense, which is the identification and precise tracking of a ballistic missile. The NMD should be -- will be an abrogation of the Anti-Ballistic Missile Treaty. This Treaty has been a cornerstone of our security for over 25 years. We should not weaken this Treaty as that would make us less safe. **7**

We need our enemies and ourselves to both feel more secure. If our enemies feel less secure they will build more offensive weapons to overpower our NMD system.

We need nuclear disarmament, not a new arms race touched off by doing away with a pivotal ABM Treaty.

I support the No-action Alternative but would especially like to see no PAVE PAWS. It would be fine to make it into a museum for the cold war

MARY E. PHILLIPS, RPR

pst031

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

military mission.

(Clapping.)

THE HEARING MODERATOR: Charles Kleekary (sic). PS-T-004

MR. KLEEKAMP: Yes, my name is Charles Kleekamp, K-l-e-e-k-a-m-p. I have a few comments to make on the Draft EIS that's submitted dated January 2000.

The first comment is -- and these have to do with primarily technical comments -- on table 11 you talk about the peak power being 582 kilowatts. Your information is correct but incomplete. There are two faces on the PAVE PAWS Radar, a north face and a south face. They each transmit a peak power of 582 kilowatts so the total peak power is over one megawatt.

I'd like to further comment on your figure 1.3, which shows the extent of the beam width. Again, the figure is correct in showing the elevation is three degrees and technically correct in saying that the bottom of the beam is at 1.9 degrees. But what you don't say for the ordinary people is this figure of 1.9 degrees is based on the half power points of the beam. I would appreciate you correcting this figure by showing the beam width to

COMMENT NUMBER
PS-T-004
1
2

the first null, which is 5.2 degrees and leaves the radiation in the first -- in the main beam .4 degrees above the horizon, not 1.9 degrees above the horizon.

Furthermore, there is no discussion in this document of the total power that we just discussed that is concerned or concentrated in the main beam. In the Air Force's 1979 EIS it described the fact that there was 60 percent of the radiated power in the main beam. I'm referring to the Air Force's Final Environmental Impact Statement dated May, 1979 table A-1, Page A-3 and text on Page A-2.

Some of your -- one of your technical consultants tonight, I won't name the person, had said that this figure of 60 percent incidentally is not correct. It should be more like 90 percent.

And so if the information in the 1979 EIS is incorrect, I would suggest that a total EIS be done, which has correct technical facts and figures.

My last comment has to do with the maximum permissible exposure, which you now correctly list as .28 milliwatts per square centimeter.

What you don't mention in the original 1979 report by The National Research Council titled Radiation Intensity of the PAVE PAWS Radar System,

COMMENT NUMBER
3
4

pst033

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

Page 6 titled by a Ghandi, et al., says that the maximum permissible exposure was 10 milliwatts per square centimeter, and that the radiation levels were far below -- this is verbatim -- were far below the level of 10 milliwatts per square centimeter that is the currently accepted U.S. occupational safety level for human exposure. Again, I'm referring to that statement from a 1979 document.

And it turns out now you are saying that the maximum permissible exposure is some 30 times less at .28 microwatts per square centimeter.

Although probably impossible, I would like you to include in the report a prediction for what this heating standard would be 20 years from now.

And last of all, I would only say that this radiation is based on the heating effects and not based --

THE HEARING MODERATOR: Sir, we need to wrap it up.

MR. KLEEKAMP: -- on the radiation. And I would like to say that we're not a hot dog in the oven that there's more to radiation than the heating effects. Thank you.

(Clapping.)

THE HEARING MODERATOR: Next, we have Ms.

Sharon Judge.

MS. JUDGE: I'd like to defer to Peter Schlesinger because he's got to get going with his kids. Is that okay? And I'll go after him. PS-T-005

MR. SCHLESINGER: I'm Peter Schlesinger from Sandwich. I'll speak really quickly so I can get it in.

First, I want to speak to the issue of the threat. I was a Peace Corps volunteer in northwest Africa not too long ago. And it's there I served my country. And the countries of that region to which PAVE PAWS looks have no capacity to deliver a threat that PAVE PAWS is supposedly looking for.

So I see no reason to invest our hard earned currency in developing a device that's looking for something that's not going to come. I really don't see any analysis of that in any of the documents.

I don't also see any analysis of -- or at least any an adequate analysis of potential locations for PAVE PAWS sites. Now, a chart was or view graph was shown this evening and there was another one in the poster session outside here showing potential locations for the EWR locations. And it implies that these are the only locations where this might be

COMMENT NUMBER

PS-T-005

1

2

pst035

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

placed in the United States.

Well, there's no analysis of this in any of the documents that shows -- giving some thresholds why these are the only potential locations for this facility.

I suggest that this facility could be moved and an adequate plan ought to be done or excuse me a survey ought to be done to find where those locations are, locations not near people that could adequately serve the mission should it necessarily have to occur.

Also another issue on your slides this evening, you showed that the material has to be in by May 12th, yet the paperwork in the brochures says it has to be postmarked by May 5th. So it's confusing to us. Good thing this isn't televised, because everybody would put their stuff in by May 12th and then they'd be late.

So I hope that for those of the press that are here they note the discrepancy and secure an adequate answer so that we report the right information in our local newspapers.

I find that this document is woefully inadequate. I applaud the previous speakers. And I really think that we should be asking for a lot more

3

4

COMMENT NUMBER

information.

I really am concerned that the IEEE standard to which we use -- which we use for assessing the threat of radar to our human health may be inadequate.

There is a body of literature which exists that suggests this.

And I also really feel that there's not adequate attention to our local situation. This is a bunch of, pardon me, mumbojumbo about radar in general with suppositions and perhapses but doesn't adequately look at our local situation and the effects of chronic exposure to this particular device, PAVE PAWS, which happens to be about a mile or so from my house.

I really would hope that your supervisors, your commanders would look for other locations for this device. And if you can't find one, shut it down. Thanks. PS-T-006

PS-T-006

1

THE HEARING MODERATOR: Mrs. Judge.

MS. JUDGE: Good evening. Four minutes is not enough time to address all the relevant issues; therefore, I will be submitting formal written comments and appropriate attachments for the public record.

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

I have to say that I am appalled by BMDO's poor public involvement program regarding the EIS process for the proposed NMD program.

Given the high level of controversy and unanswered questions surrounding the 21-year-old facility on Cape Cod, it is unconscionable that as it stands, tonight's meeting is the first and last public meeting that will have been held on Cape Cod regarding a project that is now estimated at over $60 billion.

BMDO has known of their intention to use the PAVE PAWS facility at least as far back as 1994 and has been well aware of the challenges with the PAVE PAWS here on the Cape for some time now.

BMDO has intentionally subverted the public involvement process here on Cape Cod in their EIS process. High level officials, including Generals from BMDO and Air Force Space Command had time to fly into MMR last month for private meetings. And there was time for an all day press tour last week, yet there has been no time for these individuals to hold public informational meetings here on Cape Cod.

It is disturbing that BMDO withheld information in a press release sent out to elected officials and the media in mid April announcing a

COMMENT NUMBER

date of April 27th for this public hearing, withheld the location and time for the public hearing in this press release, yet the day after the release went out, a paid advertisement appeared in the Lifestyle and Art section of the paper with the location and time.

BMDO has asked to postpone this public hearing due to inadequate public notification and scheduling conflicts. They were asked to reschedule the meeting in late May to allow for proper public notification, instead rescheduled the hearing for tonight just six days later.

Not only did this date not allow for proper public notification, obviously, but it's caused great confusion and inconvenience for the public as it's just five days before the public scoping meeting for the Air Force's EIS.

I agree with the previous speakers that this should be a public information meeting. And another public hearing should be scheduled with proper 30 days advanced effective public notification. And the public comment period should be extended accordingly.

I would like to know what regulations BMDO is following for implementing NEPA procedures.

pst039

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

It is also very disturbing to me that Lieutenant Colonel Rick Lerner and Captain Barbara Sacra of BMDO intentionally misled the public and elected officials as to what was going to happen on Cape Cod regarding the NMD EIS and Supplement.

When Lieutenant Colonel Lerner of BMDO announced their proposed upgrades to PAVE PAWS at an invitation only meeting on MMR last September, he said that scoping would begin in November for addendum and public hearings would be held in February.

Captain Sacra, formerly of BMDO, now with Air Force Space Command in a November '99 media article discouraged the public from commenting on the NMD Draft EIS despite the fact that it contained program specific information on PAVE PAWS.

Captain Sacra said the EIS for PAVE PAWS on Cape Cod had not been written yet and BMDO officials would hold public meetings on Cape Cod after it was completed to answer questions from the public.

She said there would be also plenty of updates on the process of the meetings, et cetera.

In reality, public scoping meetings were never held on Cape Cod. And there's never been any public information meetings or updates here.

COMMENT NUMBER

Critical documentation regarding the NMD program and IES were not circulated to the appropriate individuals and agencies.

Many of the questions I and others have asked BMDO and Air Force officials over the last two years have gone unanswered.

I had to travel to Washington, DC, at my own expense for the opportunity to attend a public hearing on the Draft EIS for the NMD Program.

The public and elected officials on Cape Cod are sufficiently confused as to the two EIS processes going on for the same PAVE PAWS facility. It's unheard of.

Nobody has ever heard of two EIS processes going on concurrently for the same facility. BMDO has intentionally put the cart before the horse in attempting to analyze the environmental impact of the proposed upgrades prior to the completion of the Air Force's EIS. I'll submit the rest in written form.

(Clapping.)

PS-T-007

THE HEARING MODERATOR: Thank you. Mr. David Williams.

MR. WILLIAMS: Good evening. Can you hear me? My name is Dave Williams. I am the Senior Environmental Analyst with the Department of Public

COMMENT NUMBER

2

PS-T-007

pst041

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

Health. My director Susan Condon has submitted a letter in writing. And I just wanted to make a few comments based on that letter.

As you are aware there is concerns among residents and scientists regarding health effects of non-ionizing radiation which have come to the forefront of public health discussion over the past 10 years.

The MDPH as well as other State and Federal agencies have been called upon to address these concerns based on the level of scientific understanding that currently exist. These concerns continue to grow at a tremendous rate.

The current MDH response to the public health concerns related to non-ionizing radio frequency radiation or RFR includes an assessment of available scientific data on the Cape Cod PAVE PAWS facility and recommendations for follow-up environmental monitoring through an independent expert panel review as well as the review of the Draft EIS.

Specifically of concern to MDPH is whether the actual exposure levels are accurately predicted by computer modeling.

The Draft EIS concluded that based

1

COMMENT NUMBER

primarily on computer modeling data, the radiated peak and average power in operating bands and radar outputs would be unchanged from current levels.

Therefore the predicted exposure values both in '79 and today fall below the Federal standards, and that the upgrade will thus not increase exposure of humans based on these exposure of modeling values.

Our expert panel, however, has recommended that better environmental data are needed to characterize opportunities for exposure and potential health impacts from the facility.

Specifically, the expert panel has stated the scientific evidence cannot answer the question conclusively whether the PAVE PAWS radar will or will not cause harmful effects to the humans in the community.

This is an important qualification. And we feel that again MDPH is supportive of the panel's overall conclusion for an independent characterization of the RFR exposure in the community and that this scientific process be performed.

Specifically, in conclusion based on the recommendation of our expert panel, we strongly recommend that the EIS include validation of the PAVE

pst043

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

PAWS mathematical exposure models by the use of exposure sampling methods prior to the decision of the deployment of the upgrade. Thank you for the opportunity to comment. PS-T-008

THE HEARING MODERATOR: Thank you. Mr. Gordy.

MR. GORDY: I'm Minos Gordy. I'm from the Patriots, represent Patriots, excuse me.

And I just have a few comments here, some things that may be a little history. In '97 we did have The Center for Disease Control give us a presentation on cancer on the Cape. Also Silent Spring was there. It was the Morse Pond School right down the road from here. And I think that the State kind of dropped the ball. The only real activity I've seen since as far as a study is concerned is Silent Spring.

I think it would be helpful if the Air Force would use its influence or let's say BMDO would use its influence for another presentation about cancer on the Cape.

We don't just have higher cancer rates here around PAVE PAWS. But we have higher cancer rates elsewhere. I am in the town of Barnstable. I live in Centerville. We've got high cancer rates there,

COMMENT NUMBER

PS-T-008

1

too.

As a matter of fact, one of the towns that has the lowest rates is Mashpee. And it's directly in the path of the radar. But let's say we do have a big difference in demographics there.

Another factor I think that really needs to be looked at is radon. We do have a lot of igneous rocks in our, let's say, in the soil here, as well as a basement that's down there is igneous. And I think some people have been trying to do a study on radon, but I haven't seen anything develop on that.

Now, as far as the radar is concerned, this is an EIS which is a step up from an EIR. And just because they're going to piggyback the missile defense on to the Air Force EIS, I don't see anything wrong with that, running the two together, because well, the one is going to only use a small portion of the capability of the Air Force's system.

As Ronald Reagan says, If not now, when? If not us, who? We have to defend our country, and we may have a very short timeframe in which to do it.

Some of our enemies, such as, Iraq or maybe some other nation could threaten us in some way and say that, If you don't allow us to take over

COMMENT NUMBER

2

3

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

	COMMENT NUMBER
47	
someplace else then we're going to send a missile.	
The Supplement should be the baseline for comments. I had a lot of difficulty in getting this Supplement. It went to another fellow. And he gave me a copy of it. And I put it in Adobe Acrobat and sent it around to our members without realizing that I could have gone to the BMDO site and gotten it in tact, but I didn't know how to do that.	4
If PAVE PAWS on their web page would put a link, you know, so that people if they knew, you know, if they go just to the MMR website they could get a link, you know, and tie things in, I think the communications could be improved where everybody could get a copy of this stuff.	
I really recommend using the web because it saves a lot of paper.	
Also, when we were going around in the exhibits here, one of the things that I suggested was that we need to make comparisons with things that we are familiar with. Microwave and an oven, you know, is one thing, but let's say you have Loran navigation and weather radar and things like that. And all of our comments should be related to clinical evidence rather than just, you know, cluster of cancer when we're examining this thing. Thank you.	5
MARY E. PHILLIPS, RPR	

	COMMENT NUMBER
48	
THE HEARING MODERATOR: Thank you. Mr. Richard Judge. PS-T-009	PS-T-009
MR. JUDGE: I'd like to say right off the bat thank you for holding this meeting. In my mind it's an informational meeting.	
In your mind this is a hearing. In my mind it doesn't qualify as a hearing because of the notification process, et cetera, et cetera. You've heard people make comments on that earlier.	1
I counted 19 citizens here. Now, there are probably 50 owe or so people here, I'm not exactly sure. But when the vast majority of the people that are here are either Air Force or even more so private contractors that work for the Air Force or BMDO and when I count three people from the BMDO, three here tonight out of all these people being represented, three are actually from the agency that we want to talk to.	
Now, Mr. DeVanney has been very good and been very outspoken. I spoke with him a little earlier. He said, We've done a good job. Well, I tell you, Mr. DeVanney, I disagree. I think the public disagrees with you. I think you can tell by the number of people that showed up here tonight, not that they weren't interested in coming here tonight,	
MARY E. PHILLIPS, RPR	

pst047

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

but God knows how many people never even knew this was happening.

You moved the meeting. You don't give a time or a date of the meeting -- I mean, you give a date, but you don't give the time or place. And then you switch the meeting and again you don't give a time or a place, but you give a date.

Well, does that qualify as public notification when you give a date but no time or place? Not in my book it doesn't. And therefore you got caught in a challenge with the Department of Public Health. Because they said, Well, you know, we've announced the meeting after you, but we've announced the meeting with a time and a place. You folks haven't.

Now potentially a $60 billion project, you'd think you'd be able to spend a few bucks and come down to Cape Cod and really tell people what's going on.

Now we have a situation where we have two EIS's, most people aren't even aware that there are two EIS's going on. And I heard comments, Well, you know, it's the same building, it's okay if they piggyback them.

Well, if they were going to piggyback them

COMMENT NUMBER

why wouldn't you piggyback these EIS's? Well, you're not. You're keeping them completely and totally separate. Why?

I'll give you -- I'm going to read just a couple quick notes here. You can guess the date of this. Earlier this week we received a report from the Air Force requesting last January ba, ba, ba, the PAVE PAWS Radar will not endanger residents of Cape Cod, even though this report does not unfortunately address the central issue in the PAVE PAWS controversy, the adequacy of our national safety standard for exposure of non-ionizing radiation.

We have forwarded copies to the Environmental Protection Agency, Bureau of Radiological Health, et cetera, et cetera. We are especially interested in learning whether these agencies believe that the Air Force has overlooked any aspect of current research which might lead us to the question of safety in the PAVE PAWS Radar Installation.

This was written by Representative Gerry Studds, Senator Edward Kennedy and Senator Brook 21 years ago. And 21 years ago you put up on a screen that the IEEE Standard, the national standard is fine. Well, it's gone down, as you've heard, by --

COMMENT NUMBER

2

pst049

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

by an unbelievable amount.

So in this last 30 seconds I'm just going to stand here and berate the BMDO for a poor, poor job in involving the people of Cape Cod in a process in which they are entitled to.

They are entitled to notification. They are entitled to proper identification of places and times. They are entitled to more than one public meeting, because that's all we're going to get on Cape Cod, is one public meeting in a place called Falmouth, which is not real close to PAVE PAWS.

So in closing, I would just like to say congratulations, this meeting is a failure. And it's a failure because BMDO failed in their duty to bring their program to the public. Thank you.

(Clapping.)

THE HEARING MODERATOR: Thank you. Is there anyone else who would like to make a comment tonight that has not signed up?

(No response.)

THE HEARING MODERATOR: At this time we have no more cards indicating someone wishes to speak.

Mr. DeVanney, closing remarks.

MR. DeVANNEY: This has been useful

3

COMMENT NUMBER

tonight, been valuable to us. We appreciate your comments. We'll take them into account. And we will address them. I appreciate all of you coming out.

I do have that one correction to make. The program had the wrong date in it. The correct date is 12 May for written comments. And we'd be happy to address any comments we get by 12 May. Thanks again.

THE HEARING MODERATOR: Ms. Mitchell.

MS. JUDGE: I just had a quick question. In the past it's always said postmarked by that date. Now this says received by that date. Can it be postmarked --

MS. MITCHELL: Yeah.

MR. DeVANNEY: Postmarked will be okay.

MS. WALKER: So May 5th is wrong. It should be May 12.

THE HEARING MODERATOR: It should be May 12. Thank you for your comments tonight and your courtesy during the evening. Good night.

(Whereupon the deposition concluded at 8:52 p.m.)

pst051

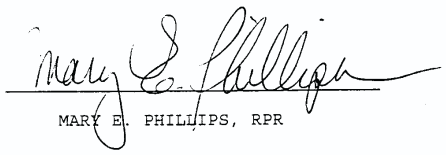
Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

COMMENT NUMBER

C E R T I F I C A T E

I, MARY E. PHILLIPS, Registered Professional Reporter, do hereby certify that the foregoing transcript, pages 2 through 53 inclusive, was taken by me stenographically and thereafter under my direction was reduced to typewriting and is a true record of the testimony of the proceedings to the best of my ability.

Dated at Bourne, Massachusetts, this 5th day of May, 2000.



MARY E. PHILLIPS, RPR

MARY E. PHILLIPS, RPR

pst053

COMMENT NUMBER

THIS PAGE INTENTIONALLY LEFT BLANK

COMMENT NUMBER

Exhibit 9.2.3-1: Reproductions of Transcript Documents (Continued)

Table 9.2.3-2: Responses to Transcript Comments

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
Joshua Mant – Senator Murray's Office	PS-T-001.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a, 3b, and 3c).
State Representative Ruth W. Provost	PS-T-002.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3b and 3c).
	PS-T-002.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4a, 4b, and 10).
Sue Walker – Action for Nuclear Disarmament Cape Cod	PS-T-003.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3b and 3c).
	PS-T-003.2			See response to written comment PS-W-014.
Charles Kleekamp	PS-T-004.1			The total peak power is a measure of the peak power in the direction of the transmit main beam. The operating parameters listed in table 1-1 of the UEWR analysis in appendix H apply to each face. Each array face scans sectors with azimuthal extents of +/- 60 degrees of the array boresights, such that the total azimuthal coverage is 240 degrees. Thus the radar's two transmit beams do not steer to the same locations.
	PS-T-004.2			The main beam of the antenna is described in terms of its half-power beam width as a means of illustrating that most of the transmitted energy is directed in this narrow beam and the rest of the energy is distributed over the half space in front of the array. From the half-power point to the first null, (1.1 to 2.6 degrees from the center of the main beam – 0 degrees) the intensity ratio of the antenna pattern rapidly decreases. For example, from 0 to 1.1 degrees, the intensity ratio of the antenna pattern decreases by a factor of 0.5, whereas from 1.1 to 2.6 degrees, if we assume a first null depth of 0.0001 from Figure A-4 of the 1979 EIS, the intensity ratio of the antenna pattern decreases by a factor of 0.0002.
	PS-T-004.3			The information in the 1979 EIS to which you are referring is not incorrect. There are two ways to measure the energy in the main beam and both are correct providing you understand the basis of measurement and what information they provide. The largest portion of the radiated radar power is concentrated in the main antenna lobe. The highest point in the main lobe (the peak of the main lobe) is steered in the desired direction in azimuth and elevation. The local power level in the main lobe decreases as the angle differs from the desired steering direction. The half power (3 dB) point in the main lobe is defined as that direction in which the local radiated power is half of that at the peak of the main lobe. Actually, the 3 dB locations form a cone whose center is the peak of the main lobe. The total power radiated within this cone is approximately 60% of the total radiated radio-frequency. The radiated power continues to decrease as the angle from the desired steering direction increases. At a point, defined as the first null radiated power attains a minimum value. The angular locations of the first null lie on a cone whose center is at the peak of the main lobe. About 90% of the total power radiated by the radar lies within this cone. The remaining 10% of total radiated power is found in the numerous side lobes that are located at angles further away from the main lobe than the location of the first null. From the perspective of the average person of what should be considered the main beam, the "null" measurement method would provide a more accurate picture. Typically engineers use the half power point for power calculations and that is why that method was used in the original EIS report.
	PS-T-004.4			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4a, 4b, 9a, and 9b).

Table 9.2.3-2: Responses to Transcript Comments (Continued)

Commentor and Affiliation	Comment Number	Resource Area	Section	RESPONSE
Peter Schlesinger	PS-T-005.1			Treaty and foreign policy considerations and timing of a decision to deploy an NMD system are political and policy issues that are not within the scope of this EIS or the NEPA process.
	PS-T-005.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 5).
	PS-T-005.3			This comment was clarified in the public hearing.
	PS-T-005.4			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4a, 5, and 9a).
Sharon Judge – Cape Cod Coalition to Decommission PAVE PAWS	PS-T-006.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a, 3b, 3c, 4, and 4b).
	PS-T-006.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 2).
David Williams	PS-T-007.1			See response to written comment PS-W-004.1 and to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3a, 4, and 10).
Minos Gordy	PS-T-008.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 3a).
	PS-T-008.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 4).
	PS-T-008.3			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, response 2).
	PS-T-008.4			A link to the BMDO website has been provided on the MMR website that should improve the accessibility of the Final NMD Deployment EIS.
	PS-T-008.5			Comment noted.
Richard Judge	PS-T-009.1			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 2, 3b and 3c).
	PS-T-009.2			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 4a, 4b, 9a, and 9b).
	PS-T-009.3			See response to written comment PS-W-010 (table 9.2.1.2, attachment A, responses 3b and 3c).

THIS PAGE INTENTIONALLY LEFT BLANK